Business Mathematics Statistics & Logical Reasoning

CA Foundation (New Course)

By
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Preface

While the paper setting pattern and assessment methodology have been revised many times over and newer criteria devised to help develop more aspirant-friendly entrance test, the need to standardize the selection process and their outcome at the national level has been felt.

While the methodology and scope of a CA Entrance Test (CA Foundation) are prone to change there are two basic objectives that any test need to serve:

1. The Objective to test an aspirant's caliber, aptitude and attitude for the CA field and Profession.
2. The need to test an aspirant's grasp and understanding of concept of the subject of study and their applicability at the grassroot level.

Students appearing for CA Foundation Examination cannot bank solely on conventional shortcut measures to crack the exam. Conventional techniques alone are not enough as most of the questions asked in the examination are based on the concept rather than on just formula. Hence, it is necessary for students appearing for CA Foundation examination to not only gain a thorough knowledge and understanding of the concept but also develop problem-solving skills to be able to relate their understanding of the subject to real-life application based on these concepts.

About the book

- **Reduction of unnecessary levels of details in Mathematics**
- **Chapters as per latest ICAI Syllabus has been updated**
- **Past Exam Questions**
- **Exceptionally strong emphasis on conceptual Clarity**
- **Clear text with relevant diagrams**
- **Flexibility that allows a student to study**
- **Consist of MIND MAPS for Quick Revision Purpose**
- **Quantity, Quality and range of Multiple-Choice Questions (MCQs)**

Aman Khedia

Dedicated To

My Mother
Seema Khedia

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Basic Mathematical Tools

Chapter **B**asics

Basic

Note: Questions Below Have Designed to Connect Students from Some Basic's this Is not Part of Syllabus as per ICAI but This Questions Will Help Students Later on in Various Chapters

1. Find the product

(i) (5 – 2x) (3 +x)

(ii) $(a^2 + b)(a + b^2)$

(iii) $(p^2 – q^2)(2p + q)$

(iv) $(x^2 - 5)(x + 5) + 25$

2. Find the multiplicative inverse of the following

(i) 2^{-4}

(ii) 10^{-5}

(iii) 7^{-2}

(iv) 5^{-3}

3. Simplify and write in exponential form

(i) $(-2)^{-3} \times (-2)^{-4}$

(ii) $p^3 \times p^{-10}$

(iii) $3^2 \times 3^{-5} \times 3^6$

4. Simplify the expressions and evaluate them as directed:

(i) x (x – 3) + 2 for x = 1 **(ii)** 3y (2y – 7) – 3 (y – 4) – 63 for y = -2

5. Simplify the following algebraic expressions:

a. $\frac{x}{3} + \frac{x}{2}$ **b.** $\frac{5}{t+1} + \frac{4}{t-3}$ **c.** $\frac{m}{7} - \frac{m}{5}$ **d.** $\frac{x}{2} - \frac{x}{3}$

e. $\frac{m}{3} + \frac{2m}{7}$ **f.** $\frac{3x}{5} + \frac{x}{2}$ **g.** $\frac{2}{x^2} + \frac{5}{x}$ **h.** $\frac{m^2}{6} - \frac{9}{4m}$

i. $\frac{5}{6x} - \frac{1}{3x}$ **j.** $\frac{2}{ab^2} - \frac{3}{b^3}$ **k.** $\frac{xy}{5} - \frac{1}{x}$ **l.** $\frac{x+4}{3} + \frac{x+1}{2}$

m. $\frac{2x+1}{2} + \frac{x+3}{5}$ **n.** $\frac{5x-2}{3} - \frac{2x+7}{4}$ ***o.*** $\frac{3}{x+1} + \frac{x+7}{(x+1)(x+2)}$

6. Simplify the following algebraic expressions:

(i) $\frac{m}{16} \div \frac{5m}{12}$

(ii) $\frac{3m}{8} \div \frac{15m}{20}$

(iii) $\frac{6x+3}{8} \div \frac{2x+1}{12}$

(iv) $\frac{9xy}{7} \div \frac{6x}{3}$

(v) $\frac{\frac{4x}{7}}{\frac{6xy}{5}}$

You Must Know

Square Root: $\sqrt{a} = a^{\frac{1}{2}}$

Cube Root: $\sqrt[3]{a} = a^{\frac{1}{3}}$

Nth Root: $\sqrt[n]{a} = a^{\frac{1}{n}}$

Ratio Proportion & Indices

Chapter **1**

EXERCISE

RATIO

Basic Level-1

1. The ratio of two quantities is 3: 4 If the antecedent is 15, the consequent is
(a) 16 **(b)** 60 **(c)** 22 **(d)** 20

2. The ratio of the quantities is 5: 7. If the consequent of its inverse ratio is 5, the antecedent is
(a) 5 **(b)** $\sqrt{5}$ **(c)** 7 **(d)** none of these

Basic Level-2

3. If a: b = 3 : 4, the value of (2a + 3b) : (3a + 4b) is
(a) 54: 25 **(b)** 8: 25 **(c)** 17: 24 **(d)** none of these

4. If x: y = 3: 4, the value of $x^2y + xy^2$: $x^3 + y^3$ is
(a) 13: 12 **(b)** 12: 13 **(c)** 21: 31 **(d)** none of these

5. If p: q is the sub-duplicate ratio of p-x^2: q-x^2 then x^2 is
(a) $\frac{p}{p+q}$ **(b)** $\frac{q}{p+q}$ **(c)** $\frac{pq}{p+q}$ **(d)** none of these

6. If 2s: 3t is the duplicate ratio of 2s – p: 3t – p then
(a) $p^2 = 6st$ **(b)** $p = 6st$ **(c)** $2p = 3st$ **(d)** none of these

7. If p: q = 2: 3 and x: y = 4: 5, then the value of 5px + 3qy: 10px + 4qy is
(a) 71: 82 **(b)** 27: 28 **(c)** 17: 28 **(d)** none of these

Types of Ratios

8. The inverse ratio of 11: 15 is
(a) 15: 11 **(b)** $\sqrt{11} : \sqrt{15}$ **(c)** 121: 225 **(d)** none of these

9. The ratio compounded of 2: 3, 9: 4, 5: 6 and 8: 10 is
(a) 1: 1 **(b)** 1: 5 **(c)** 3: 8 **(d)** none of these

10. The duplicate ratio of 3: 4 is
(a) $\sqrt{3} : 2$ **(b)** 4: 3 **(c)** 9: 16 **(d)** none of these

11. The sub-duplicate ratio of 25: 36 is
(a) 6: 5 **(b)** 36: 25 **(c)** 50: 72 **(d)** 5: 6

12. The triplicate ratio of 2: 3 is
(a) 8: 27 **(b)** 6: 9 **(c)** 3: 2 **(d)** none of these

13. The sub-triplicate ratio of 8: 27 is
(a) 27: 8 **(b)** 24: 81 **(c)** 2: 3 **(d)** none of these

14. The ratio compounded of 4: 9 and the duplicate ratio of 3: 4 is
(a) 1: 4 **(b)** 1: 3 **(c)** 3: 1 **(d)** none of these

15. The ratio compounded of 4: 9, the duplicate ratio of 3: 4, the triplicate ratio of 2: 3 and 9: 7 is
(a) 2: 7 **(b)** 7: 2 **(c)** 2: 21 **(d)** none of these

16. The ratio compounded of duplicate ratio of 4 : 5, triplicate ratio of 1 : 3, sub duplicate ratio of 81 : 256 and sub-triplicate ratio of 125 : 512 is
(a) 4: 512 **(b)** 3: 32 **(c)** 1: 12 **(d)** none of these

Word Problems

17. Two numbers are in the ratio 2: 3. If 4 be subtracted from each, they are in the ratio 3: 5. The numbers are
(a) (16, 24) **(b)** (4, 6) **(c)** (2, 3) **(d)** none of these

18. The angles of a triangle are in ratio 2 : 7 : 11. The angles are
(a) (20^o, 70^o, 90^o) **(b)** (30^o, 70^o, 80^o)
(c) (18^o, 63^o, 99^o) **(d)** none of these

19. Division of Rs. 324 between X and Y is in the ratio 11: 7. X & Y would get Rupees
(a) (204, 120) **(b)** (200, 124)
(c) (180, 144) **(d)** none of these

20. Anand earns Rs. 80 in 7 hours and Pramod Rs. 90 in 12 hours. The ratio of their earnings is
(a) 30: 21 **(b)** 23: 12 **(c)** 8: 9 **(d)** none of these

21. The ratio of two numbers is 7: 10 and their difference is 105. The numbers are
(a) (200, 305) **(b)** (185, 290)
(c) (245, 350) **(d)** none of these

22. P, Q and R are three cities. The ratio of average temperature between P and Q is 11: 12 and that between P and R is 9: 8. The ratio between the average temperature of Q and R is
(a) 22:27 **(b)** 27:22 **(c)** 32:33 **(d)** none of these

23. The number which when subtracted from each of the terms of the ratio 19: 31 reducing it to 1: 4 is
(a) 15 **(b)** 5 **(c)** 1 **(d)** none of these

24. Daily earnings of two persons are in the ratio 4:5 and their daily expenses are in the ratio 7: 9 If each save Rs. 50 per day, their daily earnings in Rs. are
(a) (40, 50) **(b)** (50, 40) **(c)** (400, 500) **(d)** none of these

25. The ratio between the speeds of two trains is 7: 8. If the second train runs 400 kms. in 5 hours, the speed of the first train is
(a) 10 Km/hr **(b)** 50 Km/hr **(c)** 70 Km/hr **(d)** none of these

Advanced Problems

26. If 10% of x is the same as 20% of y, x:y is equal to
(a) 1:2 (b) 2:1 (c) 5:1 (d) 10:1

27. What must be added to each term of the ratio 7:13 so that the ratio becomes 2:3?
(a) 1 (b) 2 (c) 3 (d) 5

28. If a carton containing a dozen mirrors is dropped, which of the following cannot be the ratio of broken mirrors to unbroken mirrors
(a) 2:1
(b) 3:1
(c) 3:2
(d) 7:5

29. The incomes of A & B are in the ratio 3:2 and their expenditures in the ratio 5:3. If each saves Rs. 1000, A's income is
(a) Rs.3000
(b) Rs.4000
(c) Rs.6000
(d) Rs.9000

30. Rs. 680 has been divided among A, B, C such that A gets 2/3 of what B gets and B ¼ of what c gets. Then B's Share is
(a) 60
(b) 80
(c) 120
(d) 180

31. 729 ml of a mixture contains milk and water in the ratio 7:2. How much more water is to be added to get a new mixture containing milk and water in the ratio of 7:3?
(a) 60 ml
(b) 70 ml
(c) 81 ml
(d) 90 ml

32. The prices of scooter & moped are in the ratio 9:5. If a scooter costs Rs. 6800 more than a moped, the price of scooter is
(a) 17000
(b) 13600
(c) 15300
(d) None

33. In an express train, the passengers travelling in AC Sleeper Class, first class and 2nd class are in the ratio 1:2:7 and rate per each class is in the ratio 5:4:2. If the total income from this train is Rs. 54,000, then the income of railways from Ac Sleeper Class is
(a) Rs.16000
(b) Rs.10000
(c) Rs.14000
(d) Rs.2000

34. The sum of present ages of father and son is 68 years. Eight years ago, the ratio of their age was 12:1. What will be the ratio of their ages 4 years hence?
(a) 13:2
(b) 15:4
(c) 14:3
(d) 16:3

35. An alloy contains tin & copper in the ratio 4:5 If tin has 20% impurity and copper has 58%, then average impurity percentage is
(a) 20%
(b) 41%
(c) 35%
(d) 38%

Answer Sheet

1.	d	2.	c	3.	b	4.	b	5.	c	6.	a	7.	c	8.	a	9.	a	10.	c
11.	d	12.	a	13.	c	14.	a	15.	c	16.	d	17.	a	18.	c	19.	d	20.	D
21.	c	22.	b	23.	a	24.	d	25.	C	26.	B	27.	D	28.	C	29.	C	30.	C
31.	C	32.	C	33.	B	34.	B	35.	B										

PROPORTION

Basic Level-1

1. The fourth proportional to 4, 6, 8 is
(a) 12 **(b)** 32 **(c)** 48 **(d)** none of these

2. The third proportional to 12, 18 is
(a) 24 **(b)** 27 **(c)** 36 **(d)** none of these

3. The mean proportional between 25, 81 is
(a) 40 **(b)** 50 **(c)** 45 **(d)** none of these

4. The fourth proportional to 2a, a^2, c is
(a) ac/2 **(b)** ac **(c)** 2/ac **(d)** none of these

5. If four numbers ½, 1/3, 1/5, 1/x are proportional then x is
(a) 6/5 **(b)** 5/6 **(c)** 15/2 **(d)** none of these

6. The mean proportional between $12x^2$ and $27y^2$ is
(a) 18xy **(b)** 81xy **(c)** 8xy **(d)** none of these

7. 12, 16, *, 20 are in proportion. Then * is
(a) 25 **(b)** 14 **(c)** 15 **(d)** none of these

8. 4, *, 9, 13 ½ are in proportion. Then * is
(a) 6 **(b)** 8 **(c)** 9 **(d)** none of these

9. The mean proportional between 1.4 gms and 5.6 gms is
(a) 28 gms **(b)** 2.8 gms **(c)** 3.2 gms **(d)** none of these

BASIC LEVEL-2

10. If A = B/2 = C/5, then A: B: C is
(a) 3: 5: 2 **(b)** 2: 5: 3 **(c)** 1: 2: 5 **(d)** none of these

11. If a/3 = b/4 = c/7, then a + b + c/c is
(a) 1 **(b)** 3 **(c)** 2 **(d)** none of these

12. If $\frac{a}{4} = \frac{b}{5} = \frac{c}{9}$ then $\frac{a+b+c}{c}$ is
(a) 4 **(b)** 2 **(c)** 7 **(d)** none of these

13. If p/q = r/s = 2.5/1.5, the value of ps : qr is
(a) 3/5 **(b)** 1:1 **(c)** 5/3 **(d)** none of these

14. If x : y = z : w = 2.5 : 1.5, the value of (x + z) / (y + w) is
(a) 1 **(b)** 3/5 **(c)** 5/3 **(d)** none of these

15. If (5x – 3y) / (5y – 3x) = ¾, the value of x : y is
(a) 2 : 9 **(b)** 7 : 2 **(c)** 7 : 9 **(d)** none of these

16. If A : B = 3 : 2 and B : C = 3 : 5, then A : B : C is
(a) 9 : 6 : 10 **(b)** 6 : 9 : 10 **(c)** 10 : 9 : 6 **(d)** none of these

17. If x/2 = y/3 = z/7, then the value of (2x – 5y + 4z) / 2y is
(a) 6/23 **(b)** 23/6 **(c)** 3/2 **(d)** 17/6

18. If x: y = 2: 3, y: z = 4: 3 then x: y: z is
(a) 2: 3: 4 **(b)** 4: 3: 2 **(c)** 3: 2: 4 **(d)** none of these

Properties of Proportions

19. If x/y = z/w, implies y/x = w/z, then the process is called
(a) Dividendo **(b)** Componendo **(c)** Alternendo **(d)** none of these

20. If p/q = r/s = p – r/q – s, the process is called
(a) Subtrahendo **(b)** Addendo **(c)** Invertendo **(d)** none of these

21. If a/b = c/d, implies (a + b) / (a-b) = (c+d)/(c-d), the process is called
(a) Componendo **(b)** Dividendo
(c) Componendo and Dividendo **(d)** none of these

22. If u/v = w/p, then (u-v)/(u+v)=(w-p)/(w+p). The process is called
(a) Invertendo **(b)** Alternendo **(c)** Addendo **(d)** none of these

23. If $\frac{a}{4} = \frac{b}{5}$ then
(a) $\frac{a+4}{a-4} = \frac{b-5}{b+5}$ **(b)** $\frac{a+4}{a-4} = \frac{b+5}{b-5}$ **(c)** $\frac{a-4}{a+4} = \frac{b+5}{b-5}$ **(d)** none of these

Word Problem

24. Division of Rs. 750 into 3 parts in the ratio 4: 5: 6 is
(a) (200, 250, 300) **(b)** (250, 250, 250) **(c)** (350, 250, 150) **(d)** 8: 12: 9

25. The sum of the ages of 3 persons is 150 years. 10 years ago, their ages were in the ratio 7: 8: 9. Their present ages are
(a) (45, 50, 55) **(b)** (40,60,50) **(c)** (35, 45, 70) **(d)** none of these

26. The numbers 14, 16, 35, 42 are not in proportion. The fourth term for which they will be in proportion is
(a) 45 **(b)** 40 **(c)** 32 **(d)** none of these

27. Two numbers are in the ratio 3: 4; if 6 be added to each terms of the ratio, then the new ratio will be 4: 5, then the numbers are
(a) 14, 20 **(b)** 17, 19 **(c)** 18 and 24 **(d)** none of these

Miscellaneous Problems

28. If a: b = 4: 1 then $\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}}$ *is*
(a) 5/2 **(b)** 4 **(c)** 5 **(d)** none of these

29. If $\frac{x}{b+c-a} = \frac{y}{c+a-b} = \frac{z}{a+b-c}$ then (b-c) x + (c-a) y + (a-b) z is
(a) 1 **(b)** 0 **(c)** 5 **(d)** none of these

30. The 4th term for which the numbers 14,16,35,32 will be in proportion is
(a) 45 (b) 40 (c) 32 (d) None

31. Find the third proportional to 2.4 kg & 9.6 kg
(a) 34.8 kg (b) 38.4 kg (c) 36.8 kg (d) 35.8 kg

32. The fourth proportional to 2a, a^3, c is:
(a) $a^2c/2$ (b) ac (c) 2/ac (d) None

33. The fourth proportional to $(a^2 - ab + b^2), (a^3 + b^3) and\ (a - b) is\ eaqual\ to$
(a) $a^2 + b^3$ (b) $a^2 - b^2$ (c) 1 (d) None

34. Find 2 numbers such that mean proportional between them is 18 & third proportional to them is 144.
(a) 9, 36 (b) 29, 56 (c) 18, 72 (d) None

35. If a,b,c,d,e are in continued proportion then abde is equal to
(a) a^4 (b) b^4 (c) c^4 (d) d^4

36. If a:b = c:d = e:f = 2:5, Then value of $\frac{4a + 15c + 29e}{4b + 15d + 29f}$ is
(a) 2:4 (b) 1:5 (c) 4:5 (d) 2:5

37. If $\frac{\sqrt{2-x} + \sqrt{2+x}}{\sqrt{2-x} - \sqrt{2+x}}$ = 3, then x is equal to
(a) -6/5 (b) -5/6 (c) -1/5 (d) 6/5

38. If $\frac{a^3+3a}{3a^2+1} = \frac{91}{37}$ then 'a' equal
(a) 8 (b) 7 (c) 6 (d) None

Answer Sheet

1.	**a**	**2.**	**b**	**3.**	**c**	**4.**	**a**	**5.**	**c**	**6.**	**a**	**7.**	**c**	**8.**	**a**	**9.**	**b**	**10.**	**c**
11.	**c**	**12.**	**b**	**13.**	**b**	**14.**	**c**	**15.**	**d**	**16.**	**a**	**17.**	**d**	**18.**	**d**	**19.**	**d**	**20.**	**A**
21.	**c**	**22.**	**d**	**23.**	**b**	**24.**	**a**	**25.**	**a**	**26.**	**b**	**27.**	**c**	**28.**	**a**	**29.**	**b**	**3.**	**B**
31.	**B**	**32.**	**A**	**33.**	**B**	**34.**	**A**	**35.**	**C**	**36.**	**D**	**37.**	**A**	**38.**	**b**				

INDICES

Basic Level-1

1. $4x^{-1/4}$ is expressed as
(a) -4x ¼ **(b)** x^{-1} **(c)** $4/x^{1/4}$ **(d)** none of these

2. The value of $8^{1/3}$ is
(a) 2 **(b)** 2 **(c)** 2 **(d)** none of these

3. The value of $2 \times (32)^{1/5}$ is
(a) 2 **(b)** 10 **(c)** 4 **(d)** none of these

4. The value of $4/(32)^{1/5}$ is
(a) 8 **(b)** 2 **(c)** 4 **(d)** none of these

5. The value of $(8/27)^{1/3}$ is
(a) 2/3 **(b)** 3/2 **(c)** 2/9 **(d)** none of these

6. The value of $2(256)^{-1/8}$ is
(a) 1 **(b)** 2 **(c)** 1/2 **(d)** none of these

7. $2^{1/4}$, $4^{1/4}$ is equal to
(a) a fraction **(b)** a positive integer
(c) 1/2 **(d)** none of these

8. $\left(\frac{81x^4}{y^{-8}}\right)^{\frac{1}{4}}$ has simplified value equal to
(a) xy^2 **(b)** x^2y **(c)** $9xy^2$ **(d)** none of these

9. The value of $(\frac{243}{32})^{-4/5}$ is:
(a) 18/16 **(b)** 16/81 **(c)**4/9 **(d)** 9/4

10. The value of $[(10)^{150} \div (10)^{146}]$ is:
(a) 1000 **(b)** 10000 **(c)** 100000 **(d)**$(10)^6$

11. Simplification of $9^{x+3} = 27^{x-1}$ gives:
(a) 8 **(b)** 7 **(c)** 9 **(d)** none of these

12. If $(25)^{7.5} \times (5)^{2.5} \div (125)^{1.5} = 5^x$, then the value of x is:
(a) 8.5 **(b)** 13 **(c)** 16 **(d)** none of these

Basic Level-2

13. If $\frac{9^n \times 3^5 \times 27^3}{3 \times 81^4}$=27, then the value of n is:
(a) 0 **(b)** 2 **(c)** 3 **(d)** 4

14. $64^{-1/2} - (-32)^{-4/5}$=x, then the value of x is:
(a) 1/8 **(b)** 3/8 **(c)** 1/16 **(d)** 3/16

15. If $2^x - 2^{x-1}$=4, then the value of x^x is:
(a) 27 **(b)** 4 **(c)**1 **(d)** 256

16. If $\left(\frac{x^a}{x^b}\right)^{(a+b)} . \left(\frac{x^b}{x^c}\right)^{(b+c)} . \left(\frac{x^c}{x^a}\right)^{(c+a)} =$ x, then the value of x is:

(a) 0 **(b)** x^{abc} **(c)** x^{a+b+c} **(d)** 1

17. If $\left(\frac{x^b}{x^c}\right)^{(b+c-a)} . \left(\frac{x^c}{x^a}\right)^{(c+a-b)} . \left(\frac{x^a}{x^b}\right)^{(a+b-c)} = x$, then the value of x is :

(a) x^{abc} **(b)** 1 **(c)** $x^{ab+bc+ca}$ **(d)** x^{b+c+a}

18. If $2^x = 4^y = 8^z$ and $\left(\frac{1}{2x} + \frac{1}{4y} + \frac{1}{6z}\right) = \frac{24}{7}$, the c the value of z is:

(a) $\frac{7}{16}$ **(b)** $7/32$ **(c)** $7/48$ **(d)** $7/64$

19. If a^x =b, b^y =c, $c^z = a$, then the value of xyz is:

(a) 1 **(b)** -1 **(c)** 0 **(d)** 2

20. If $2^x = 3^y = 6^{-z}$ then value of $\left(\frac{1}{x} + \frac{1}{y} + \frac{1}{z}\right) is$:

(a) 0 **(b)** 1 **(c)** $3/2$ **(d)** $-(1/2)$

Miscellaneous Problems

21. If $(a/b)^{x-3} = (b/a)^{x-3}$, Then x is equal to

(a) 1 **(b)** ½ **(c)** 7/2 **(d)** 3

22. The value of x for which $2^{x+4} - 2^{x+2}$ = 6

(a) 0 **(b)** -2 **(c)** 2 **(d)** -1

23. If $9^x - (10 * 3^x)$ + 9 = 0, then x is equal to:

(a) 2 or 0 **(b)** 1 or 3 **(c)** 1 or 9 **(d)** 1 or -2

24. The Value of $\frac{3^{(19+n)} * 27^{(2n-7)}}{3^{7n}}$ is

(a) 1/3 **(b)** 9/13 **(c)** 1/9 **(d)** 2/3

25. If m & n are whole numbers such that $m^n = 121$, then the value of $(m-1)^{n+1}$ is

(a) 1 **(b)** 10 **(c)** 121 **(d)** 1000

26. $\sqrt{x^3\sqrt{x^3\sqrt{x^3}}}$ is

(a) x^7 **(b)** x^8 **(c)** $x^{21/8}$ **(d)** x^9

27. Value of $\left(a^{1/8} + a^{-1/8}\right)\left(a^{1/8} - a^{-1/8}\right)\left(a^{1/4} + a^{-1/4}\right)\left(a^{1/2} + a^{-1/2}\right)$ is

(a) a + (1/a) **(b)** $a^2 + (1/a^2)$ **(c)** a - (1/a) **(d)** $a^2 - (1/a^2)$

28. $\sqrt{11 + 4\sqrt{7}}$ - $\sqrt{11 - 4\sqrt{7}}$ =

(a) 8 **(b)** 2 **(c)** 6 **(d)** 4

29. If x = $p^{1/3} - p^{-1/3}$, then

(a) $x^3 + 3x$ = p + (1/p) **(b)** $x^3 + 3x$ = p - (1/p)

(c) $x^3 + 3x$ = p + 1 **(d)** None

30. If $(5.678)^x = (0.5678)^y = 10^z$ then

(a) $\frac{1}{x} - \frac{1}{y} + \frac{1}{z} = 1$ **(b)** $\frac{1}{x} - \frac{1}{y} - \frac{1}{z} = 0$ **(c)** $\frac{1}{x} - \frac{1}{y} + \frac{1}{z} = -1$ **(d)** None

31. If $3^a = 5^b = (75)^c$ then the value of ab – c(2a + b) reduces to
(a) 1 **(b)** 0 **(c)** 3 **(d)** 5

32. If $a = xy^{m-1}, b = xy^{n-1}, c = xy^{p-1}$ *then* $a^{n-p} * c^{m-n}$ reduces to
(a) 1 **(b)** -1 **(c)** 0 **(d)** None

33. On simplification $\left[\frac{x^{ab}}{x^{(a^2+b^2)}}\right]^{(a+b)} * \left[\frac{x^{(b^2+c^2)}}{x^{bc}}\right]^{(b+c)} * \left[\frac{x^{ca}}{x^{(c^2+a^2)}}\right]^{(c+a)}$
(a) x^{-2a^3} **(b)** x^{2a^3} **(c)** $x^{-2(a^3+b^3+c^3)}$ **(d)** $x^{2(a^3+b^3+c^3)}$

34. If $x = 3^{1/3} + 3^{-1/3}$, *then* $3x^3 - 9x$ is
(a) 15 **(b)** 10 **(c)** 12 **(d)** None

35. Show that $\left(\frac{x^b}{x^c}\right)^{1/bc} * \left(\frac{x^c}{x^a}\right)^{\frac{1}{ca}} * \left(\frac{x^a}{x^b}\right)^{1/ab}$ reduces to
(a) -1 **(b)** 0 **(c)** 1 **(d)** None

36. If $x = \sqrt{7 + 4\sqrt{3}}$, then $x + \frac{1}{x} =$
(a) 4 **(b)** 6 **(c)** 3 **(d)** 2

37. If $a^b = b^a$ *then the value of* $\left(\frac{a}{b}\right)^{\frac{a}{b}} - a^{\frac{a}{b}-1}$ reduces to
(a) a **(b)** b **(c)** 0 **(d)** None

Answer Sheet

1.	**c**	**2.**	**c**	**3.**	**c**	**4.**	**b**	**5.**	**a**	**6.**	**a**	**7.**	**b**	**8.**	**d**	**9.**	**b**	**10.**	**b**
11.	**c**	**12.**	**b**	**13.**	**c**	**14.**	**c**	**15.**	**a**	**16.**	**d**	**17.**	**b**	**18.**	**c**	**19.**	**a**	**20.**	**a**
21.	**a**	**22.**	**d**	**23.**	**a**	**24.**	**c**	**25.**	**d**	**26.**	**c**	**27.**	**b**	**28.**	**d**	**29.**	**b**	**30.**	**b**
31.	**b**	**32.**	**a**	**33.**	**a**	**34.**	**b**	**35.**	**c**	**36.**	**a**	**37.**	**c**						

ALP-NO-1A

***Tutorial Note:** This ALP Sheets are designed for Students Self Practice if any difficulty arrives then students Should Refer Lectures This Will Develop There Mind to Deal with New Problems in Exams*

1. If p : q is the sub-duplicate ratio of $p - x^2 : q - x^2$, then x^2 is :

(a) $\frac{p}{p+q}$ (b) $\frac{q}{p+q}$

(c) $\frac{qp}{p-q}$ (d) none

2. An alloy is to contain copper and zinc 9 : 4. The zinc required to melt with 24 kg of copper is :

(a) $10\frac{2}{3}$ kg (b) $10\frac{1}{3}$kg

(c) $9\frac{2}{3}$kg (d) 9 kg

3. 3. A box contains Rs 56 in the form of coins of one rupee, 50 paise and 25 paise. The number of 50 paise coin is double the number of 25 paise coins and four times the numbers of one rupee coins. The numbers of 50 paise coins in the box is :

(a)64 (b) 32

(c) 16 (d) 14

4. Value of $(a^{1/8} + a^{-1/8})(a^{1/8} - a^{-1/8})(a^{1/4} + a^{-1/4})(a^{1/2} + a^{-1/2})$ is:

(a) $a + \frac{1}{a}$ (b) $a - \frac{1}{a}$

(c) $a^2 + \frac{1}{a^2}$ (d) $a^2 - \frac{1}{a^2}$

5. Eight people are planning to share equally the cost of a rental car. If one person withdraws from the arrangement and the others share equally entire cost of the car, then the share of each of the remaining persons increased by :

(a) 1/9 (b) 1/8

(c) 1/7 (d) 7/8

6. A bag contains Rs 187 in the form of 1 rupee, 50 paise and 10 paise coins in the ratio 3:4:5. Find the number of each type of coins:

(a) 102, 136, 170 (b) 136, 102, 170

(c) 170, 102, 136 (d) none

7. On simplification $\frac{1}{1+z^{a-b}+z^{a-c}} + \frac{1}{1+z^{b-c}+z^{b-a}} + \frac{1}{1+z^{c-a}+z^{c-b}}$ reduces to :

(a) $\frac{1}{z^{2(a+b+c)}}$ (b) $\frac{1}{z^{(a+b+c)}}$

(c)1 (d) 0

8. Ratio of earning of A and B is 4 : 7. If the earning of A increase by 50% and those of B decrease by 25%, the new ratio of their earning becomes 8 :7. What is A's earning?

(a) Rs 21,000 (b) Rs 26,000

(c) Rs 28,000 (d) data inadequate.

9. In 40 liters mixture of glycerin and water, the ratio of glycerin and water is 3:1. The quantity of water added in the mixture in order to make the ratio 2:1 is:

(a) 15 litres (b) 10 litres

(c) 8 litres (d) 5 litres

10. log 144 is equal to :

(a) 2 log 4 + 2 log 2

(b) 4 log 2 + 2 log 3

(c) 3 log 2 + 4 log 3

(d) 3 log 2 – 4 log 3

11. If $x = 3^{1/3} + 3^{-1/3}$ then find value of $3x^3 - 9x$

(a) 3 (b) 9

(c) 12 (d) 10

12. What must be added to each term of the ratio 49 : 68, so that it becomes 3 : 4

(a) 3 (b) 5

(c) 8 (d) 9

Answers

1.	d	2.	a	3.	a	4.	b	5.	c
6.	a	7.	c	8.	d	9.	d	10.	b
11.	d	12.	c						

ALP-NO-1B

1. The third proportional between $(a^2 - b^2)$ and $(a + b)^2$ is :

(a) $\frac{a+b}{a-b}$ (b) $\frac{a-b}{a+b}$

(c) $\frac{(a-b)^2}{a+b}$ (d) $\frac{(a+b)^3}{a-b}$

2. Fourth proportional to x, 2x, (x+1) is :

(a) (x + 2) (b) (x – 2)

(c) (2x + 2) (d) (2x – 2)

3. A dealer mixes Tea costing Rs 6.92 per kg with Tea costing Rs 7.77 per kg and sells the mixture at Rs 8.80 per kg and earns a profit 17.5% on his sale price. In what proportion does he mix them?

(a) 1 : 2 (b) 4 : 1

(c) 3 : 4 (d) 5 : 3

4. Gold is 19 times as heavy as Water and Copper is 9 times as heavy as Water. In what ratio should these be mixed to get an alloy 15 times as heavy as water?

(a) 1 : 1 (b) 2 : 3
(c) 1 : 2 (d) 3 : 2

5. What must be added to each of the numbers 10, 18, 22, 38 to make them proportional

(a) 5 (b) 2

(c) 3 (d) 9

6. If one type of rice of cost Rs 13.84 is mixed with another type of rice of cost Rs 15.54. the mixture is sold at Rs 17.6 with a profit of 14.6% on selling price then in which proportion the two types of rice mixed?

(a) 3 : 7 (b) 5 : 7

(c) 7 : 9 (d) None of these

7. In a film shooting, A and B received money in a certain ratio and B and C also received the money in the same ratio. If A gets Rs 1,60,000 and C gets Rs 2,50,000. Find the amount received by B?

(a) Rs 2,00,000 (b) Rs 2,50,000

(c) Rs 1,00,000 (d) Rs 1,50,000

8. Find two numbers such that mean proportional between them is 18 and third proportional between them is 144

(a) 9, 36 (b) 8, 32

(c) 7, 28 (d) 6, 24

Answers

1.	d	2.	c	3.	a	4.	d	5.	b
6.	a	7.	a	8.	a				

Miscellaneous Question Bank

Chapter **Misc.**

Basic

Note: Below are Question Based On Basic Formulas Doesn't Relates to any Specific Chapters So we will Cover it Separately this types of questions are frequently asked in Exam.

1. If $x = 4^{\frac{1}{3}} + 4^{\frac{-1}{3}}$ prove that $4x^3 - 12x$ is given by
(a) 12 **(b)** 13 **(c)** 15 **(d)** 17

2. If $x = 5^{\frac{1}{3}} + 5^{\frac{-1}{3}}$ prove that $5x^3 - 15x$ is given by
(a) 25 **(b)** **26** **(c)** **27** **(d)** 30

3. If $a^b = b^a$, then the value of $\left(\frac{a}{b}\right)^{\frac{a}{b}} - a^{\frac{a}{b}-1}$ reduces to
(a) a **(b)** b **(c)** 0 **(d)** None

4. If $m = b^x, n = b^y$ and $(m^y n^x) = b^2$ the value of xy is given by
(a) -1 **(b)** 0 **(c)** **1** **(d)** None

5. If $a = xy^{m-1}$ $b = xy^{n-1}$, $c = xy^{p-1}$ then the value of $a^{n-p} \times b^{p-m} \times c^{m-n}$ reduces to
(a) 1 **(b)** -1 **(c)** 0 **(d)** None

6. If $a = x^{n+p}y^m$, $b = x^{p+m}y^n$, $c = x^{m+n}y^p$ then the value of $a^{n-p} \times b^{p-m} \times c^{m-n}$ reduces to
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

7. If $a = \sqrt[3]{\sqrt{2}+1} - \sqrt[3]{\sqrt{2}-1}$ then the value of $a^3 + 3a - 2$ is
(a) 3 **(b)** 0 **(c)** 2 **(d)** 1

8. If $a = x^{\frac{1}{3}} + x^{\frac{-1}{3}}$ then $a^3 - 3a$ is
(a) $x + x^{-1}$ **(b)** $x - x^{-1}$ **(c)** $2x$ **(d)** 0

9. If $a = 3^{\frac{1}{4}} + 3^{\frac{-1}{4}}$ and $b = 3^{\frac{1}{4}} - 3^{\frac{-1}{4}}$ then the value of $3(a^2 + b^2)^2$ is
(a) 67 **(b)** 65 **(c)** 64 **(d)** 62

10. If $x = \sqrt{3} + \frac{1}{\sqrt{3}}$ and $y = \sqrt{3} - \frac{1}{\sqrt{3}}$ then $x^2 - y^2$ is
(a) 5 **(b)** $\sqrt{3}$ **(c)** $\frac{1}{\sqrt{3}}$ **(d)** 4

11. If $a = \frac{4\sqrt{6}}{\sqrt{2}+\sqrt{3}}$ then the value of $\frac{a+2\sqrt{2}}{a-2\sqrt{2}} + \frac{a+2\sqrt{3}}{a-2\sqrt{3}}$ is given by
(a) 1 **(b)** **-1** **(c)** **2** **(d)** -2

12. If $P + \sqrt{3}Q + \sqrt{5}R + \sqrt{15}S = \frac{1}{1+\sqrt{3}+\sqrt{5}}$ then the value of P is
(a) 7/11 **(b)** 3/11 **(c)** -1/11 **(d)** -2/11

13. If $a = 3 + 2\sqrt{2}$ then the value of $a^{\frac{1}{2}} + a^{\frac{-1}{2}}$ is
(a) $\sqrt{2}$ **(b)** $-\sqrt{2}$ **(c)** $2\sqrt{2}$ **(d)** $-2\sqrt{2}$

14. If $a = 3 + 2\sqrt{2}$ then the value of $a^{\frac{1}{2}} - a^{\frac{-1}{2}}$ is
(a) $2\sqrt{2}$ **(b)** 2 **(c)** -2 **(d)** $-2\sqrt{2}$

15. If $a = \frac{1}{2}\left(5 - \sqrt{21}\right)$ then the value of $a^3 + a^{-3} - 5a^2 - 5a^{-2} + a + a^{-1}$ is
(a) 0 **(b)** 1 **(c)** 5 **(d)** -1

16. If $a = \sqrt{\frac{7+4\sqrt{3}}{7-4\sqrt{3}}}$ then the value of $[a(a-14)]^2$ is
(a) 14 **(b)** 7 **(c)** 2 **(d)** 1

17. If $a = 3-\sqrt{5}$ then the value of $a^4 - a^3 - 20a^2 - 16a + 24$ is
(a) 10 **(b)** 14 **(c)** 0 **(d)** 15

18. If $a = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ then the value of $2a^4 - 21a^3 + 12a^2 - a + 1$ is
(a) 21 **(b)** 1 **(c)** 12 **(d)** None

19. The square root of $3 + \sqrt{5}$
(a) $\sqrt{\frac{5}{2}} + \sqrt{\frac{1}{2}}$ **(b)** $-\left(\sqrt{\frac{5}{2}} + \sqrt{\frac{1}{2}}\right)$ **(c)** Both the above **(d)** None

20. If $x = \sqrt{2 - \sqrt{2 - \sqrt{2}}} \ldots \alpha$ the value of x is given by
(a) -2 **(b)** 1 **(c)** 2 **(d)** 0

21. If $a = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, $b = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ then the value of $a + b$ is
(a) 10 **(b)** 100 **(c)** 98 **(d)** 99

22. The square root of $x + \sqrt{x^2 - y^2}$ is given by
(a) $\frac{1}{2}\left[\sqrt{x + y} + \sqrt{x - y}\right]$ **(b)** $\frac{1}{2}\left[\sqrt{x + y} - \sqrt{x - y}\right]$
(c) $\left[\sqrt{x + y} + \sqrt{x - y}\right]$ **(d)** $\left[\sqrt{x + y} - \sqrt{x - y}\right]$

23. The square root of $11 - \sqrt{120}$ is given by
(a) $\sqrt{6} + \sqrt{5}$ **(b)** $\sqrt{6} - \sqrt{5}$ **(c)** $2\sqrt{3} - 3\sqrt{2}$ **(d)** $2\sqrt{3} + 3\sqrt{2}$

Answer Sheet

1.	**D**	**2.**	**B**	**3.**	**C**	**4.**	**C**	**5.**	**A**	**6.**	**B**	**7.**	**B**	**8.**	**A**	**9.**	**C**	**10.**	**D**
11.	**C**	**12.**	**A**	**13.**	**C**	**14.**	**B**	**15.**	**A**	**16.**	**D**	**17.**	**C**	**18.**	**B**	**19.**	**C**	**20.**	**A**
21.	**A**	**22.**	**A**	**23.**	**B**														

Logarithm

Chapter **2**

EXERCISE

Basic Level -1

1. log 6 + log 5 is expressed as
(a) log 11 **(b)** log 30 **(c)** log 5/6 **(d)** none of these

2. $\log_2 8$ is equal to
(a) 2 **(b)** 8 **(c)** 3 **(d)** none of these

3. log 32/4 is equal to
(a)log 32/log 4 **(b)** 8
(c) 3 **(d)** none of these

4. log (1 × 2 × 3) id equal to
(a) log 1 + log2 + log 3 **(b)** log 3 **(c)** log 2 **(d)** none of these

5. The value of log 0.0001 to the base 0.1 is
(a)– 4 **(b)** 4 **(c)** ¼ **(d)** none of these

6. $\log_2 64$ is equal to
(a) 12 **(b)** 6 **(c)** 1 **(d)** none of these

7. $\log_{2\sqrt{3}} 1728$ is equal to
(a) $2\sqrt{3}$ **(b)** 2 **(c)** 6 **(d)** none of these

8. log (1/81) to the base 9 is equal to
(a) 2 **(b)** ½ **(c)** -2 **(d)** none of these

Basic Level - 2

9. If 2 log x = 4 log 3, the *x* is equal to
(a)-4 **(b)** 9 **(c)** 2 **(d)** none of these

10. log 0.0625 to the base 2 is equal to
(a)4 **(b)** 5 **(c)** 1 **(d)** none of these

11. The value of $\log \frac{1}{3}$ to the base 9 is
(a)-½ **(b)** ½ **(c)** 1 **(d)** none of these

12. If log x + log y = log (x+y), y can be expressed as
(a) x - 1 **(b)** x **(c)** x/x-1 **(d)** none of these

13. If $\log_2 x + \log_4 x + \log_{16} x = 21/4$, then x is equal to
(a)8 **(b)** 4 **(c)** 16 **(d)** none of these

14. The simplified value of $2 \log_{10} 5 + \log_{10} 4$ is
(a)½ **(b)** 4 **(c)** 2 **(d)** none of these

15. On solving the equation log(t) + log(t-3) = 1 the value of "t" is
(a) 5 **(b)** 2 **(c)** 3 **(d)** 0

16. $\log\frac{a^2}{bc} - \log\frac{ca}{b^2} + \log\frac{c^2}{ab} =$
(a) 0 **(b)** 1 **(c)** log a **(d)** None of these.

Finding Value Problem

17. Given $\log 2 = 0.3010$ and $\log 3 = 0.4771$ the value of log 6 is
(a) 0.9030 **(b)** 0.9542 **(c)** 0.7781 **(d)** none of these

18. Given that $\log_{10}2 = x$ and $\log_{10}3 = y$, the value of $\log_{10}60$ is expressed as
(a) $x - y + 1$ **(b)** $x + y + 1$ **(c)** $x - y - 1$ **(d)** none of these

19. Given that $\log_{10}2 = x$, $\log_{10}3 = y$, then $\log_{10}1.2$ is expressed in terms of x and y as
(a) $x + 2y + 1$ **(b)** $x + y - 1$ **(c)** $2x + y - 1$ **(d)** none of these

20. Given that $\log x = m + n$ and $\log y = m - n$, the value of $\log 10x/y^2$ is expressed in terms of m and n as
(a) $1 - m + 3n$ **(b)** $m - 1 + 3n$
(c) $m + 3n + 1$ **(d)** none of these

21. $\log(a^2) + \log a = 10$ if the value of a is given by
(a) 0 **(b)** 10 **(c)** -1 **(d)** $10^{10/3}$

Chain Based Problem

22. The value of $\log_2\log_2 16$
(a) 0 **(b)** 2 **(c)** 1 **(d)** none of these

23. The value of $\log_2[\log_2\{\log_2(\log_3 27^3)\}]$ is equal to
(a) 1 **(b)** 2 **(c)** 0 **(d)** none of these

24. On solving the equation $\log_3[\log_2(\log_3 t)] = 1$ we get the value of t as
(a) 8 **(b)** 18 **(c)** 81 **(d)** 6561

25. On solving the equation $\log_{1/2}[\log_t(\log_4 32)] = 2$ we get the value of t as
(a) $^5/_2$ **(b)** $^{25}/_4$ **(c)** $^{625}/_{16}$ **(d)** None

26. If $\log_5[\log_2(\log_3 z)] = 0$, the value of z is
(a) 30 **(b)** 9 **(c)** 21 **(d)** 1

Base Changing Theorem

27. $\frac{1}{log_{ab}(abc)} + \frac{1}{log_{bc}(abc)} + \frac{1}{log_{ca}(abc)}$ is equal to
(a) 0 **(b)** 1 **(c)** 2 **(d)** -1

28. $\frac{1}{1+log_a(bc)} + \frac{1}{1+log_b(ca)} + \frac{1}{1+log_b(ab)}$ is equal to
(a) 0 **(b)** 1 **(c)** 3 **(d)** -1

29. $\frac{1}{log_{a/b}(x)} + \frac{1}{log_{b/c}(x)} + \frac{1}{log_{c/a}(x)}$ id equal to
(a) 0 **(b)** 1 **(c)** 3 **(d)** -1

30. $log_b(a).log_c(b)log_a(c)$ is equal to
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

31. $log_b\left(a^{\frac{1}{2}}\right).log_c(b^3).log_a(c^{\frac{2}{3}})$ is equal to
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

32. The value of $\frac{1}{log_a(ab)} + \frac{1}{log_b(ab)}$ is
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

33. If $\frac{1}{log_a t} + \frac{1}{log_b t} + \frac{1}{log_c t} = \frac{1}{log_z t}$ then the value is z is given by
(a) 0 **(b)** abc **(c)** -1 **(d)** None

34. $\frac{1}{\log_{\frac{p}{q}}(m)} + \frac{1}{\log_{\frac{q}{r}}(m)} + \frac{1}{\log_{\frac{r}{p}}(m)} = ?$
(a) 0 **(b)** 2 **(c)** 3 **(d)** None

Problems on Principal Identity

35. The value of the expression $a^{\log_a b.\log_b c.\log_c d.\log_d t}$
(a) t **(b)** abcdt
(c) (a + b + c + d + t) **(d)** none

36. Find the value of $2^{2-\log_2 5}$
(a) -1 **(b)** 20 **(c)** 5/4 **(d)** 4/5

37. $4^{\log_9 3} + 9^{\log_2 4} = 10^{\log_x 83}$ then
(a)10 **(b)** -10 **(c)** 20 **(d)** 25

38. The value of $16^{\log_4 5}$ is
(a)15 **(b)** 40 **(c)** 20 **(d)** 25

Advance Problem

39. If $\log(a) = \frac{1}{2}\log(b) = \frac{1}{5}logc$ loge the value of $a^4b^3c^{-2}$ is
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

40. If $\frac{1}{2}loga = \frac{1}{3}logb = \frac{1}{5}$ logc the value of a^4-bc is
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

41. If $\frac{1}{4}log_2 a = \frac{1}{6}log_2 b = -\frac{1}{24}log_2 c$ the value of a^3b^2c is
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

42. If $\log\frac{a+b}{3} = \frac{1}{2}(\log a + \log b)$ then the value of $\frac{a}{b} + \frac{b}{a}$ is
(a) 2 **(b)** 5 **(c)** 7 **(d)** 3

43. If $a^2 + b^2 = 7ab$ then the value of is $\log\frac{a+b}{3} - \frac{loga}{2} - \frac{logb}{2}$
(a) 0 **(b)** 1 **(c)** -1 **(d)** 7

44. If $p^2 + q^2 = 12pq$, then log (p + 2q) is:

(a) $\frac{1}{2}[\log p + \log q + \log 2]$
(b) $\log\frac{p}{q} + \log\frac{q}{2} + \log 2$
(c) $\frac{1}{2}[\log p + \log q + 4\log 2]$
(d) $\frac{1}{2}[\log p - \log q + 4\log 2]$

45. If $x^{18} = y^{21} = z^{28}$, then $3,3\log_y x, 3\log_z y, 7\log_x z$ are in:
(a) A. P **(b)** G. P **(c)** H. P **(d)** None

Assuming Value Problems

46. For any three consecutive integers $x\,y\,z$ the equation $\log(1+xz) - 2\log y = 0$ is
(a) True
(b) False
(c) Sometimes true
(d) Cannot be determined in the cases of variables with cyclic

47. If $x = \log_a bc$, $y = \log_b ca$, $z = \log_c ab$ then the value of $xyz - x - y - z$ is
(a) 0 **(b)** 1 **(c)** -1 **(d)** 2

48. If $\log_x yz = p$, $\log_y zx = q$, $\log_z xy = r$, Then $\frac{1}{p+1} + \frac{1}{q+1} + \frac{1}{r+1} =$ is
(a) 0 **(b)** 1 **(c)** 2 **(d)** None

Significant Digits

49. Number of digits in the numeral for 2^{64} [Given $\log 2 = 0.30103$]:
(a) 18 digits **(b)** 19 digits **(c)** 20 digits **(d)** 21 digits

50. If $\log 107 = 0.8451$ then the position of the first significant figure of 7^{-20} is
(a) 9^{th} **(b)** 10^{th} **(c)** 17th **(d)** 8th.

51. If $\log 2 = 0.30103$ and $\log 3 = 0.4771$, then number of digits in $(648)^{10}$ is:
(a) 22 **(b)** 33 **(c)** 28 **(d)** 35

Problems Based on Cyclic Order

52. If $p + q + r = 0$, find the value of $\frac{1}{a^{q}+a^{-r}+1} + \frac{1}{a^{r}+a^{-p}+1} + \frac{1}{a^{p}+a^{-q}+1}$
(a) 0 **(b)** 2 **(c)** 1 **(d)** None

53. The value of $\frac{1}{1+y^{p-q}+y^{p-r}} + \frac{1}{1+y^{q-p}+y^{q-r}} + \frac{1}{1+y^{r-p}+y^{r-q}}$
(a) 0 **(b)** 1 **(c)** 2 **(d)** None

Miscellaneous Problems

54. The integral part of a logarithm is called _____and the decimal part of a logarithm is called_____.
(a) Mantissa, Characteristic **(b)** Characteristic, Mantissa
(c) Whole, Decimal **(d)** None of these

55. The value of $\log_2 0.0625$ is
(a) -3 **(b)** -4 **(c)** -5 **(d)** None

56. The value of $\log_{\sqrt{3}} 27$ is
(a) 6 **(b)** 5 **(c)** 2 **(d)** None

57. The logarithm of 19683 to the base of $3\sqrt{3}$& that of 21952 to the base of $2\sqrt{7}$ are
(a) Not unequal **(b)** Not equal
(c) Have a difference of 1369 **(d)** None

58. The value of $16\log\frac{64}{60} + 12\ \log\frac{50}{48} + 7\log\frac{81}{80} + \log 2$ is
(a) 0 **(b)** 1 **(c)** 2 **(d)** -1

59. The value of $\log_5 \sqrt{5\sqrt{5\sqrt{5 \ldots \ldots to\ \infty}}}$ is
(a) 0 **(b)** 1 **(c)** 2 **(d)** none

60. Find the value of $2^{2+\log_2 7}$
(a) 2 **(b)** 3 **(c)** 8 **(d)** 5

61. Find the simplest value of $\log_3 \sqrt[4]{729.3\sqrt{9^{-1}.27^{-4/3}}}$
(a) 0 **(b)** 1 **(c)** 2 **(d)** none

62. Find the simplest value of $\log_{17}\sqrt{17\sqrt{17\sqrt{17\ldots\ldots\ldots.\infty}}}$
(a) 1 **(b)** -1 **(c)** 0 **(d)** none

63. If $\log_2[\log_3\sqrt{y}] = 1$ then y =?
(a) 27 **(b)** 81 **(c)** 343 **(d)** none

64. The value of $\log_{10}1 + \log_{10}10 + \log_{10}100 + \log_{10}1{,}000 + \log_{10}10{,}000 + \log_{10}1{,}00{,}000$ is:
(a)15 **(b)** $\log_{10}11111$ **(c)** $\log_{10}1111$ **(d)** $14\log_{10}100$

65. If $\log 300 = 2.4771$, then the position of first significant digit in 3^{-20} is:
(a) 9^{th} **(b)** 10^{th} **(c)** 11^{th} **(d)** 8^{th}

66. If $A = \log_2\log_2\log_4 256 + 5\log_{\sqrt{2}} 2$, then A equals:
(a) 12 **(b)** 13 **(c)** 11 **(d)** none

67. If $\log_{30}3 = x$, $\log_{30}5 = y$, then $\log_{30}8 =$
(a) 3(1 – x – y) **(b)** x – y + 1 **(c)** 1 – x – y **(d)** 2(x – y +1)

68. If x = 2983!, then the value of the expression: $\frac{1}{\log_2 x} + \frac{1}{\log_3 x} + \frac{1}{\log_4 x} \ldots\ldots\ldots + \frac{1}{\log_{2983} x}$ is equal to:
(a) 0 **(b)** 1 **(c)** 2 **(d)** 3

69. $\log_7\log_3\sqrt{3(\sqrt{3\sqrt{3}})}$ equals:
(a) $3\log_2 7$ **(b)** $1 - 3\log_3 7$ **(c)** $1 - 3\log_7 2$ **(d)** none of these

70. The expression $\log_7 3$ is:
(a) An integer **(b)** A rational
(c) An irrational number **(d)** A prime number

71. If $x = \frac{e^y - e^{-y}}{e^y + e^{-y}}$ then the value of y is:
(a) $\frac{1}{2}\log_e\frac{1+x}{1-x}$ **(b)** $\log_e\frac{1+x}{1-x}$ **(c)** $\log_e\frac{1-x}{1+x}$ **(d)** $\frac{1}{2}log\frac{1+x}{1-x}$

Answer Sheet

1.	**b**	**2.**	**c**	**3.**	**d**	**4.**	**a**	**5.**	**b**	**6.**	**b**	**7.**	**c**	**8.**	**c**	**9.**	**b**	**10.**	**d**
11.	**a**	**12.**	**c**	**13.**	**a**	**14.**	**c**	**15.**	**a**	**16.**	**a**	**17.**	**c**	**18.**	**b**	**19.**	**c**	**20.**	**a**
21.	**d**	**22.**	**b**	**23.**	**c**	**24.**	**d**	**25.**	**c**	**26.**	**b**	**27.**	**c**	**28.**	**b**	**29.**	**a**	**30.**	**b**
31.	**b**	**32.**	**b**	**33.**	**b**	**34.**	**a**	**35.**	**a**	**36.**	**d**	**37.**	**a**	**38.**	**d**	**39.**	**b**	**40.**	**a**
41.	**b**	**42.**	**c**	**43.**	**a**	**44.**	**c**	**45.**	**a**	**46.**	**a**	**47.**	**d**	**48.**	**b**	**49.**	**c**	**50.**	**c**
51.	**d**	**52.**	**c**	**53.**	**b**	**54.**	**b**	**55.**	**b**	**56.**	**a**	**57.**	**a**	**58.**	**b**	**59.**	**b**	**60.**	**a**
61.	**b**	**62.**	**a**	**63.**	**b**	**64.**	**a**	**65.**	**c**	**66.**	**c**	**67.**	**a**	**68.**	**b**	**69.**	**b**	**70.**	**c**
71.	**a**																		

Summary Notes

Equations

Chapter **3**

EXERCISE

LINEAR EQUATION

In One Variable

1. The equation -7x + 1 = 5 – 3x will be satisfied for x equal to:
(a) 2 **(c)** 1
(b) -1 **(d)** none of these

2. Pick up the correct value of x $\frac{x}{30} = \frac{2}{45}$
(a) X = 5 **(c)** x = $1\frac{1}{3}$
(b) X = 7 **(d)** none of these

3. The solution of the equation $\frac{x+24}{5} = 4 + \frac{x}{4}$
(a) 6 **(c)** 16
(b) 10 **(d)** none of these

4. 8 is the solution of equation
(a) $\frac{x+4}{4} + \frac{x-5}{3} = 11$ **(c)** $\frac{x+24}{5} = 4 + \frac{x}{4}$
(b) $\frac{x+4}{2} + \frac{x+10}{9} = 8$ **(d)** $\frac{x-15}{10} + \frac{x+5}{5} = 4$

5. The value of y that satisfies the equation $\frac{y+11}{6} - \frac{y+1}{9} = \frac{y+7}{4}$ is
(a) -1 **(c)** 1
(b) 7 **(d)** $-\frac{1}{7}$

6. The solution of the equation (p+2) (p-3) + (p+3) (p-4) = p(2p-5) is
(a) 6 **(c)** 5
(b) 7 **(d)** none of these

7. The equation $\frac{12x+1}{4} = \frac{15x-1}{5} + \frac{2x-5}{3x-1}$ is true or
(a) X = 1 **(c)** x = 5
(b) X = 2 **(d)** x = 7

8. Pick up the correct value x for which $\frac{x}{0.5} - \frac{1}{0.05} + \frac{x}{0.005} - \frac{1}{0.0005} = 0$
(a) X = 0 **(c)** x = 10
(b) X = 1 **(d)** none of these

In Two Variable

9. The solution of the set of equations 3x + 4y = 7, 4x – y = 3 is
(a) (1, -1) **(c)** (2, 1)
(b) (1, 1) **(d)** (1, -2)

10. Solve for x and y : x – 3y = 0, x + 2y = 20.
(a) X = 4, y = 12 **(c)** x = 5, y = 4
(b) X = 12, y = 4 **(d)** none of these

11. 1.5x + 3.6y = 2.1, 2.5(x +1) = 6y
(a) (0.2, 0.5) **(c)** (2, 5)
(b) (0.5, 0.2) **(d)** (-2, -5)

12. $\frac{x}{p}+\frac{y}{q}=2$, x + y = p + q are satisfied by the values given by the pair.
(a) (x=p, y=q) **(c)** (x=1, y=1)
(b) (x=q, y=p) **(d)** none of these

13. The solution for the pair of equation $\frac{1}{16x}+\frac{1}{15y}=\frac{9}{20}, \frac{1}{20x}-\frac{1}{27y}=\frac{4}{45}$ is given by
(a) $\left(\frac{1}{4},\frac{1}{3}\right)$ **(c)** (3, 4)
(b) $\left(\frac{1}{3},\frac{1}{4}\right)$ **(d)** (4, 3)

14. The simultaneous equations 7x – 3y = 31, 9x – 5y = 41 have solutions given by
(a) (-4, -1) **(c)** (4, -1)
(b) (-1, 4) **(d)** (3, 7)

15. The values of x and y satisfying the equations $\frac{3}{x+y}+\frac{2}{x-y}=3, \frac{2}{x+y}+\frac{3}{x-y}=3\frac{2}{3}$ are given by
(a) (1, 2) **(c)** (1, ½)
(b) (-1, -2) **(d)** (2, 1)

In 3 Variable

16. $\frac{x}{4}=\frac{y}{3}=\frac{z}{2}$; 7x + 8y + 5z = 62
(a) (4, 3, 2) **(c)** (3, 4, 2)
(b) (2, 3, 4) **(d)** (4, 2, 3)

17. $\frac{xy}{x+y}=20, \frac{yz}{y+z}=40, \frac{zx}{z+x}=24$
(a) (120,60, 30) **(c)** (30, 120, 60)
(b) (60, 30, 120) **(d)** (30, 60, 120)

Word Problems

18. Monthly income of two persons are in the ratio 4 : 5 and their monthly expenses are in the ratio 7 : 9. If each saves Rs 50 per month find their monthly income.
(a) (500, 400) **(c)** (300, 600)
(b) (400, 500) **(d)** (350, 550)

19. Find the fraction which is equal to ½ when both its numerator and denominator are increased by 2. It is equal to ¾ when both are increased by 12.
(a) 3/8 **(c)** 2/8
(b) 5/8 **(d)** 2/3

20. The age of a person is twice the sum of the ages of his two sons and five years ago his age was thrice the sum of their ages. Find his present age.
(a) 60 years **(c)** 51 years
(b) 52 years **(d)** 50 years

21. A number between 10 and 100 is five times the sum of its digits. If 9 be added to it the digits are reserved find the number.

(a) 54 **(c)** 45

(b) 53 **(d)** 55

22. The wages of 8 men and 6 boys amount Rs 33. If 4 men earn Rs 4.50 more than 5 boys determine the wages of each man and boy.

(a) (Rs 1.50, Rs 3) **(c)** (Rs 2.50, Rs 2)

(b) (Rs 3, Rs 1.50) **(d)** (Rs 2, Rs 2.50)

23. A number consisting of two digits is four times the sum of its digits and if 27 be added to it the digits are reserved. The number is :

(a) 63 **(c)** 36

(b) 35 **(d)** 60

24. Of two numbers, $1/5^{th}$ of the greater is equal to $1/3^{rd}$ of the smaller and their sum is 16. The numbers are:

(a) (6, 10) **(c)** (12, 4)

(b) (9, 7) **(d)** (11, 5)

25. Y is older than x by 7 years, 15 years back x's ages was ¾ of y's age. Their present ages are:

(a) $(x = 36, y = 43)$ **(c)** $(x = 43, y = 50)$

(b) $(x = 50, y = 43)$ **(d)** $(x = 40, y = 47)$

26. Two numbers are such that twice the greater number exceeds twice the smaller one by 18 and $1/3^{rd}$ of the smaller and $1/5^{th}$ of the greater number are together 21. The numbers are:

(a) (36, 45) **(c)** (50, 41)

(b) (45, 36) **(d)** (55, 46)

27. The demand and supply equations for a certain commodity are $4q + 7p = 17$ and $p = \frac{q}{3} + \frac{7}{4}$. Respectively where p is the market price and q is the quantity then the equilibrium price and quantity are:

(a) $2, \frac{3}{4}$ **(c)** $5, \frac{3}{5}$

(b) $3, \frac{1}{2}$ **(d)** none of these

28. The sum of two numbers is 52 and their difference is 2. The numbers are

(a) 17 and 15 **(c)** 27 and 25

(b) 12 and 10 **(d)** none of these

29. The fourth part of a number exceeds the sixth part by 4. The number is

(a) 84 **(c)** 48

(b) 44 **(d)** none of these

30. Ten years ago the age of a father was four times of his son. Ten years hence the age of the father will be twice that of his son. The present ages of the father and the son are

(a) (50,20) **(c)** (55, 25)

(b) (60, 20) **(d)** none of these

QUADRATIC EQUATION

Finding Roots of Equation

What is the roots of the Following Equation?

31. $x^2-3x+2=0$

32. $x^2-13x+12=0$

33. $x^2-7x+12=0$

34. $x^2-15x+26=0$

35. $x^2+3x-70=0$

36. $x^2-12x+35=0$

37. The solution of equation $3x^2 - 17x + 24 = 0$ are

(a) $(2, 3)$ **(c)** $(3, 2\frac{2}{3})$

(b) $(2, 3\frac{2}{3})$ **(d)** $(3, \frac{2}{3})$

38. A solution of the quadratic equation $(a + b - 2c)\, x^2 + (2a - b - c)\, x + (c + a - 2b) = 0$ is

(a) $X = 1$ **(c)** $x = 2$

(b) $X = -1$ **(d)** $x = -2$

39. The values of x for the equation $x^2 + 9x + 18 = 6 - 4x$ are

(a) $(1, 12)$ **(c)** $(1, -12)$

(b) $(-1, -12)$ **(d)** $(-1, 12)$

40. If $x = m$ is one of the solutions of the equation $2x^2 + 5x - m = 0$ the possible values of m are

(a) $(0, 2)$ **(c)** $(0, 1)$

(b) $(0, -2)$ **(d)** $(1, -1)$

41. The satisfying the values of x for the equation $\frac{1}{x+p+q} = \frac{1}{x} + \frac{1}{p} + \frac{1}{q}$ are

(a) (p, q) **(c)** $(p, -p)$

(b) $(-p, -q)$ **(d)** $(-p, q)$

Problems Based on Nature of Roots

42. If the roots of the equation $2x^2 + 8x - m3 = 0$ are equal then the value of m is

(a) -3 **(c)** 1

(b) -1 **(d)** -2

43. The equation $x^2 - (p+4)x + 2p + 5 = 0$ has equal roots the value of p will be

(a) ± 1 **(c)** ± 2

(b) 2 **(d)** -2

44. The roots of equation $x^2 + (2p-1)x + p^2 = 0$ are real if

(a) $P \geq 1$ **(c)** $p \geq ¼$

(b) $P \leq 4$ **(d)** $p \leq ¼$

45. If $L + M + N = 0$ and L, M, N are rationals the roots of the equation $(M + N - L)x^2 + (N + L - M)x + (L + M - N) = 0$ are
(a) Real and irrational
(b) Real and rational
(c) Imaginary and equal real and equal
(d) None of these

Problem Based on Property of Roots

46. If $\alpha\beta$ be the roots of the equation $2x^2 - 4x - 3 = 0$ the value of $\alpha^2 + \beta^2$ is
(a) 5 **(c)** 3
(b) 7 **(d)** -4

47. If p and q are the roots of $x^2 + 2x + 1 = 0$ then the values of $p^3 + q^3$ becomes
(a) 2 **(c)** 4
(b) -2 **(d)** -4

48. If one root of $5^2x + 13x + p = 0$ be reciprocal of the other then the value of p is
(a) -5 **(c)** 1/5
(b) 5 **(d)** -1/5

49. If the root of the equation $x^2 - 8x + m = 0$ exceeds the other by 4 then the value of m is
(a) $M = 10$ **(c)** $m = 9$
(b) $M = 11$ **(d)** $m = 12$

50. If α and β are the roots of $x^2 = x + 1$ then the value of $\frac{\alpha^2}{\beta} - \frac{\beta^2}{\alpha}$ is
(a) $2\sqrt{5}$ **(c)** $3\sqrt{5}$
(b) $\sqrt{5}$ **(d)** $-2\sqrt{5}$

51. The equation $\left(\frac{l-m}{2}\right)x^2 - \left(\frac{l+m}{2}\right)x + m = 0$ has got two values of x to satisfy the equation given as
(a) $\left(1, \frac{2m}{l-m}\right)$ **(c)** $\left(1, \frac{2l}{l-m}\right)$
(b) $\left(1, \frac{m}{l-m}\right)$ **(d)** $\left(1, \frac{l}{l-m}\right)$

Equation Forming Problems

52. If $p \neq q$ and $p^2 = 5p - 3$ and $q^2 = 5q - 3$ the equation having roots as $\frac{p}{q}$ and $\frac{q}{p}$ is
(a) $X^2 - 19x + 3 = 0$ **(c)** $3x^2 - 19x + 3 = 0$
(b) $3x^2 - 19x - 3 = 0$ **(d)** $3x^2 + 19x + 3 = 0$

53. If α and β be the roots of the equation $X^2 + 3x + 4 = 0$, then find the equation whose roots are $(\alpha + \beta)^2$ and $(\alpha - \beta)^2$
(a) $X^2 - 2x - 63 = 0$ **(c)** $X^2 - 2x + 63 = 0$
(b) $X^2 + 2x + 63 = 0$ **(d)** None of These

Word Problems

54. The sum of two numbers is 8 and the sum of their squares is 34. Taking one number as x form an equation in x and hence find the numbers. The numbers are
(a) (7, 10) **(c)** (3, 5)
(b) (4, 4) **(d)** (2, 6)

55. The difference of two positive integers is 3 and the sum of their squares is 89. Taking the smaller integer as x form a quadratic equation and solve it to find the integers. The integers are
(a) (7, 4) **(c)** (3, 6)
(b) (5, 8) **(d)** (2, 5)

56. Five times of a positive whole number is 3 less than twice the square of the number. The number is
(a) 3 **(c)** – 3
(b) 4 **(d)** 2

57. The area of a rectangular field is 2000 sq.m and its perimeter is 180 m. form a quadratic equation by taking the length of the field as x and solve it to find the length and breadth of the field. The length and breadth are
(a) (205m, 80m) **(c)** (60m, 50m)
(b) (50m, 40m) **(d)** none

58. Two squares had sides p cm and (p+5) cms. The sum of their squares is 625 sq.cm. The sides of the squares are
(a) (10cm, 30cm) **(c)** (15cm, 20cm)
(b) (12cm, 25cm) **(d)** none of these

59. Divide 50into two parts such that the sum of their reciprocals is 1/12. The numbers are
(a) (24, 26) **(c)** (27, 23)
(b) (28, 22) **(d)** (20, 30)

60. There are two consecutive numbers such that the sum of their reciprocals is 1/240. The numbers are
(a) 15, 16) **(c)** (13, 14)
(b) (17, 18) **(d)** (12, 13)

61. The hypotenuse of a right-angled triangle is 20 cm. the difference between its other two sides be 4 cm. the sides are
(a) (11cm, 15cm) **(c)** (20cm, 24cm)
(b) (12cm, 16cm) **(d)** none of these

62. The sum of two number is 45 and the mean proportional between them is 18. The numbers are
(a) (15, 30) **(c)** (36, 9)
(b) (32, 13) **(d)** (25, 20)

63. The sides of an equilateral triangle are shortened by 12 units, 13 units and 14 units respectively and a right angle triangle is formed. The sides of the equilateral triangle is
(a) 17 units **(c)** 15 units
(b) 16 units **(d)** 18 units

64. The sum of two irrational numbers multiplied by the larger one is 70 and their difference is multiplied by the smaller one is 12; the two numbers are
(a) $3\sqrt{2}, 2\sqrt{3}$ **(c)** $2\sqrt{2}, 5\sqrt{2}$
(b) $5\sqrt{2}, 3\sqrt{5}$ **(d)** none of these

Advance Problems

65. If $2^{2x+3} - 3^2.2^x + 1 = 0$ then the values of x are
(a) 0, 1 **(c)** 0, 3
(b) 1, 2 **(d)** 0, -3

66. The values of $4 + \cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{4+\cdots\ldots\infty}}}$
(a) $1 \pm \sqrt{2}$ **(c)** $2 \pm \sqrt{5}$
(b) $2 + \sqrt{5}$ **(d)** none of these

67. If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is equal to the sum of the squares of their reciprocals then $\frac{a^2}{ac} + \frac{bc}{a^2}$ is equal to
(a) 2 **(c)** 1
(b) -2 **(d)** -1

CUBIC EQUATION

Finding Solution/Roots Based Problems

68. The cubic equation $x^3 + 2x^2 - x - 2 = 0$ has 3 roots namely.
(a) (1, -1, 2) **(c)** (-1, 2, -2)
(b) (-1, 1, -2) **(d)** (1, 2, 2)

69. The roots of the equation $x^3 + 7x^2 - 21x - 27 = 0$ are
(a) (-3, -9, -1) **(c)** (3, 9, 1)
(b) (3, -9, -1) **(d)** (-3, 9, 1)

70. The roots of $x^3 + x^2 - x - 1 = 0$ are
(a) (-1, -1, 1) **(c)** (-1, -1, -1)
(b) (1, 1, -1) **(d)** (1, 1, 1)

71. A rational root of the cubic equation $2x^3 - x^2 - 4x + 2 = 0$ is
(a) $\frac{1}{2}$ **(b)** $-\frac{1}{2}$
(c) 2 **(d)** -2

72. Factors of the equation $3x^2 + 5x^2 - 3x - 5 = 0$ are
(a) $x - 1, x - 2, x - 5/3$ **(b)** $x - 1, x + 1, 3x + 5$
(c) $x + 1, x - 1, 3x - 5$ **(d)** $x - 1, x + 1, x - 2$

Formation of Cubic Equations from given factors

73. Find cubic equation Whose roots are 1,2, -3?
(a) $x^3 - 7x^2 + 6 = 0$ **(c)** $x^3 + 7x^2 + 6 = 0$
(b) $x^3 + 7x^2 + 6 = 0$ **(d)** None of these

74. If $x, x - 4, x + 5$ are the factors of which cubic equation.
(a) $x^3 + 2x^2 - x - 2 = 0$ **(b)** $x^3 + x^2 - 20x = 0$
(c) $x^3 - 3x^2 - 4x + 12 = 0$ **(d)** $x^3 - 6x^2 + 11x - 6 = 0$

Answer Sheet

1.	**b**	**2.**	**c**	**3.**	**c**	**4.**	**b**	**5.**	**d**	**6.**	**a**	**7.**	**d**
8.	**c**	**9.**	**b**	**10.**	**b**	**11.**	**a**	**12.**	**a**	**13.**	**a**	**14.**	**c**
15.	**d**	**16.**	**a**	**17.**	**d**	**18.**	**b**	**19.**	**a**	**20.**	**d**	**21.**	**c**
22.	**b**	**23.**	**c**	**24.**	**a**	**25.**	**a**	**26.**	**b**	**27.**	**a**	**28.**	**c**
29.	**c**	**30.**	**a**	**31.**	**(2,1)**	**32.**	**(12,1)**	**33.**	**(4,3)**	**34.**	**(2,13)**	**35.**	**(-10,7)**
36.	**(5,7)**	**37.**	**c**	**38.**	**b**	**39.**	**b**	**40.**	**b**	**41.**	**b**	**42.**	**d**
43.	**c**	**44.**	**d**	**45.**	**b**	**46.**	**b**	**47.**	**b**	**48.**	**b**	**49.**	**d**
50.	**d**	**50.**	**d**	**50.**	**d**	**50.**	**d**	**50.**	**d**	**50.**	**d**	**50.**	**d**
57.	**b**	**58.**	**c**	**59.**	**d**	**60.**	**a**	**61.**	**b**	**62.**	**c**	**63.**	**a**
64.	**c**	**65.**	**d**	**66.**	**c**	**67.**	**a**	**68.**	**b**	**69.**	**b**	**70.**	**a**
71.	**a**	**72.**	**b**	**73.**	**a**	**74.**	**b**						

ADDITIONAL QUESTION BANK

1. Solving equation $x^2-(a+b)x+ab=0$ are, value(s) of x
(a) a, b **(b)** a **(c)** b **(d)** None

2. Solving equation $x^2-24x+135=0$ are, value(s) of x
(a) $9,6$ **(b)** $9,15$ **(c)** $15,6$ **(d)** None

3. If $\frac{x}{b}+\frac{b}{x}=\frac{a}{b}+\frac{b}{a}$ the roots of the equation are
(a) $a,b^2/a$ **(b)** $a^2,b/a^2$ **(c)** $a^2,b^2/a$ **(d)** a,b^2

4. Solving equation $\frac{6x+2}{4}+\frac{2x^2-1}{2x^2+2}=\frac{10x-1}{4x}$ we get roots as
(a) ±1 **(b)** $+1$ **(c)** -1 **(d)** 0

5. Solving equation $3x^2-14x+16=0$ we get roots as
(a) ±1 **(b)** $2 and \frac{8}{3}$ **(c)** 0 **(d)** None

6. Solving equation $3x^2-14x+8=0$ we get roots as
(a) ±4 **(b)** ±2 **(c)** $4\frac{2}{3}$ **(d)** None

7. Solving equation $(b-c)x^2(c-a)x+(a-b)=0$ following roots are obtained
(a) $\frac{a-b}{b-c},1$ **(b)** $(a-b)(a-c),1$ **(c)** $\frac{b-c}{a-b},1$ **(d)** None

8. Solving equation $7\sqrt{\frac{x}{1-x}}+8\sqrt{\frac{1-x}{x}}=15$ following roots are obtained
(a) $\frac{64}{113},\frac{1}{2}$ **(b)** $\frac{1}{50},\frac{1}{65}$ **(c)** $\frac{49}{50},\frac{1}{65}$ **(d)** $\frac{1}{50},\frac{64}{65}$

9. Solving equation $6\left[\sqrt{\frac{x}{1-x}}+\sqrt{\frac{1-x}{x}}\right]=13$ following roots are obtained
(a) $\frac{4}{13},\frac{9}{13}$ **(b)** $\frac{-4}{13},\frac{-9}{13}$ **(c)** $\frac{4}{13},\frac{5}{13}$ **(d)** $\frac{6}{13},\frac{7}{13}$

10. Solving equation $z^2-6z+9=4\sqrt{z^2-6z+6}$ following roots are obtained
(a) $3+2\sqrt{3},3-2\sqrt{3}$ **(b)** $5,1$ **(c)** all of above **(d)** None

11. Solving equation $\frac{x+\sqrt{12p-x}}{x-\sqrt{12p-x}}=\frac{\sqrt{p+1}}{\sqrt{p-1}}$ following roots are obtained
(a) $3p$ **(b)** both $3p and -4p$
(c) only $-4p$ **(d)** $-3p$ *and* $4p$

12. Solving equation $(1+x)^{2/3}+(1-x)^{2/3}=4(1-x^2)^{1/3}$ are, values of x
(a) $\frac{5}{\sqrt{3}}$ **(b)** $-\frac{5}{\sqrt{3}}$ **(c)** $\pm\frac{5}{3\sqrt{3}}$ **(d)** $\pm\frac{15}{\sqrt{3}}$

13. Solving equation $(2x+1)+(2x+3)(x-1)(x-2)=150$ the roots available are
(a) $\frac{1\pm\sqrt{129}}{4}$ **(b)** $\frac{7}{2},-3$ **(c)** $-\frac{7}{2},3$ **(d)** None

14. Solving equation $(2x+3)+(2x+5)(x-1)(x-2)=30$ the roots available are
(a) $0,\frac{1}{2},\frac{11}{4},\frac{9}{4}$ **(b)** $0,-\frac{1}{2},\frac{-1\pm\sqrt{105}}{4}$
(c) $0,-\frac{1}{2},-\frac{11}{4},\frac{9}{4}$ **(d)** None

15. Solving equation $z + \sqrt{z} = \frac{6}{25}$ the value of z works out to

(a) $\frac{1}{5}$ **(b)** $\frac{2}{5}$ **(c)** $\frac{1}{25}$ **(d)** $\frac{2}{25}$

16. Solving equation $z^{10} - 33z^5 + 32 = 0$ the following value of z are obtained

(a) $1, 2$ **(b)** $2, 3$ **(c)** $2, 4$ **(d)** $1, 2, 3$

17. When $\sqrt{2z+1} + \sqrt{3z+4} = 7$ the value of z is given by

(a) 1 **(b)** 2 **(c)** 3 **(d)** 4

18. Solving equation $\sqrt{x^2 - 9x + 18} + \sqrt{x^2 + 2x - 15} = \sqrt{x^2 - 4x + 3}$ following roots are obtained

(a) $3, \frac{2 \pm \sqrt{94}}{3}$ **(b)** $\frac{2 \pm \sqrt{94}}{3}$ **(c)** $4, -\frac{8}{3}$ **(d)** $3, 4 - \frac{8}{3}$

19. Solving equation $\sqrt{y^2 + 4y - 21} + \sqrt{y^2 - y - 6} = \sqrt{6y^2 - 5y - 39}$ following roots are obtained

(a) $2, 3, 5/3$ **(b)** $2, 3, -5/3$

(c) $-2, -3, 5/3$ **(d)** $-2, -3, -5/3$

20. Solving equation $6x^4 + 11x^3 - 9x^2 - 11x + 6 = 0$ following roots are obtained

(a) $\frac{1}{2}, -2, \frac{-1 \pm \sqrt{37}}{6}$ **(b)** $-\frac{1}{2}, 2, \frac{-1 \pm \sqrt{37}}{6}$

(c) $\frac{1}{2}, -2, \frac{5}{6}, \frac{-7}{6}$ **(d)** None

21. If $\frac{x-bc}{d+c} + \frac{x-ca}{c+a} + \frac{x-ab}{a+b} = a + b + c$ the value of x is

(a) $a^2 + b^2 + c^2$ **(b)** $a + (a + b + c)$

(c) $(a + b)(b + c)$ **(d)** $ab + bc + ca$

22. If $\frac{x+2}{x-2} - \frac{x-2}{x+2} = \frac{x-1}{x+3} - \frac{x+3}{x-3}$ then the value of x are

(a) $0, \pm\sqrt{6}$ **(b)** $0, \pm\sqrt{3}$ **(c)** $0, \pm 2\sqrt{3}$ **(d)** None

23. If $\frac{x-a}{b} + \frac{x-b}{a} = \frac{b}{x-a} + \frac{a}{x-b}$ then the value of x are

(a) $0, (a + b)(a - b)$ **(b)** $0, (a + b), \frac{a^2+b^2}{a+b}$

(c) $0, (a - b), \frac{a^2+b^2}{a+b}$ **(d)** $\frac{a^2+b^2}{a+b}$

24. If $\frac{x-a^2b^2}{c^2} + \frac{c^2}{x-a^2-b^2} = 2$ the value of is

(a) $a^2 + b^2 + c^2$ **(b)** $-a^2 - b^2 - c^2$

(c) $\frac{1}{a^2+b^2+c^2}$ **(d)** $-\frac{1}{a^2+b^2+c^2}$

25. Solving equation $\left(x - \frac{1}{x}\right)^2 - 6\left(x + \frac{1}{x}\right) + 12 = 0$ we get roots as follows

(a) 0 **(b)** 1 **(c)** -1 **(d)** None

26. Solving equation $\left(x - \frac{1}{x}\right)^2 - 10\left(x - \frac{1}{x}\right) + 24 = 0$ we get roots as follows

(a) 0 **(b)** 1

(c) -1 **(d)** $(2 \pm \sqrt{5}), (3 \pm \sqrt{10})$

27. Solving equation $2\left(x - \frac{1}{x}\right)^2 - 5\left(x + \frac{1}{x} + 2\right) + 18 = 0$ we get roots as under

(a) 0 **(b)** 1 **(c)** -1 **(d)** $-2 \pm \sqrt{3}$

28. If α, β are the roots of equation $x^2 - 5x + 6 = 0 and \alpha > \beta$ then the equation with roots and $(\alpha - \beta)$ is

(a) $x^2 - 6x + 5 = 0$ **(b)** $2x^2 - 6x + 5 = 0$

(c) $2x^2 - 5x + 6 = 0$ **(d)** $x^2 - 5x + 6 = 0$

29. If α, β are the roots of equation $x^2 - 5x + 6 = 0 and\ \alpha > \beta$ then the equation with root $(\alpha^2 + \beta)$ and $(\alpha + \beta^2)$ is

(a) $x^2 - 9x + 99 = 0$ **(b)** $x^2 - 18x + 90 = 0$

(c) $x^2 - 18x + 77 = 0$ **(d)** None

30. If α, β are the roots of equation $x^2 - 5x + 6 = 0 and \alpha > \beta$ then the equation with roots $(\alpha\beta + \alpha + \beta)$ and $(\alpha\beta - \alpha - \beta)$ is

(a) $x^2 - 12x + 11 = 0$ **(b)** $2x^2 - 6x + 12 = 0$

(c) $x^2 - 12x + 12 = 0$ **(d)** None

31. The condition that one of $ax^2 + bx + c = 0$ the roots of is twice the other is

(a) $b^2 = 4ca$ **(b)** $2b^2 = 9(c + a)$

(c) $2x^2 = 9ca$ **(d)** $2b^2 = 9(c - a)$

32. The condition that one of $ax^2 + bx + c = 0$ the roots of is thrice the other is

(a) $3b^2 = 16ca$ **(b)** $b^2 = 9ca$

(c) $3b^2 = -16ca$ **(d)** $b^2 = -9ca$

33. If the roots of $ax^2 + bx + c = 0$ are in the ratio $\frac{p}{q}$ then the value of $\frac{b^2}{(ca)}$ is

(a) $\frac{(p+q)^2}{(pq)}$ **(b)** $\frac{(p+q)}{(pq)}$ **(c)** $\frac{(p-q)^2}{(pq)}$ **(d)** $\frac{(p-q)}{(pq)}$

34. Solving $6x + 5y - 16 = 0$ and $3x - y - 1 = 0$ we get values of x and y as

(a) $1,1$ **(b)** $1, 2$ **(c)** $-1, 2$ **(d)** $0, 2$

35. Solving $x^2 + y^2 - 25 = 0$ and $x - y - 1 = 0$ we get the roots as under

(a) $\pm 3 \pm 4$ **(b)** $\pm 2 \pm 3$

(c) $0, 3, 4$ **(d)** $0, -3, -4$

36. Solving $\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} - \frac{5}{2} = 0$ and $x + y - 5 = 0$ we get the roots as under

(a) $1, 4$ **(b)** $1, 2$ **(c)** $1, 3$ **(d)** $1, 5$

37. Solving $\frac{1}{x^2} + \frac{1}{y^2} - 13 = 0$ and $\frac{1}{x} + \frac{1}{y} - 5 = 0$ we get the roots as under

(a) $\frac{1}{8}, \frac{1}{5}$ **(b)** $\frac{1}{2}, \frac{1}{3}$ **(c)** $\frac{1}{13}, \frac{1}{5}$ **(d)** $\frac{1}{4}, \frac{1}{5}$

38. Solving $x^2 + xy - 21 = 0$ and $xy - 2y^2 + 20 = 0$ we get the roots as under

(a) $\pm 1, \pm 2$ **(b)** $\pm 2, \pm 3$ **(c)** $\pm 3, \pm 4$ **(d)** None

39. Solving $x^2 + xy + y^2 = 37$ and $3xy + 2y^2 = 68$ we get the following roots

(a) $\pm 3, \pm 4$ **(b)** $\pm 4, \pm 5$ **(c)** $\pm 2, \pm 3$ **(d)** None

40. Solving $4^x . 2^y = 128$ and $3^{3x+2y} = 9^{xy}$ we get the following roots

(a) $\frac{7}{4}, \frac{7}{2}$ **(b)** $2,3$ **(c)** $1,2$ **(d)** $1,3$

41. Solving $9^x = 3^y$ and $5^{x+y+1} = 25^{xy}$ we get the following roots

(a) $1, 2$ **(b)** $0,1$ **(c)** $0, 3$ **(d)** $1, 3$

42. Solving $9x + 3y - 4z = 3, x + y = 0$ and $2x - 5y - 4z = 0$ following roots are obtained

(a) $2, 3, 4$ **(b)** $1, 3, 4$ **(c)** $1, 2, 3$ **(d)** None

43. Solving $x + 2y + 2z = 0, 3x - 4y + z = 0$ and $x^2 + 3y^2 + z^2 = 11$ following roots are obtained

(a) $2,1, -2 and -2, -1,2$ **(b)** $2,1,2\ and\ -2, -1, -2$

(c) only $2,1, -2$ **(d)** only $-2, -1,2$

44. Solving $x^3 - 6x^2 + 11x - 6 = 0$ get the following roots

(a) $-1, -2, 3$ **(b)** $1, 2, -3$

(c) $1, 2, 3$ **(d)** $-1, -2, -3$

45. Solving $x^3 + 9x^2 - x - 9 = 0$ get the following roots

(a) $\pm 1, -9$ **(b)** $\pm 1, \pm 9$ **(c)** $\pm 1, 9$ **(d)** None

46. It is being given that one of the roots is half the sum of the order two solving $x^3 - 12x^2 + 47x - 60 = 0$ get the following roots :

(a) $1, 2, 3$ **(b)** $3, 4, 5$

(c) $2, 3, 4$ **(d)** $-3, -4, -5$

47. Solve $x^3 + 3x^2 - x - 3 = 0$ given that the roots are in arithmetical progression

(a) $-1, 1, 3$ **(b)** $1, 2, 3$

(c) $-3, -1, 1$ **(d)** $-3, -2, -1$

48. Solve $x^3 - 7x^2 + 14x - 8 = 0$ given that the roots are in geometrical progression

(a) ½, $1, 2$ **(b)** $1, 2, 4$

(c) $\frac{1}{2}, -1, 2$ **(d)** $-1, 2, -4$

49. Solve $x^3 - 6x^2 + 5x + 12 = 0$ given that the product of the two roots is 12

(a) $1, 3, 4$ **(b)** $-1, 3, 4$

(c) $1, 6, 2$ **(d)** $1, -6, -2$

50. Solve $x^3 - 5x^2 - 2x + 24 = 0$ given that two of its roots being in the ratio of 3:4

(a) $-2, 4, 3$ **(b)** $-1, 4, 3$

(c) $2, 4, 3$ **(d)** $-2, -4, -3$

ANSWERS

1.	(a)	**18.**	(a)	**35.**	(a)
2.	(b)	**19.**	(b)	**36.**	(a)
3.	(a)	**20.**	(a)	**37.**	(b)
4.	(b)	**21.**	(d)	**38.**	(c)
5.	(b)	**22.**	(d)	**39.**	(a)
6.	(c)	**23.**	(d)	**40.**	(a), (b)
7.	(a)	**24.**	(a)	**41.**	(a)
8.	(a)	**25.**	(b)	**42.**	(c)
9.	(a)	**26.**	(d)	**43.**	(a)
10.	(c)	**27.**	(d)	**44.**	(c)
11.	(a)	**28.**	(a)	**45.**	(a)
12.	(c)	**29.**	(c)	**46.**	(b)
13.	(a)	**30.**	(a)	**47.**	(c)
14.	(b)	**31.**	(c)	**48.**	(b)
15.	(c)	**32.**	(a)	**49.**	(b)
16.	(a)	**33.**	(a)	**50.**	(a)
17.	(d)	**34.**	(b)		

ALP-NO-3A

Tutorial Note: This ALP Sheets are designed for Students Self Practice if any difficulty arrives then students Should Refer Lectures This Will Develop There Mind to Deal with New Problems in Exams

1. If the ratio of (5x – 3y) and (5y – 3x) is 3 : 4, then the value of x : y is:
(a) 27 : 29 (c) 3 : 4
(b) 29 : 27 (d) 4 : 3

2. If roots of equation $x^2 + x + r = 0$ are '$\propto$' and 'β' and $\propto^3 + \beta^3 = -6$. Find the value of 'r'?
(a) $\frac{-5}{3}$ (c) $\frac{-4}{3}$
(b) $\frac{7}{3}$ (d) 1

3. If one root of the equation $px^2 + qx + r = 0$ is r then other root of the equation will be:
(a) 1/q (c) 1/p
(b) 1/r (d) $\frac{1}{p+q}$

4. If the ratio of the roots of the equation $4x^2 - 6x + p = 0$ is 1 : 2 then the value of p is:
(a) 1 (c) -2
(b) 2 (d) -1

5. The minimum value of the function $x^2 - 6x + 10$ is _____.
(a) 1 (c) 3
(b) 2 (d) 10

6. If p & q are the roots of the equation $x^2 - bx + C = 0$, then what is the equation whose roots are (pq + p + q) and (pq – p –q)?
(a) $x^2 - 2cx + c^2 - b^2 = 0$
(b) $8cx^2 - 2(b+c)x + c^2$
(c) $x^2 - 2bx + C^2 + b^2 = 0$
(d) $x^2 + 2bx - (C^2 - b^2) = 0$

7. If arithmetic mean between roots of a quadratic equation is 8 and the geometric mean between them is 5, the equation is _____.
(a) $x^2 - 16x - 25 = 0$
(b) $x^2 - 16x + 25 = 0$
(c) $x^2 - 16x + 5 = 0$
(d) none of these

8. The equation of the straight line passing through the intersection of 4x – 3y – 1 = 0 and 2x – 5y + 3 = 0 and parallel to 4x + 5y = 6 is:
(a) 4x + 5y – 12 = 0
(b) 4x + 5y – 16 = 0
(c) 4x + 5y – 9 = 0
(d) 4x + 5y – 4 = 0

9. If |x - 2| + |x - 3| = 7 then, 'x' will be equal to
(a) 6 (c) 6 and -1
(b)-1 (d) none of the above

10. Roots of equation $2x^2 + 3x + 7 = 0$ are α and β. The value of $\alpha\beta^{-1} + \beta\alpha^{-1}$ is
(a) 2 (c) 7/2
(b) 3/7 (d) -19/14

Answers

1.	**a**	2.	**a**	3.	**c**	4.	**b**	5.	**a**
6.	**a**	7.	**b**	8.	**c**	9.	**c**	10.	**d**

ALP-NO-3B

1. The present age of a man is 8 years more than thrice the sum of the ages of his two grandsons who are twins. After 8 years, his age will be 10 years more than twice the sum of the ages of his grandsons. The age of a man when his grandsons were born was:
(a) 86 years (c) 68 years
(b) 73 years (d) 63 years

2. The roots of the cubic equation $x^3 - 7x + 6 = 0$ are:
(a) 1, 2 and 3 (c) 1, 2 and -3
(b) 1, -2 and 3 (d) 1, -2 and -3

3. If the roots of the equation $4x^2 - 12x + k = 0$ are equal, then the value of k is:
(a) -3 (c) -9
(b) 3 (d) 9

4. If 3x – y = 2, 5x + ay = 3 and 2x + y = 3 are concurrent lines, then the value of 'a' is:
(a) -1 (c) 2
(b) -2 (d) 3

5. The equation of line passing through the point of intersection of the lines y = 3 and x + y = 0 and parallel to the 2x – y = 4 is:
(a) 2x – y + 9 = 0 (c) x – 2y + 9 = 0
(b) 2x – y – 9 = 0 (d) x + 2y – 9 = 0

6. If $\alpha + \beta = -2$ and $\alpha\ \beta = -3$, then α, β are the roots of the equation, which is:
(a) $x^2 - 2x - 3 = 0$ (c) $x^2 + 2x + 3 = 0$
(b) $x^2 + 2x - 3 = 0$ (d) $x^2 - 2x + 3 = 0$

7. If α, β are the roots of the equation $x^2 + x + 5 = 0$ then $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$ is equal to
(a) $\frac{16}{5}$ (c) 3
(b) 2 (d) $\frac{14}{5}$

8. If $\frac{3}{x+y} + \frac{2}{x-y} = -1 and\ \frac{1}{x+y} - \frac{1}{x-y} = \frac{4}{3}$ then (x, y) is:
(a) (2, 1) (c) (-1, 2)
(b) (1, 2) (d) (-2, 1)

9. The roots of the cubic equation $x^3 + 7x^2 - 21x - 27 = 0$ are
(a) -1, 3, 9 (c) -1, 3, -9
(b) 1, -3, 9 (d) -1, -3, 9

10. The difference between the roots of the equation $x^2 - 7x - 9 = 0$ is:
(a) 7 (c) 9
(b) $\sqrt{85}$ (d) $2\sqrt{85}$

Answers

1.	**b**	2.	**c**	3.	**d**	4.	**b**	5.	**a**
6.	**b**	7.	**d**	8.	**b**	9.	**c**	10.	**b**

ALP-NO-3C

1. The value of k for which the points (k, 1), (5, 5) and (10, 7) may be collinear is:
(a) K – 5 (c) K = 9
(b) K = 7 (d) k = 1

2. If the sides of an equilateral triangle are shortened by 3 units, 4 units and 5 units respectively and a right triangle is formed, then the side of an equilateral triangle is:
(a) 6 units (c) 8 units
(b) 7 units (d) 10 units

3. If α, β are the roots of the equation $x^2 + x + 5 = 0$ then $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$ is equal to
(a) $\frac{16}{5}$ (c) 3
(b) 2 (d) $\frac{14}{5}$

4. If $\alpha + \beta = -2$ and $\alpha\beta = -3$, then α, β are the roots of the equation, which is:
(a) $x^2 - 2x - 3 = 0$ (c) $x^2 + 2x + 3 = 0$
(b) $x^2 + 2x - 3 = 0$ (d) $x^2 - 2x + 3 = 0$

5. If $2^{x+y} = 2^{2x-y} = \sqrt{8}$, then the respective values of x and y are_____
(a) $1, \frac{1}{2}$ (c) $\frac{1}{2}, \frac{1}{2}$
(b) $\frac{1}{2}, 1$ (d) none of these

Answers

1.	a	2.	c	3.	d	4.	B	5.	a

Linear Inequalities

Chapter 4

EXERCISE

Formation of Inequality

1. An employer recruits experienced (x) and fresh workmen (y) for his firm under the condition that he cannot employ more than 9 people. X and y can be related by the inequality

(a) $X + y \neq 9$ **(c)** $x + y \geq 9, x \geq 0, y \geq 0$

(b) $x + y \leq 9, x \geq 0, y \geq 0$ **(d)** none of these

2. On the average experienced person does 5 units of work while a fresh one 3 units of work daily but the employer has to maintain an output of al least 30 units of work per day. This situation can be expressed as

(a) $5x + 3y \leq 30$ **(c)** $5x + 3y \geq x \geq 0, y \geq 0$

(b) $5x + 3y > 30$ **(d)** none of these

3. The rules and regulations demand that the employer should employ not more than 5 experienced hands to 1 fresh one and this fact can be expressed as

(a) $Y \geq x/5$ **(c)** $5y \geq x$

(b) $5y \leq x$ **(d)** none of these

4. The union however forbids him to employ less than 2 experienced persons to each fresh person. This situation can be expressed as

(a) $X \leq y/2$ **(c)** $y \geq x/2$

(b) $Y \leq x/2$ **(d)** $x > 2y$

5. A dietitian wishes to mix together two kinds of food so that the vitamin content of the mixture is at least 9 units of vitamin A, 7 units of vitamin B, 10 units of vitamin C and 12 units of vitamin D. the vitamin content per kg of each food is shown below:

	A	B	C	D
Food I:	2	1	1	2
Food II:	1	1	2	3

Assuming x units of food I is to be mixed with y units of food II the situation can be expressed as

(a) $2x + y \leq 9$
$x + y \leq 7$
$x + 2y \leq 10$
$2x + 3y \leq 12$
$x > 0, y > 0$

(b) $2x + y \geq 30$
$x + y \leq 7$
$x + 2y \geq 10$
$x + 3y \geq 12$

(c) $2x + y \geq 9$
$x + y \geq 7$
$x + y \leq 10$
$x + 3y \geq 12$

(d) $2x + y \geq 9$
$x + y \geq 7$
$x + 2y \geq 10$
$2x + 3y \geq 12$
$x \geq 0, y \geq 0$

6. A firm makes two types of products: type A and type B. The profit on product A is Nu. 20 each and that on product B is Nu. 30 each. Both types are processed on three machines M1, M2 and M3. The time required in hours by each product and total time available in hours per week on each machine are as follows:

Machine	Product A	Product B	Available time
M1	3	3	36
M2	5	2	50
M3	2	6	60

The constraints can be formulated taking x_1 = number of units A and x_2 = number of units B as

(a) $X_1 + x_2 \leq 12$
$5x_1 + 2x_2 \leq 50$
$2x_1 + 6x_2 \leq 60$
$x_1 \geq 0, x_2 \geq 0$

(b) $3x_1 + 3x_2 \geq 36$
$5x_1 + 2x_2 \leq 50$
$2x_1 + 6x_2 \geq 60$
$x_1 \geq 0, x_2 \geq 0$

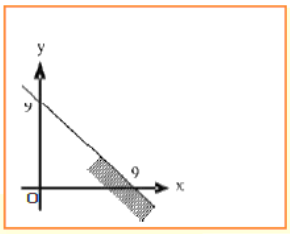
(c) $3x_1 + 3x_2 \leq 36$
$5x_1 + 2x_2 \leq 50$
$2x_1 + 6x_2 \leq 60$

(d) none of these

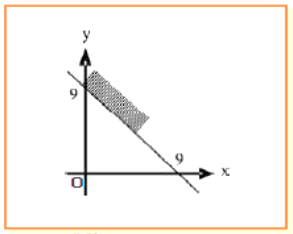
Equation Is Given & Graph Is Asked

7. The graph to express the inequality $x + y \leq 9$ is

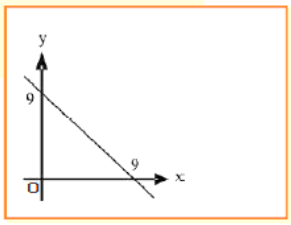
(a)



(b)



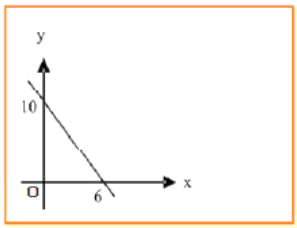
(c)



(d) none of these

8. The graph to express the inequality $5x + 3y \geq 30$ is

(a)



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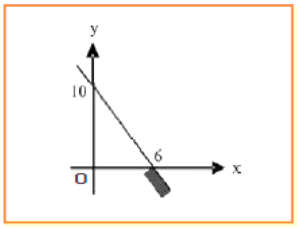
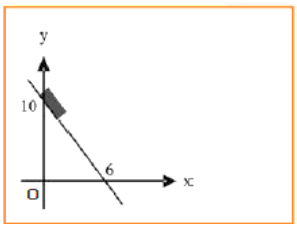


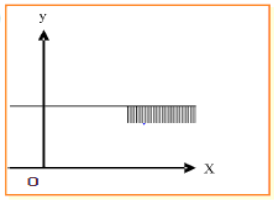
(c)



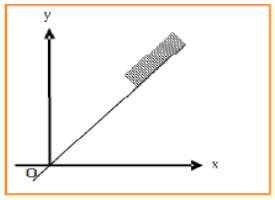
(d) none of these

9. The graph to express the inequality $y \leq \left(\frac{1}{2}\right) x$ is indicated by

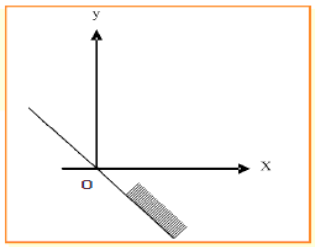
(a)



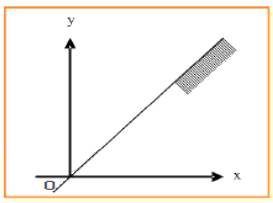
(b)



(c)

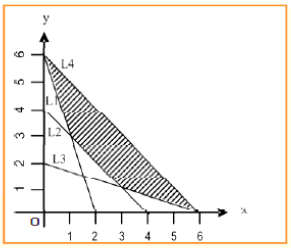


(d)

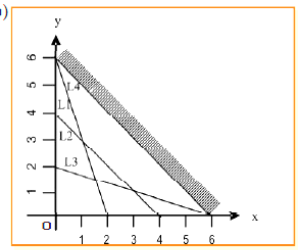


10. The common region satisfied by the in equalities L1: $3x + y \geq 6$, L2: $x + y \geq 4$, L3: $x + 3y \geq 6$, and L4 : $x + y \leq 6$ is indicated by :

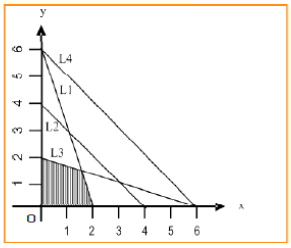
(a)



(b)



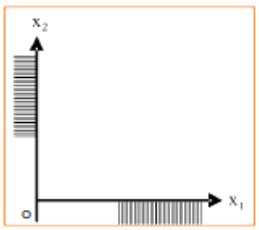
(c)



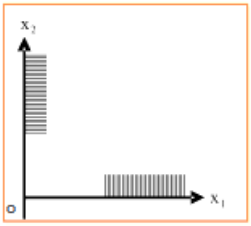
(d) none of these

11. The in equalities $x_1 \geq 0$, $x_2 \geq 0$, are represented by one of the graphs shown below:

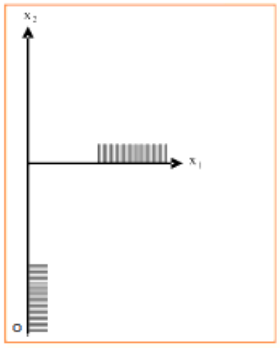
(a)



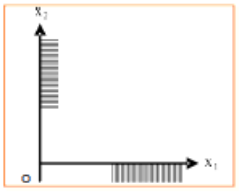
(b)



(c)

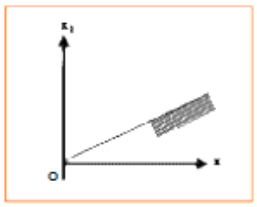


(d)

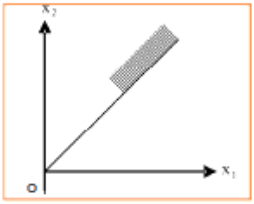


12. The inequality $-x_1 + 2x_2 \leq 0$ is indicated on the graph as

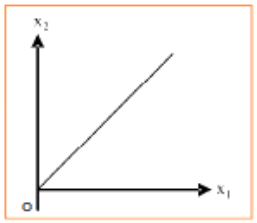
(a)



(b)



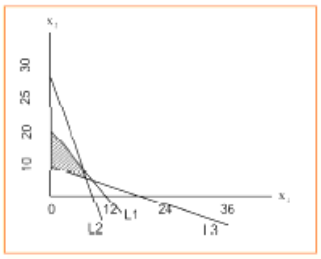
(c)



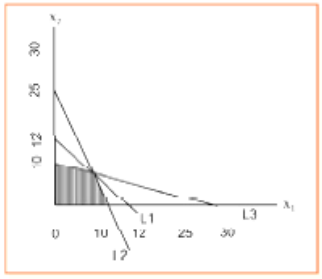
(d) none of these

13. The set of in equalities L1; $x_1 + x_2 \leq 12$, L2: $5x_1 + 2x_2 \leq 50$, L3 : $x_1 + 3x_2 \leq 30$, $x_1 \geq 0$, and $x_2 \geq 0$ is represented by

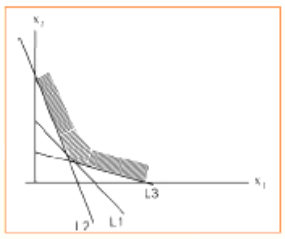
(a)



(b)

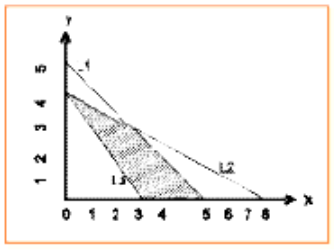


(c)

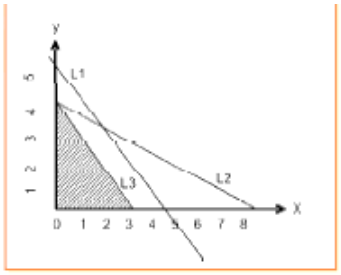


14. The common region satisfying the set of inequalities
$x \geq 0, y \geq 0$, **L1** : $x + y \leq 5$, **L2** : $x + 2y \leq 8$ and **L3** : $4x + 3y \geq 12$ is indicated by

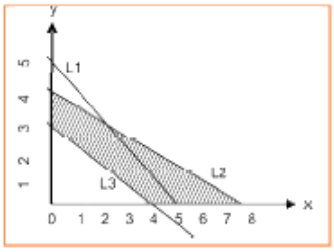
a)



(b)



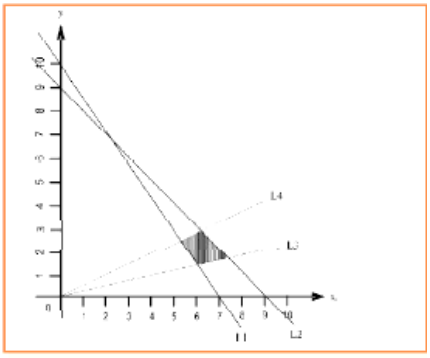
c)



(d) none of these

Graph Is Given & Inequality Is Asked

15. The common region (shaded part) shown in the diagram refers to



L1 : $5x + 3y = 30$ **L2** : $x + y = 9$ **L3** : $y = x/3$ **L4** : $y = x/2$

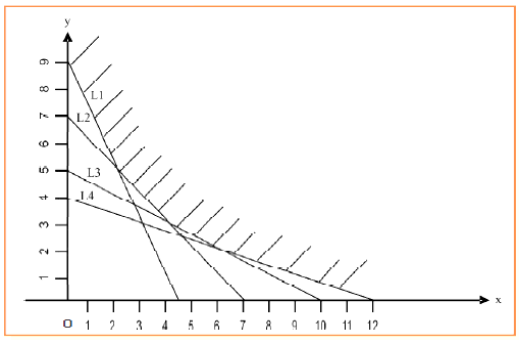
(a) $5x + 3y \le 30$
$x + y \le 9$
$y \le 1/5x$
$y \le x/2$

(b) $5x + 3y \ge 30$
$x + y \ge 9$
$y \ge x/3$
$y \le x/2$
$x \ge 0, y \ge 0$

(c) $5x + 3y \ge 30$
$x + y \ge 9$
$y \le x/3$
$y \ge x/2$
$x \ge 0, y \ge 0$

(d) $5x + 3y > 30$
$x + y < 9$
$y \ge 9$
$y \le x/2$
$x \ge 0, y \ge 0$

16. Graphs of the in equations are drawn below:



L1 : $2x + y = 9$ **L2** : $x + y = 7$ **L3** : $x + 2y = 10$ **L4** : $x + 3y = 12$

The common region (shaded part) indicated on the diagram is expressed by the set of inequalities

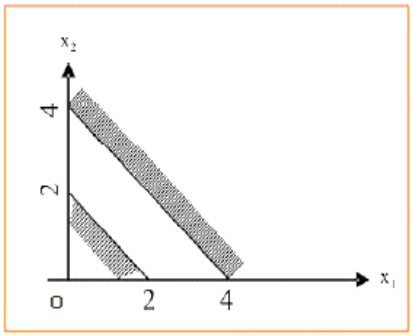
(a) $2x + y \le 9$
$x + y \ge 7$
$x + 2y \ge 10$
$x + 3y \ge 12$

(b) $2x + y \ge 9$
$x + y \le 7$
$x + 2y \ge 10$
$x + 3y \ge 12$

(c) $2x + y \ge 9$
$x + y \ge 7$
$x + 2y \ge 10$
$x + 3y \ge 12$
$x \ge 0, y \ge 0$

(d) none of these

17. The region indicated by the shading in the graph is expressed by in equalities



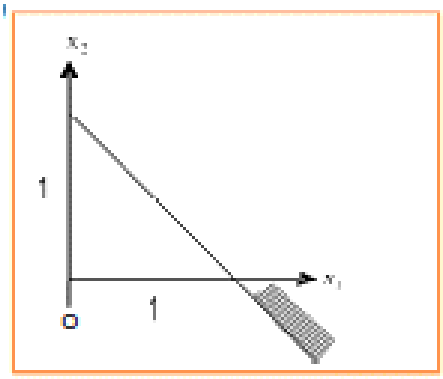
(a) $x_1 + x_2 \le 2$
$2x_1 + 2x_2 \ge 8$
$x_1 \ge 0, x_2 \ge 0$

(b) $x_1 + x_2 \le 2$
$x_2x_1 + x_2 \le 4$

(c) $x_1 + x_2 \ge 2$
$2x_1 + 2x_2 \ge 8$

(d) $x_1 + x_2 \le 2$
$2x_1 + 2x_2 > 8$

18. The region is expressed as



(a) $X_1 - x_2 \geq 1$
(b) $X_1 + x_2 \leq 1$
(c) $X_1 + x_2 \geq 1$
(d) None of these

Finding Solution of Equation

19. On solving the inequalities $2x + 5y \leq 20$, $3x + 2y \leq 12$, $x \geq 0$, $y \geq 0$, we get the following situation
(a) (0, 0), (0, 4), (4, 0) and (20/11, 36/11)
(b) (0, 0), (10, 0), (0, 6) and (20/11, 36/11)
(c) (0, 0), (0, 4), (4, 0) and (2, 3)
(d) (0, 0), (10, 0), (0, 6) and (2, 3)

20. On solving the inequalities $6x + y \geq 18$, $x + 4y \geq 12$, $2x + y \geq 10$, we get the following situation
(a) (0, 18), (12, 0), (4, 2) and (2, 6)
(b) (3, 0), (0, 3), (4, 2) and (7, 6)
(c) (5, 0), (0, 10), (4, 2) and (7, 6)
(d) (0, 18), (12, 0), (4, 2), (0, 0) and (7, 6)

Miscellaneous Problems

21. If $\left|x + \frac{1}{4}\right| > \frac{7}{4}$, then:

(a) $x < \frac{-3}{2}$ or $x > 2$ **(b)** $x < -2$ or $x > \frac{3}{2}$
(c) $-2 < x < \frac{3}{2}$ **(d)** none of these

22. If $\left|\frac{3x-4}{4}\right| \leq \frac{5}{12}$, then solution set is :

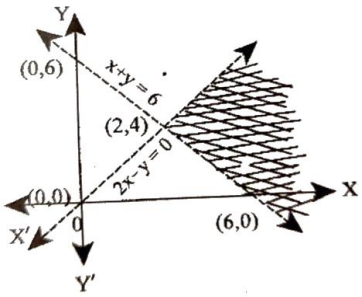
(a) $\left\{x: \frac{19}{18} \leq x \leq \frac{29}{18}\right\}$ **(b)** $\left\{x: \frac{7}{9} \leq x \leq \frac{17}{9}\right\}$
(c) $\left\{x: \frac{-29}{18} \leq x \leq \frac{-19}{18}\right\}$ **(d)** none of these

23. On solving the inequalities
$6x + y \geq 18$, $x + 4y \geq 12$, $2x + y \geq 10$, we get the following situation:
(a) (0,18), (12, 0), (4, 2) & (7, 6)
(b) (3, 0), (0,3), (4, 2) & (7, 6)
(c) (5, 0), (0, 10), (4, 2) & (7, 6)
(d) (0, 18), (12, 0), (4, 2), (0, 0) and (7, 6)

24. The rules and regulations demand that the employer should employ not more than 5 experienced hands to 1 fresh one and this fact is represented by: (taking experienced person as x and fresh person as y)

(a) $y \geq \frac{x}{5}$ **(b)** $5y \leq x$
(c) $5y \geq x$ **(d)** none

25. The shaded region represents:



(a) $x + y > 6, 2x - y > 0$ **(b)** $x + y < 6, 2x - y > 0$
(c) $x + y > 6, 2x - y < 0$ **(d)** none of these

26. If $a > 0$ and $b < 0$, it followings that:

(a) $\frac{1}{a} > \frac{1}{b}$ **(b)** $\frac{1}{a} < \frac{1}{b}$
(c) $\frac{1}{a} = \frac{1}{b}$ **(d)** none of these

27. The common region represented by the inequalities $2x + y \geq 8, x + y \geq 12, 3x + 2y \leq 34$ is

(a) Unbounded **(b)** In feasible
(c) Feasible and bounded **(d)** Feasible and unbounded

Answer Sheet

1.	**c**	**2.**	**c**	**3.**	**a**	**4.**	**b**	**5.**	**d**	**6.**	**c**	**7.**	**a**	**8.**	**c**	**9.**	**d**	**10.**	**a**
11.	**b**	**12.**	**b**	**13.**	**b**	**14.**	**a**	**15.**	**d**	**16.**	**c**	**17.**	**a**	**18.**	**c**	**19.**	**a**	**20.**	**a**
21.	**b**	**22.**	**b**	**23.**	**a**	**24.**	**a,c**	**25.**	**a**	**26.**	**a**	**27.**	**c**						

Summary Notes

Time Value of Money

Chapter 5

EXERCISE

Problems on Simple Interest

1. S.I on Rs. 3500 for 3 years at 12% per annum is
(a) Rs. 1200 **(b)** 1260 **(c)** 2260 **(d)** none of these

2. P = 5000, R = 15, T = 4½ using 1 = PRT/100, 1 will be
(a) Rs. 3375 **(b)** Rs. 3300 **(c)** Rs. 3735 **(d)** none of these

3. If P = 5000, T = 1, I = Rs. 300, R will be
(a) 5% **(b)** 5% **(c)** 6% **(d)** none of these

4. If P = Rs. 4500, A = Rs. 7200, then Simple interest i.e. I will be
(a) Rs. 2000 **(b)** 3000 **(c)** Rs. 2500 **(d)** Rs.2700

5. P = Rs. 12000, A = Rs. 16500, T = 2½ years, Rate percent per annum simple interest will be
(a) 15% **(b)** 12% **(c)** 10% **(d)** none of these

6. P = Rs. 10000, I = Rs. 2500, R =12½% SI. The number of years T will be
(a) 1½ years **(b)** 2 years **(c)** 3 years **(d)** none of these

7. P = Rs. 8500, A = Rs. 10200, R = 12½% SI, t will be.
(a) 1 yr. 7 month. **(b)** 2 yrs. **(c)** 1½ yr. **(d)** none of these

8. The sum required to earn a monthly interest of Rs. 1200 at 18% per annum SI is
(a) Rs. 50000 **(b)** Rs. 60000 **(c)** Rs. 80000 **(d)** none of these

9. A sum of money amount to Rs. 6200 is 2 years and Rs. 7400 in 3 years. The principal and rate of interest are
(a) Rs. 3800 31.57% **(b)** Rs. 3000, 20%
(c) Rs. 3500, 15% **(d)** none of these

10. A sum of money doubles itself in 10 years. The number of years it would triple itself is
(a) 25 years. **(b)** 15 years. **(c)** 20 years **(d)** None of these

11. A lent a sum at 4% S.I. If interest in 8 years was Rs 3,400 less than the sum, find the sum
(a) Rs. 7,000 **(b)** Rs. 5,000 **(c)** Rs. 5,700 **(d)** Rs. 6,000

12. Out of Rs. 70,000, I invest Rs. 30,000 at 4% & Rs. 20,000 at 3% S. I.. At what rate of interest must I invest the balance to get a return of 5% on whole amount per annum?
(a) 5% **(b)** 7% **(c)** 8% **(d)** 8.5%

13. X, Y and Z are the three sums of money such that Y is the simple interest on X and Z is the simple interest on Y for the same time and rate. The relation between X, Y and Z is.
(a) $x^2 = YZ$ **(b)** $Y^2 = ZX$ **(c)** $Z^2 = XY$ **(d)** XYZ = 1

14. What sum will discharge a debt of Rs. 5,300 due after one and half year at 5% p.a. simple interest today.
(a) Rs. 4,730 **(b)** Rs. 4,630 **(c)** Rs. 4,930 **(d)** Rs. 4,830

15. A sum of Rs. 46,875 was lent out at simple interest and at the end of 1 year 8 months the total amount was Rs. 50,000. Find the rate of interest per cent per annum.
(a) 4% **(b)** 5% **(c)** 7% **(d)** None

16. It the simple interest on Rs. 20,000 increases by Rs. 4,000 with the increase of time by 4 Yrs. Find the rate per cent per annum.
(a) 0.15% **(b)** 0.5% **(c)** 5% **(d)** None

17. If the difference between simple interest on Rs. 4,000 and on Rs. 6,500 for 5 Yrs. Be Rs. 800 at same rate of simple interest per annum. Then the rate of interest is
(a) 5.3% **(b)** 6.2% **(c)** 6.4% **(d)** None

18. A certain sum of money trebles itself in 10 years at a certain rate of S.I. p.a. then the rate of interest is
(a) 20% **(b)** 10% **(c)** 5% **(d)** None

19. A certain sum of money amounts to Rs.756 in 2 years and to Rs. 873 in 3.5 years at same rate of S.I. p.a. The rate of interest is
(a)12% **(b)** 13% **(c)** 14% **(d)** None

20. Mrs. Sudha lent Rs. 4,000 in such a way that some amount to Mr.A at 3% p.a. S.I. and rest amount to B at 5% p.a. S.I, the annual interest from both is Rs.144, Find the amount lent to Mr. A
(a) Rs. 2,800 **(b)** Rs. 1,200 **(c)** Rs. 2,500 **(d)** None

21. Rs. 1,521 is lent out in two parts in such a way that the S.I. on 1st part at 10% for 5 years is equal to that on 2nd part at 8% for 10 years. Find the both parts.
(a) Rs. 1,000 ; Rs. 521 **(b)** Rs. 920; Rs. 601
(c) Rs.936; Rs. 585 **(d)** None

22. A certain sum of money become six times at 5% S.I. p.a. At what rate % it will become 12 times.
(a) 15% **(b)**13% **(c)** 11% **(d)**None

23. A certain sum of money amounted to Rs. 765 at 8% in a certain time, in same time Rs. 640 amounted Rs. 750 at 5% p.a. S.I. Find the sum.
(a) Rs. 500 **(b)** Rs. 600 **(c)** Rs. 700 **(d)**None

24. A certain sum of money amounts to Rs. 5,000 in 5 years at 10% p.a. In how many years will it amount to Rs, 6,000 at same rate of S.L p.a.
(a) 10 years **(b)** 8 years **(c)** 6 years **(d)** None

25. Mr. X lent some amount of money at 4% S.L and he obtained Rs. 520 less than he lent in 5 years. The sum lent is
(a) Rs. 620 **(b)** Rs. 650 **(c)** Rs. 750 **(d)** None

26. If the simple interest on Rs. 750 is less than the interest on Rs. 845 at 10% p.a. S.I. by Rs. 57. Find the time
(a) 4 years **(b)** 5 years **(c)** 6 years **(d)** None

27. The simple interest in 14 months on a certain sum of money at the rate of 6% p.a. is Rs. 250 more than the interest on the same sum at the rate of 8% p.a. in 8 months. How much amount was borrowed?
(a) Rs. 15,000 **(b)** Rs. 25,000 **(c)** Rs. 7,500 **(d)** None

28. Mr. X borrows Rs. 7,000 from ICICI bank at S.I. He paid Rs. 3,000 after 3 years and Rs. 5,450 in next 2 years to settle the account. Find the rate of interest
(a) 5% **(b)** 6% **(c)** 8% **(d)** None

29. If S.I. on a certain sum of money Rs. 100 is Rs. 9 and the number of years and rate % are equal. Find the rate per cent.
(a) 3% **(b)** 4% **(c)** 5% **(d)** None

Problems on Compound Interest

30. If P = Rs. 1000, R = 5% p.a., n = 4; What is Amount and C.I. is
(a) Rs. 1215.50, Rs. 215.50 **(b)**Rs. 1125, Rs. 125
(c) Rs. 2115, Rs. 115 **(d)** none of these

31. Rs. 100 will become after 20 years at 5% p.a. compound interest amount
(a) Rs. 250 **(b)**Rs. 205 **(c)**Rs. 265.50 **(d)**none of these

32. If A = Rs. 1000, n = 2 years, R = 6% p.a. compound interest payable half-yearly, then principal (P) is
(a) Rs. 888.80 **(b)**Rs. 885 **(c)** 800 **(d)**none of these

33. The population of a town increases every year by 2% of the population at the beginning of that year. The number of years by which the total increase of population be 40% is
(a) 7 years **(b)** 10 years **(c)** 17 years **(d)** none of these

34. The difference between C.I. and S.I on a certain sum of money invested for 3 years at 6% p.a is Rs. 110.16. The sum is?
(a) Rs. 3000 **(b)**Rs. 3700 **(c)**Rs. 12000 **(d)** Rs. 10000

35. The C.I on Rs. 16000 for 1½ years at 10% p.a. payable half yearly is
(a) Rs. 2222 **(b)**Rs. 2522 **(c)**Rs. 2500 **(d)**none of these

36. The C.I. on Rs. 40000 at 10% p.a. for 1 year when the interest is payable quarterly is
(a) Rs. 4000 **(b)**Rs. 4100 **(c)**Rs. 4152.51 **(d)** none of these

37. The difference between the S.I and the C.I on Rs. 2400 for 2 years at 5% p.a. is
(a) Rs. 5 **(b)**Rs. 10 **(c)**Rs. 16 **(d)**Rs. 6

38. The annual birth and death rates per 1000 are 39.4 and 19.4 respectively. The number of years in which the population will be doubled assuming there is no immigration or emigration is
(a) 35 yrs. **(b)** 30 yrs. **(c)** 25 yrs. **(d)**none of these

39. The C.I on Rs. 4000 for 6 months at 12% p.a. payable quarterly is
(a) Rs. 243.60 **(b)**Rs. 240 **(c)** 243 **(d)** none of these

40. The compound interest in charged on a sum of rs. 15,000 is 10% p.a. for the 1st year, 12% p.a. for the 2ndyar& 15% p.a. for the 3rd year, interest being compounded annually in all the cases. What is the total interest is payable at the end of 3 years?
(a) Rs. 7,273 **(b)**Rs. 6,067 **(c)**Rs. 6252 **(d)**Rs. 5,268

41. Mohan borrows Rs. 50,000 from a bank at 10% per annum. He repays Rs 25,000 at the end of each year. What amount does he owe to the bank after the second repayment?
(a) Rs. 10,000 **(b)**Rs. 8,000 **(c)**Rs. 12,000 **(d)**Rs. 18,000

42. A sum at C.I. becomes Rs. 1,020 after 3 yrs. & Rs.1,088 after 4 yrs. The rate of interest is
(a) 5.60% **(b)** 6.66% **(c)** 7.66% **(d)** 8.66%

43. A sum at C.I. becomes Rs. 6,500 after 6 years &Rs. 7,800 after a further period of 2 more years. The amount due after a further period of 2 more years is –
(a) Rs. 9,360 **(b)**Rs. 6,500 **(c)**Rs. 9,100 **(d)**Rs. 9,390

44. How many years it take for investment of Rs. 1,000 to double itself when interest is compounded annually at 6% [Given: $(1.06)^{11.9} = 2.0005$]
(a) 11 years **(b)** 11.3 years
(c) 11.6 years **(d)**11.9 years

45. After Mr. Gupta introduced new norms, turnover of Gupta & sons went up from Rs. 100 million to Rs 300 million in 3 yrs. The compounded growth rate of co. is $\left(3^{1/2} = 1.4422\right)$
(a)11.22% **(b)** 33.22% **(c)** 40% **(d)** 44.22%

46. Find the amount of Rs.2000 after 10 years at 8% converted quarterly for the 1st 4 years and 6% converted monthly thereafter.
(a) Rs.4025.50 **(b)** Rs.3931.78 **(c)**Rs.2600.50 **(d)** None

47. If the compound Interest on a certain sum of money for 2 years at 4% p.a. be Rs.510, then its simple Interest (S.L) of same time at same rate of interest is
(a) Rs.500 **(b)** Rs.510 **(c)** Rs.450 **(d)** None

48. If the S.I. on a certain sum of money for 3 years at 5% p.a. is Rs. 1260. Then its compound interest (C.I.) is
(a) Rs.1324.05 **(b)** Rs.1330 **(c)** Rs. 1425 **(d)** None

49. If the difference between C.I and S.I on a certain sum of money at 5% p.a. for 2 years is Rs. 1.50. Find the sum of money.
(a) Rs. 600 **(b)** Rs.500 **(c)** Rs. 400 **(d)** None

50. Find the difference between the S.I. and C.I. on Rs.8000 for 3 years at 5% p.a.
(a) Rs.65 **(b)** Rs.62 **(c)** Rs.61 **(d)** None

51. A certain sum of money amounts to Rs.752 in 20 years and Rs.7896 in 21 years at rate of interest compounded annually the rate of interest is
(a) 9.5% **(b)** 8% **(c)** 10% **(d)** None

52. A certain sum of money amounts to Rs.2750 in 2 years and Rs.3125 in 3 years at same rate of compound interest, the sum of money is
(a) Rs.2129.60 **(b)** Rs.2210.37
(c) Rs.2531.62 **(d)** Data inadequate.

53. The ratio of Cl and SI on a certain sum of money at 10% p.a. for 2 years is
(a) 8:5 **(b)** 20: 19 **(c)** 21:20 **(d)** None

54. Sohan deposited Rs.4800 in a bank after 4years it becomes Rs.6000 at a certain rate of compound interest what will be his amount in the bank after 12 years.
(a) Rs.9375 **(b)** Rs.9000 **(c)** Rs.9525 **(d)** None

55. Mr. X lent Rs.6100 to Mr. A and Mr. B at same rate of compound interest of 20% p.a. so that A's share at the end of 3 years may equal to B's share at the end of 5 years.
(a) Rs.3500; Rs.2600 **(b)** Rs.3600; Rs.2500
(c) Rs.3400; Rs.2700 **(d)** None

56. A money- lender charges 'interest' at the rate of 5 rupees per 100 rupees per quarter, Payable in advance. What effective rate does he charge per annum?
(a) 22.6% **(b)** 12.8% **(c)** 22,8% **(d)** None of these

57. The simple interest on Rs.300 for 4 years together with that on Rs.500 for 3 years came to Rs.162, the rate being the same in both cases. Find the rate percent of interest.
(a)4% **(b)** 6% **(c)** 7% **(d)** None of these

Problems on Effective Rate

58. The effective rate of interest corresponding to a nominal rate 3% p.a. payable half yearly is
(a) 3.2% **(b)** 3.25% p.a. **(c)** 3.0225% p.a. **(d)** None of these

59. The effective rate of interest corresponding a nominal rate of 7% p.a. convertible quarterly is
(a) 7% **(b)** 7.5% **(c)** 5% **(d)** 7.18%

60. Mr. Natarajan wants to make an investment of Rs. 50,000 in one of the two banks that fetches him the maximum return after 6 years. One bank offers 8% interest compounded annually and the other offers 7.5% interest compounded semi – annually. Which bank should be chosen, so that he gets the maximum return? [Given: $(1.08)^6 = 1.5869$ and $(1.0375)^{12} = 1.5554$]
(a) First bank **(b)** Second bank
(c) Any of the two bank **(d)** Both the banks.

Problems on Depreciation

61. A machine is depreciated at the rate of 20% on reducing balance. The original cost of the machine was Rs. 100000 and its ultimate scrap value was Rs. 3000The effective life of the machine is
(a) 4.5 years (appx.) **(b)** 5.4 years (appx.)
(c) 5 years (appx.) **(d)** None of these

62. The useful life of a machine is estimated to be 10 years and cost Rs. 10000. Rate of depreciation is 10% p.a. The scrap value at the end of its life is
(a) Rs. 3486 **(b)** Rs. 4383 **(c)** Rs. 3400 **(d)** Rs. 10000

63. A machine is depreciated at the rate of 10% on reducing balance. The original cost was Rs. 10,000 and the ultimate scrap value was Rs.3,750. Find the effective life of the machine. (Given: log 2 = 0.30103, log 3= 0.47712).
(a) 5 yrs. **(b)** 5.19 yrs. **(c)** 9.3 yrs. **(d)** None of these

Advance Problems

64. In how many years will a sum become 27 times when it trebles itself in 2 years at C.I.?
(a) 9 years **(b)** 6 years **(c)** 12 years **(d)**13 ½ years

65. The compound interest on a sum for two years is Rs. 1,575 and the corresponding simple interest is Rs. 1,500. Find the compound interest on the same sum at the same rate of interest at the end of third year.
(a) Rs. 2,428.50 **(b)**Rs. 2,482.50
(c) Rs. 2,284.50 **(d)**Rs. 2,382.50

66. A certain sum was lent at compound interest, compounded annually for three years. The rate of interest for each of the three years was 20%, 15% and 10% p.a. respectively. If the same sum was lent at a constant rate of simple interest for the same period, then what would have been the interest rate for obtaining the same amount of interest?
(a) 17.27% **(b)** 17% **(c)** 18% **(d)** 18.27%

67. The difference between C.I. & S.I. on a sum for 3 years at 10% p.a. is Rs. 1550. The sum is
(a) 40000 **(b)** 50000 **(c)** 45000 **(d)** 48000

Problems on Present Value

Ordinary Annuity

68. The present value of an annuity of Rs. 3000 for 15 years at 4.5% p.a. CI is
(a) Rs. 23809.41 **(b)**Rs. 32218.63
(c) Rs. 32908.41 **(d)** none of these

69. A loan of Rs. 10.000 is to be paid back in 30 equal instalments. The amount of each installment to cover the principal and at 4% p.a. CI is
(a) Rs. 587.87 **(b)**Rs. 587
(c) Rs. 578.87 **(d)** none of these

70. A company borrows Rs. 10000 on condition to repay it with compound interest at 5% p.a. by annual installments of Rs. 1000 each. The number of years by which the debt will be clear is
(a) 14.2 yrs. **(b)** 10 yrs. **(c)** 12 yrs. **(d)** None of these

71. Mr. Paul borrows Rs. 20000 on condition to repay it with C.I. at 5% p.a. in annual installments of Rs. 2000 each. The number of years for the debt to be paid off is
(a) 10 yrs. **(b)** 12 yrs. **(c)** 11 yrs. **(d)** None of these

72. The present value of annuity of Rs. 5000 per annum for 12 years at 4% p.a. C.I. annually is
(a) Rs. 46000 **(b)**Rs. 46850
(c) Rs. 15000 **(d)** none of these

73. Y bought a TV costing Rs. 13,000 by making a down payment of Rs. 3000 and agreeing to make equal annual payment for four years. How much would be each payment if the interest on unpaid amount be 14% compounded annually?
(a) Rs. 3,432.05 **(b)** Rs. 3,932.05 **(c)**Rs. 15000 **(d)** none of these

74. The amount of an annuity due consisting of 15 annual payments invested at 8% effective is Rs. 10,000. Find the size of each payment.
(a) Rs.873.86 **(b)** Rs. 108.60 **(c)** Rs.341.01 **(d)** none of these

75. Arjun buys a house for which he agrees to pay Rs. 5000 at the end of each month for 8 years. If money is worth 12% converted monthly, what is the capital value of the house?
(a) Rs. 307638.50 **(b)** Rs. 310825.60 **(c)** Rs. 25902.75 **(d)** None of these

76. Munna purchased LED TVpayingRs.5,000 down and promising to pay Rs.200 every quarter for next 10 years. The seller charges interest at the rate of 12% per annum compounded quarterly. If Munna missed the first 10 payments, what must he pay when the 11th payment is due to discharge his entire loan?
(a) Rs.5873.86 **(b)**Rs.7108.60 **(c)** Rs.6399.26 **(d)** None of these

Due Annuity

77. Suppose your Mom decides to gift you Rs 10,000 every year starting from today for the next five year. You deposit this amount in a bank as and when you receive and get 10% per annum interest rate compounded annually. What is present value of annuity?
(a) Rs. 41698.70 **(b)**Rs. 51820.40
(c) Rs. 60000 **(d)** none of these

78. Ram purchased a house for which he agreed to pay Rs.5000 at the beginning of each 3 months until he has made 10 payments. If money is worth 6% compounded quarterly, what is the equivalent cash price of the house?
(a) Rs. 46802.58 **(b)** Rs. 47108.60
(c) Rs. 46399.26 **(d)** None of these

79. The value of each equal instalment made at the beginning of each year for 10 years will pay for a piece of property priced at Rs.80,000, if money is worth 7% effective?
(a) Rs. 15873.86 **(b)** Rs. 10645.05
(c) Rs. 16399.26 **(d)** none of these

Perpetual Annuity

80. The value of the present value of a sequence of payments of Rs. 80 made at the end of each 6 months and continuity forever, if money is worth 4% compounded semi-annually is....
(a) Rs. 4,000 **(b)** Rs. 5,000
(c) Rs. 3,000 **(d)** None of these

81. How much money is needed to endure Machine costing Rs. 2,500 at the beginning of each year indefinitely, if money is worth 3% compounded annually?
(a) Rs. 80,454.67 **(b)** Rs.85,833.33
(c) Rs. 90,350.45 **(d)** None of these

82. At what rate converted semi-annually will the present value of a perpetuity of Rs. 450 payables at the end of each 6 months be Rs. 20,000?
(a) 3.5% **(b)** 4% **(c)** 4.5% **(d)** None of these

83. Assuming that the discount rate is 10% per annum, how much would you pay to receive Rs.800, growing at 8%, annually, forever?
(a) 1000 **(b)** 1500 **(c)** 2200 **(d)** None of these

Problems on Future Value

Ordinary Annuity

84. The amount of an annuity certain of Rs. 150 for 12 years at 3.5% p.a. C.I is
(a) Rs. 2190.28 **(b)**Rs. 1290.28
(c) Rs. 2180.28 **(d)** none of these

85. A = Rs. 1200 n = 12 yrs. i = 0.08 v =?
Using the formula $V = \frac{A}{i}\left[1 - \frac{1}{(1+i)^n}\right]$ value of v will be
(a) Rs. 3039 **(b)**Rs. 3990
(c) Rs. 9930 **(d)** none of these

86. a = Rs. 100 n = 10, i = 5% find the FV of annuity
Using the formula FV = a / {(1 + i) n − 1}, FV is equal to
(a) Rs. 1258 **(b)**Rs. 2581
(c) Rs. 1528 **(d)** none of these

87. If the amount of an annuity after 25 years at 5% p.a C.I is Rs. 50000 the annuity will be
(a) Rs. 1406.90 **(b)**Rs. 1046.90
(c) Rs. 1146.90 **(d)** none of these

88. Given annuity of Rs. 100 amounts to Rs. 3137.12 at 4.5% p.a C.I. The number of years will be
(a) 25 yrs. (appx.) **(b)** 20 yrs. (appx.)
(c) 22 yrs. **(d)**none of these

89. Mr. X borrowed Rs. 5120 at 12½ p.a. C.I. At the end of 3 yrs., the money was repaid along with the interest accrued. The amount of interest paid by him is
(a) Rs. 2100 **(b)**Rs. 2170 **(c)**Rs. 2000 **(d)** None of these

90. A person invests Rs. 500 at the end of each year with a bank which pays interest at 10% p. a. C.I. annually. The amount standing to his credit one year after he has made his yearly investment for the 12^{th} time is.
(a) Rs. 11764.50 **(b)**Rs. 10000 **(c)**Rs. 12000 **(d)** none of these

91. Rs 200 is invested at the end of each month in an account paying interest 6% per year compounded monthly. What is the future value of this annuity after 10^{TH} payment?
(a) Rs. 2044 **(b)**Rs. 5000
(c) Rs. 1200 **(d)** none of these

92. Find the future value of an annuity of Rs. 500 made annually for 7 years at interest rate of 14% compounded annually. Given that $(1.14)^7 = 2.5023$.
(a) Rs. 5,365.35 **(b)**Rs. 5000
(c) Rs. 6500 **(d)** none of these

93. Rs. 200 is invested at the end of each month in an account paying interest 6% per year compounded monthly. What is the future value of this annuity after 10^{th} payment? Given that $(1.005)^{10} = 1.0511$
(a) Rs2500 **(b)** Rs. 2,044
(c) Rs. 1850 **(d)** none of these

94. An annuity consisting of payments of Rs. 500 made at the end of every 3 months for 4 years at the rate of 6% compounded quarterly. Its Future value is...
(a) Rs. 8966.18 **(b)**Rs. 8108.60
(c) Rs. 9602.75 **(d)** none of these

95. An annuity consisting of equal payments at the end of each month for 2 years is to be purchased for Rs. 2000. If the interest rate is 6% compounded monthly, how much is each payment?
(a) Rs.73.86 **(b)** Rs.31.60 **(c)** Rs.78.64 **(d)** None of these

Due Annuity

96. Z invested Rs 10,000 every year starting from today for next 10 Years. Suppose interest rate 8% per annum compounded annually. Calculate future value of the annuity.
(a) Rs. 1,56,454.875 **(b)**Rs. 1,60,500.900
(c) Rs. 1,80,500.900 **(d)** none of these

97. At the Beginning of each Period Consisting of 6-months, Rs 500 is deposited into saving account that pays 5% compounded half-yearly. Find the balance in the account at the end of each year.
(a) Rs.5724 **(b)** Rs.5742
(c) Rs.5472 **(d)** None of these

98. A Bank Pay interest at the rate of 8% per annum compounded quarterly. Find how much should be deposited in the bank at the beginning of each quarter in order to accumulate Rs.80,000 in 3 Years.
(a) Rs 5,884 **(b)** Rs.5,488
(c) Rs.5,848 **(d)** Rs.4,588

Sinking Fund

99. A person desires to create a fund to be invested at 10% CI per annum to provide for a prize of Rs. 300 every year. Using V = a/1 find V and V will be
(a) Rs. 2000 **(b)** 2500 **(c)**Rs. 3000 **(d)** none of these

100. How much amount is required to be invested every year so as to accumulate Rs. 300000 at the end of 10 years if interest is compounded annually at 10%?
(a) Rs. 18,823.62 **(b)** 25,000.62 **(c)**Rs. 16,000 **(d)** none of these

Capital Expenditure

101. A machine with useful life of 7 years costs Rs. 10,000 while another machine with useful life of 5 years costs Rs. 8,000. The first machine saves labor expenses of Rs. 1900 annually and the second one saves labor expenses by Rs. 2,200 annually. Determine the preferred course of action. Assume cost of borrowing as 10% per annum.
[Given: $(1.1)^7 = 1.9487$, $(1.1)^5 = 1.610$]
(a) First machine **(b)** Second machine
(c) Any of two machine **(d)** Both the machine.

102. A company may obtain a machine either by taking it on lease for 5 years (useful life) at an annual rent of Rs. 2,000 or by purchasing the machine for Rs. 8,100. If the company can borrow money at 8% p.a., what is the present value of the preferable alternative?
(a) 7985.42 **(b)** 7875.42 **(c)** 7765.42 **(d)** None

Net Present Value

103. Assume cash outflow are Rs. 1,20,000 followed by cash inflows of Rs. 25,000 per year for 8 years and cost of capital is 11% what is the net present value?
(a) Rs. 38,214 **(b)** Rs. 9,650 **(c)** Rs. 8,650 **(d)** Rs. 38,214

104. A company proposes to install a machine involving a capital cost of Rs. 3,60,000. The life of the machine is 5 years and its salvage value at the end of the life is nil. The machine will produce the net cash flow of Rs. 68,000 per annum. You are required to calculate NPV when discounting rate is
15 % pa. The net present value factors for 5 years as under

Discounting Rate	14	15	16	17	18
Cumulative factor	3.43	3.35	3.27	3.20	3.13

(a) - 13,2200 **(b)** 13,2200 **(c)** Rs. 15,500 **(d)** none of these

105. A company is considering the proposal of taking up a new project which requires an investment of Rs. 400 lakhs on machinery and other assets. The project is expected to yield the following cash flows over the next five years.

Year	Cash Flow (Rs. Lakhs)
1	160
2	160
3	180
4	180
5	150

The cost of raising the additional capital is 12% The scrap value at the end of the five year may be taken as zero.
You are required to calculate the Net Present Value of the project
(a) 197.91 **(b)** 132
(c) 250 **(d)** none of these

Leasing Decision

106. A company is considering proposal of purchasing a machine either by making full payment of Rs. 4,000 or by leasing it for 4 years at an annual rent of Rs. 1,250. Which course of action is preferable, if the company can borrow money at 14% per annum? [Given: $(1.14)^4 = 1.68896$]
(a) Leasing is preferable **(b)** Leasing is not preferable
(c) Can't say. **(d)** None of these

107. ABC Ltd. wants to lease out an asset costing Rs. 3,60,000 for a five-year period. It has fixed a rental of Rs. 1,05,000 per annum payable annually starting from the end of first year. Suppose rate of interest is 14% per annum compounded annually on which money can be invested by the company. Is this agreement favorable to the company?
(a) Leasing is preferable **(b)** Leasing is not preferable
(c) Can't say. **(d)** None of these

Valuation of Bond

108. An investor intends purchasing a three-year Rs. 1,000 par value bond having nominal interest rate of 10%. At what price the bond may be purchased now if it matures at par and the investor requires a rate of return of 14%?
(a) Rs. 907.125 **(b)** 1000 **(c)** 825.45 **(d)**None of these

Compound Annual Growth Rate (CAGR)

109. Suppose the revenues of a company for four years, V(t) in the above formula, have been

Year	2013	2014	2015	2016
Revenues	100	120	160	210

Calculate Compound annual Growth Rate.
(a) =27.74% **(b)** 23.64% **(c)** 34.56% **(d)**None of these

Answer Sheet

1.	b	2.	a	3.	c	4.	d	5.	a	6.	b	7.	a	8.	c	9.	a	10.	c
11.	b	12.	d	13.	b	14.	c	15.	a	16.	c	17.	c	18.	a	19.	b	20.	a
21.	c	22.	c	23.	b	24.	b	25.	b	26.	c	27.	a	28.	a	29.	a	30.	a
31.	c	32.	a	33.	c	34.	d	35.	b	36.	c	37.	d	38.	a	39.	a	40.	c
41.	b	42.	b	43.	a	44.	d	45.	d	46.	b	47.	a	48.	a	49.	a	50.	c
51.	a	52.	a	53.	c	54.	a	55.	b	56.	c	57.	b	58.	c	59.	d	60.	a
61.	b	62.	a	63.	c	64.	a	65.	c	66.	a	67.	b	68.	b	69.	c	70.	a
71.	d	72.	b	73.	a	74.	c	75.	a	76.	c	77.	a	78.	a	79.	b	80.	a
81.	b	82.	c	83.	a	84.	a	85.	d	86.	a	87.	b	88.	d	89.	b	90.	a
91.	a	92.	a	93.	b	94.	c	95.	c	96.	a	97.	b	98.	c	99.	c	100.	a
101.	b	102.	a	103.	c	104.	a	105.	a	106.	a	107.	a	108.	a	109.	a		

ADDITIONAL QUESTION BANK

1. The difference between compound and simple interest at 5% per annum for 4 years on Rs. 20,000 is Rs. _____

(a) 250 (b) 277 (c) 300 (d) 310

2. The compound interest on half-yearly rests on Rs. 10,000 the rate for the first and second years being 6% and for the third year 9% p.a. is Rs._____

(a) 2,200 (b) 2,287 (c) 2,285 (d) None

3. The present value of Rs. 10,000 due in 2 years at 5% p.a. compound interest when the interest is paid on yearly basis is Rs. _____

(a) 9,070 (b) 9,000 (c) 9,061 (d) None

4. The present value of Rs. 10,000 due in 2 years at 5% p.a. compound interest when the interest is paid on half-yearly basis is Rs. _____

(a) 9,070 (b) 9,069 (c) 9,061 (d) None

5. Johnson left Rs. 1,00,000 with the direction that it should be divided in such a way that his minor sons Tom, Dick and Harry aged 9,12 and 15 years should each receive equally after attaining the age 25 years. The rate of interest being 3.5%, how much each son receive after getting 25 years old?

(a) 50,000 (b) 51,994 (c) 52,000 (d) None

6. In how many years will a sum of money double at 5% p.a. compound interest?

(a) 15 years 3 months (b) 14 years 2 months

(c) 14 years 3 months (d) 15 years 2 months

7. In how many years a sum of money trebles at 5% p.a. compound interest payable on half-yearly basis?

(a) 18 years 7 months (b) 18 years 6 months

(c) 18 years 8 months (d) 22 years 3 months

8. A machine depreciates at 10% of its value at the beginning of a year. The cost and scrap value realized at the time of sale being Rs. 23,240 and Rs. 9,000 respectively. For how many years the machine was put to use?

(a) 7 years (b) 8 years (c) 9 years (d) 10 years

9. A machine worth Rs. 4,90,740 is depreciated at 15% on its opening value each year. When its value would reduce to Rs. 2,00,000?

(a) 4 years 6 months (b) 4 years 7 months

(c) 4 years 5 months (d) 5 years 7 months approximately

10. A machine worth Rs. 4,90,740 is depreciated at 15% of its opening value each year. When its value would reduce by 90%?

(a) 11 years 6 months (b) 11 years 7 months
(c) 11 years 8 months (d) 14 years 2 months approximately

11. Alibaba borrows Rs. 6 lakhs Housing Loan at 6% repayable in 20 annual installments commencing at the end of the first year. How much annual payment is necessary.

(a) 52,420 (b) 52,419 (c) 52,310 (d) 52,320

12. A sinking fund is created for redeming debentures worth Rs. 5 lakhs at the end of 25 years. How much provision needs to be made out of profits each year provided sinking fund investments can earn interest at 4% p.a.?

(a) 12,006 (b) 12,040 (c) 12,039 (d) 12,035

13. A machine costs Rs. 5,20,000 with an estimated life of 25 years. A sinking fund is created to replace it by a new model at 25% higher cost after 25 years with a scrap value realization of Rs. 25000. what amount should be set aside every year if the sinking fund investments accumulate at 3.5% compound interest p.a.?

(a) 16,000 (b) 16,500 (c) 16,050 (d) 16,005

14. Raja aged 40 wishes his wife Rani to have Rs. 40 lakhs at his death. If his expectation of life is another 30 years and he starts making equal annual investments commencing now at 3% compound interest p.a. how much should he invest annually?

(a) 84,448 (b) 84,450 (c) 84,449 (d) 84,077

15. Appu retires at 60 years receiving a pension of 14,400 a year paid in half-yearly installments for rest of his life after reckoning his life expectation to be 13 years and that interest at 4% p.a. is payable half-yearly. What single sum is equivalent to his pension?

(a) 1,45,000 (b) 1,44,900 (c) 1,44,800 (d) 1,44,700

16. A stock pay annually an amount of Rs.10 from 6^{th} year onwards ,what is the present value of perpetuity ,if the rate of interest is 20% ?
(a) 20.1 (b) 19.1 (c) 21.1 (d) 22.1

17. An amount is lent at nominal rate of 4.5% per annum compounded quarterly. What would be the gain in rupees over when compounded annually.
(a) 0.056 (b) 0.045 (c) 0.076 (d) 0.085

Answer Sheet

1.	(d)	**2.**	(d)	**3.**	(a)	**4.**	(c)	**5.**	(d)	**6.**	(b)
7.	(d)	**8.**	(c)	**9.**	(d)	**10.**	(d)	**11.**	(c)	**12.**	(a)
13.	(c)	**14.**	(d)	**15.**	(b)	**16.**	(a)	**17.**	(c)		

ALP-NO-7A

Tutorial Note: This ALP Sheets are designed for Students Self Practice if any difficulty arrives then students Should Refer Lectures This Will Develop There Mind to Deal with New Problems in Exams

1. If the difference of S.I and C.I is Rs 72 at 12% for 2 years. Calculate the amount.
(a) Rs 8,000 (c) Rs 5,000
(b) Rs 6,000 (d) Rs 7,750

2. If a simple interest on a sum of money at 65 p.a. for 7 years is equal to twice of simple interest on another sum for 9 years at 5% p.a.. The ratio will be:
(a) 2 : 15 (c) 15 : 7
(b) 7 : 15 (d) 1 : 7

3. By mistake a clerk, calculated the simple interest on principal for 5 months at 6.5% p.a. instead of 6 months at 5.5% p.a. If the error in calculation was Rs 25.40. The original sum of principal was_____
(a) Rs 60, 690 (c) Rs 90, 660
(b) Rs 60,960 (d) Rs 90,690

4. If the simple interest on Rs 1,400 for 3 years is less than the simple interest on Rs 1,800 for the same period by Rs 80, then the rate of interest is
(a) 5.67% (c) 7.20%
(b) 6.67% (d) 5.00%

5. Nominal rate of interest is 9.9% p.a. If interest is compounded monthly, What will be the effective rate of interest (given $\left(\frac{4033}{4000}\right)^{12} = 1.1036$ (approx))?
(a) 10.36% (c) 11.36%
(b) 9.36% (d) 9.9%

6. The S.I on a sum of money is $\frac{4}{9}$ of the principal and the no. of years is equal to the rate of interest per annum. Find the rate of interest per annum?
(a) 5% (c) 22/7%
(b) 20/3% (d) 6%

7. Simple interest on Rs 2,000 for 5 months at 16% p.a is _____.
(a) Rs 133.33 (c) Rs 134.00
(b)Rs 133.22 (d) Rs 132.09

8. How much investment is required to yield an Annual income of Rs 420 at 7% p.a simple interest.
(a) Rs 6,000 (c) Rs 5,580
(b) Rs 6,420 (d) Rs 5,000

9. Mr.X invests Rs 90,500 in post office at 7.5% p.a simple interest. While calculating the rate was wrongly taken as 5.7% p.a. The difference in amounts at maturity is Rs 9,774. Find the period for which the sum was invested:
(a) 7 years (c) 6 years
(b) 5.8 years (d) 8 years

10. In what will a sum of money double its y at 6.25% p.a simple interest?
(a) 5 years (c) 12 years
(b) 8 years (d) 16 years

Answers

1.	**c**	2.	**c**	3.	**b**	4.	**b**	5.	**a**
6.	**b**	7.	**b**	8.	**a**	9.	**c**	10.	**d**

ALP-NO-7B

1. The difference between compound and simple interest on a certain sum of money for 2 years at 4% p.a is Rs 1. The sum (in Rs) is:
(a) 625 (c) 640
(b) 630 (d) 635

2. A sum of money compounded annually becomes Rs 1,140 in two years and Rs 1,710 in three years. Find the rate of interest per annum.
(a) 30% (c) 50%
(b) 40% (d) 60%

3. On what sum difference between compound interest and simple interest for two years at 7% p.a interest is Rs 29.4
(a) Rs 5,000 (c) Rs 6,000
(b) Rs 5,500 (d) Rs 6,500

4. The partners A and B together lent Rs 3,903 at 4% per annum interest compounded annually. After a span of 7 years, A gets the same amount as B gets after 9 years. The share of A in the sum of Rs 3,903 would have been:
(a) Rs 1,875 (c) Rs 2,028
(b) Rs 2,280 (d) Rs 2,820

5. If a sum triples in 15 years at simple rate of interest, the rate of interest per annum will be:
(a) 13.0% (c) 13.5%
(b) 13.3% (d) 18.0%

6. How much amount is required to be invested every year as to accumulate Rs 6,00,000 at the end of 10 years, if interest is compounded annually at 10% rate of interest [given: $(1.)^{10} = 2.59374$]
(a) Rs 37,467 (c) Rs 37,647
(b) Rs 37,476 (d) Rs 37,674

7. The future value of an annuity of Rs 1,000 made annually for 5 years at the interest of 14% compounded annually is: (given $(1.14)^5 = 1.92541$))
(a) Rs 5,610 (c) Rs 6,160
(b) Rs 6,610 (d) Rs 5,160

8. A sum of money invested of compound interest doubles itself in four years. It becomes 32 times of itself at the same rate of compound interest in
(a) 12 years (c) 20 years
(b)16 years (d) 24 years

9. A certain sum of money was invested at simple rate of interest for three years. If the same has been invested at a rate that was seven percent higher, the interest amount would have been Rs 882 more. The amount of sum invested is:
(a) Rs 12,600 (c) Rs 4,200
(b) Rs 6,800 (d) Rs 2,800

10. A sum of Rs 44,000 is divided into three parts such that the corresponding interest earned after 2 years, 3 years and 6 years may be equal. If the rate of simple interest are 6% p.a, 8% p.a and 6% p.a respectively, then the smallest part of the sum will be:
(a) Rs 4,000 (c) Rs 10,000
(b) Rs 8,000 (d) Rs 12,000

Answers

1.	**a**	2.	**c**	3.	**c**	4.	**c**	5.	**b**
6.	**c**	7.	**b**	8.	**c**	9.	**c**	10.	**b**

ALP-NO-7C

1. A sum of money doubles itself in 8 years at the simple interest. The number of years it would triple itself is _____
(a) 20 years (c) 16 years
(b) 12 years (d) none of these

2. Suppose your parent decides to open a PPF (Public Provident Fund) account in a bank towards your name with Rs 10,000 every year starting from today for next 15 years. When you receive and get 8.5% per annum interest rate compounded annually. What is the present value of this annuity? {given answer in Rs without any fraction) (given P (15,0.085) = 8.304236576)
(a) 83,042 (c) 93,042
(b) 1,66,084 (d) 8,30,423

3. In how many years will a sum of money become four times at 12% p.a simple interest?
(a) 18 years (c) 25 years
(b) 21 years (d) 28 years

4. The simple interest for a certain sum of 2 years at 10% per annum is Rs 90. The corresponding compound interest is (in Rs):
(a) 99 (c) 94.50
(b) 95.60 (d) 108

5. Mr. X bought an electronic item for Rs 1,000. What would be the future value of the same item after 2 years, if the value is compounded semi annually at 22% per annum?
(a) Rs 1,488.40 (c) Rs 2,008.07
(b) Rs 1,518.07 (d) Rs 2,200.00

6. If an amount is kept at simple interest, it earns an interest of Rs 600 in first two years but when kept at compound interest it earns an interest of Rs 660 for the same period, then the rate of interest and principal amount respectively are:
(a) 20%, Rs 1,200 (c) 20%, Rs 1,500
(b) 10%, Rs 1,200 (d) 10%, Rs 1,500

7. The sum invested at 4% per annum compounded semi-annually amounts to Rs 7,803 at the end of one year, is:
(a) RS 7,000 (c) Rs 7,225
(b) Rs 7,500 (d) Rs 8,000

8. A compound interest on a sum for 2 years is Rs 30 more than the simple interest at the rate of 5% per annum then the sum is:
(a) Rs 11,000 (c) Rs 12,000
(b) Rs 13,000 (d) Rs 15,000

9. A person lends Rs 6,000 for 4 years and Rs 8,000 for 3 years at simple interest. If he gets Rs 2,400 as total interest, the rate of interest is:
(a) 5% (c) 6%
(b) 4% (d) 7%

Answers

1.	**c**	2.	**c**	3.	**c**	4.	**c**	5.	**b**
6.	**c**	7.	**b**	8.	**c**	9.	**a**		

ALP-NO-7D

1. The future value of an annuity of Rs 1,500 made annually for five years at interest rate 10% compounded annually is (given that $(1.1)^5 = 1.61051$):
(a) Rs 9,517.56 (c) Rs 9,715.56
(b) Rs 9,157.65 (d) Rs 9,175.65

2. How much amount is required to be invested every year as to accumulate Rs 7,96,870 at the end of 10 years, if interest compounded annually at 10% given that A(10,0.1) = 15.9374?
(a) Rs 40,000 (c) Rs 48,000
(b) Rs 4,50,000 (d) Rs 50,000

3. If compound interest on any sum at the rate of %% for two years is Rs 512.50 then the sum would be:
(a) Rs 3,000 (c) Rs 5,000
(b) Rs 4,000 (d) Rs 6,000

4. The effective rate of interest equivalent to the nominal rate of 7% converted monthly:
(a) 7.26% (c) 7.02%
(b) 7.22% (d) 7.20%

5. Mr. X invest Rs 10,000 every year starting from today for next 10 years suppose interest rate is 8% per annual compounded annually. Calculate future value of the annuity.
(a) Rs 1,56,454.88 (c) Rs 1,44,865.625
(b) Rs 1,56,554.88 (d) none of these

6. How much amount is required to be invested every year so as to accumulate Rs 3,00,000 at the end of 10 years, if interest is compounded annually at 10%?
(a) Rs 18,823.65 (c) Rs 18,828.65
(b) Rs 18 (d) Rs 18,882.65

7. If Rs 1,000 be invested at interest rate of 5% and the interest be added to the principal every 10 years, than the number of years in which it will amount to Rs 2,000 is:
(a) $16\frac{2}{3}$ years (c) 16 years
(b) $6\frac{1}{4}$ years (d) $6\frac{2}{3}$ years

8. A person borrows Rs 5,000 for 2 years at 4% per annual simple interest. He immediately lends to another person at $6\frac{1}{4}$%. Per annual for 2 years find his gain in the transaction for year:
(a) Rs 112.50 (c) Rs 125
(b) Rs 225 (d) Rs 107.50

9. If an amount is kept at S.I it earns an interest of Rs 600 in first two years but when kept at compound interest it earns an interest of Rs 660 for the same period, then the rate of interest and principal amount respectively are:
(a) 20%, Rs 1,200 (c) 10%, Rs 1,200
(b) 20%, Rs 1,500 (d) 10%, Rs 1,500

10. The future value of an annuity of Rs 1,000 made annually for 5 years at the interest of 14% compounded annually is:
(a) Rs 5,610 (c) Rs 6,160
(b) Rs 6,610 (d) Rs 5,160

Answers

1.	**b**	2.	**d**	3.	**c**	4.	**b**	5.	**a**
6.	**a**	7.	**a**	8.	**b**	9.	**b**	10.	**b**

ALP-NO-7E

1. A man invests an amount of Rs 15,860 in the names of his three sons A, B and C in such a way that they get the same amount after 2, 3 and 4 years respectively. If the rate of interest is 5%, then the ratio of amount invested in the name of A, B and C is
(a) 6 : 4 : 3 (b) 3 : 4 : 6
(c) 30 : 12 : 5 (d) None of the above

2. If the difference between the compound interest compounded annually and simple interest on a certain amount at 10% per annum for two years is Rs 372, then the principal amount is
(a) Rs 37,200 (b) Rs 37,000
(c) Rs 37,500 (d) None of the above

3. How much will Rs 25,00 amount to in 2 years at compound interest if the rates for the successive years are 4% and 5% per year
(a) Rs 27,300 (b) Rs 27,000
(c) Rs 27,500 (d) Rs 27,900

Answers

1.	**a**	2.	**a**	3.	**a**

Summary Notes

Permutations & Combinations

Chapter **6**

EXERCISE

Problem Based on Word's

1. In how many ways can the letters of the word HEXAGON be permuted?
(a) 720 **(b)** 5040 **(c)** 740 **(d)** 640

2. How many different words can be formed with letters of the word HARYANA?
(a) 240 **(b)** 360 **(c)** 840 **(d)** 640

3. How many different words can be formed by using all the letters of the word ALLAHABAD?
(a) 9! / (4! × 2!) **(b)** 11! /4! **(c)** 11! **(d)** None

4. The number of ways the letters of the word COMPUTER can be rearranged is:
(a) 40319 **(b)** 40340 **(c)** 40318 **(d)** None

5. The number of ways in which the letters of the word "DOGMATIC" can be arranged is
(a) 40,319 **(b)** 40,320 **(c)** 40,321 **(d)** none of these

6. In how many ways can the letters of the word PENCIL be arranged so that N is always next to E
(a) 120 **(b)** 130 **(c)** 140 **(d)** 160

7. How many words can be formed of the letters in the word FAILURE, the four vowels always coming together?
(a)576 **(b)** 586 **(c)** 476 **(d)** 486

8. In how many can the letters of the word "LAUGHTER" be arranged so that the vowels may never be separated?
(a) 4320 **(b)** 4230 **(c)** 4370 **(d)** 4270

9. The number of arrangements in which the letters of the word 'MONDAY' be arranged so that the words thus formed begin with M and do not end with N is
(a) 720 **(b)** 120 **(c)** 96 **(d)** none of these.

10. The number of ways in which the letters of the word 'MOBILE' be arranged so that consonants always occupy the odd places is
(a) 36 **(b)** 63 **(c)** 30 **(d)** none of these

11. In how many ways can the letters of the word "STRANGE" be arranged so that vowels may appear in the odd places?
(a) 1440 **(b)** 1460 **(c)** 1340 **(d)** 1360

12. How many ways of the word MATHEMATICS can be arranged so that the vowels occur together?
(a) 11! /$(2!)^3$ **(b)**12! / $(2!)^3$ **(c)** $(8! \times 4!)/(2!)^3$ **(d)** None

13. The number of ways the letters of the word "TRIANGLE" to be arranged so that the word "ANGLE" will be always present is:
(a) 20 **(b)** 60 **(c)** 24 **(d)** 32

14. How many 3 letter words can be made using the letters of the word ORIENTAL?
(a) 336 **(b)** 320 **(c)** 226 **(d)** 436

15. If the letters of word DAUGHTER are to be arranged so that vowels occupy the odd places then number of different words are
(a) 2,880 **(b)** 676 **(c)** 625 **(d)** 576

16. The number of words that can be made by rearranging the letters of the word APURNA so that vowels and consonants appear alternate is
(a) 18 **(b)** 35 **(c)** 36 **(d)** none of these

17. The number of arrangements of the letters of the word. 'COMMERCE' is
(a) 8 **(b)** 8! /2! 2! 2! **(c)** 7 **(d)** none of these

18. The number of different words that can be formed with 12 consonants and 5 vowels by taking 4 consonants and 3 vowels in each word is
(a) $12_{c_4} x 5_{c_3}$ **(b)** 17_{c_7}
(c) 4950 x 7! **(d)** none of these

19. The ways of selecting 4 letters from the word 'EXAMINATION' is
(a) 136 **(b)** 130 **(c)** 125 **(d)** none of these

20. How many words can be formed with the letters of the word 'ORIENTAL' so that A and E always occupy odd places.
(a) 8540 **(b)** 8640 **(c)** 8460 **(d)** 8540

Problem Based on Number

21. How many four-digit number can be formed by using the digit 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 with no digit repeated?
(a) 4536 **(b)** 3604 **(c)** 3354 **(d)** 5554

22. The number of 4-digit numbers greater than 5,000 can be formed out of the digits 3,4,5,6 and 7 (No Digit is repeated) the number of such is
(a) 72 **(b)** 27 **(c)** 70 **(d)** none of these

23. The number of numbers lying between 100 and 1000 can be formed with the digits 1,2,3,4, 5,6,7 is
(a) 210 **(b)** 200 **(c)** 110 **(d)** none of these

24. The number of even numbers greater than 300 can be formed with the digits 1,2,3,4,5 without repletion is
(a) 110 **(b)** 112 **(c)** 111 **(d)** none of these

25. The sum of all 4-digit number containing the digits 2, 4, 6, 8 without repetitions is
(a) 1, 33,330 **(b)** 1, 22,220 **(c)** 2, 13,330 **(d)** none of these

26. Find the sum of all the four-digit numbers that formed with the digits 3,2,3,4.
(a) 6666600 **(b)** 39996 **(c)** 33963 **(d)** none

27. How many numbers greater than 2000 can be formed with the digits 1, 2, 3, 4, 5 ?
(a) 216 **(b)** 210 **(c)** 220 **(d)** 12440

28. In how many numbers greater than a million can be formed with the digits 4, 5, 5, 0, 4, 5, 3 ?
(a) 260 **(b)** 360 **(c)** 280 **(d)** 380

29. The number of numbers lying between 10 and 1000 can be formed with the digits 2,3,4,0,8,9 is
(a) 124 **(b)** 120 **(c)** 125 **(d)** none of these

30. The total number of 9-digit numbers of different digits is
(a) 10! 9 **(b)** 8! 9 **(c)** 9! 9 **(d)** none of these

Problems Based on Geometry

31. The number of straight lines obtained by Joining 16 points on a plane, on twice of them being on the same line is
(a) 120 **(b)** 110 **(c)** 210 **(d)** none of these

32. 8 Points are marked on the circumference of a circle. The number of chords obtained by joining these in pairs is
(a)25 **(b)** 27 **(c)** 28 **(d)** none of these

33. There are 12 points in a plane of which 5 are collinear. The number of triangles in
(a) 200 **(b)** 211 **(c)** 210 **(d)** none of these

34. The number of diagonals in a decagon is
(a) 30 **(b)** 35 **(c)** 45 **(d)** none of these

35. The number of parallelograms that can be formed from a set of four parallel lines intersecting another set of three parallel lines is
(a) 6 **(b)** 18 **(c)** 12 **(d)** 9

36. The number of diagonals that Can be drawn by joining the angular points of a heptagon is:
(a) 21 **(b)** 14 **(c)** 7 **(d)** 28

Circular Permutations

37. The number of ways in which 7 girls form a ring is
(a) 700 **(b)** 710 **(c)** 720 **(d)** none of these

38. If 50 different jewels can be set to form a necklace then the number of ways is
(a) 49! /2 **(b)** 50! /2 **(c)** 49! **(d)**none of these

39. 3 ladies mind 3 gents can be seated at a round table so that any two and only two of the ladies sit together. The number of ways is
(a) 70 **(b)** 27 **(c)** 72 **(d)** none of these

40. 5 persons are sitting in a round table in such way that Tallest person is always on the right-side of the shortest person the number of such arrangements is
(a) 6 **(b)** 8 **(c)** 24 **(d)** none of these

41. The number of ways in which 8 different beads be strung on a necklace is
(a) 2500 **(b)** 2520 **(c)** 2250 **(d)** none of these

BASED ON THEOREMS

42. A person has 8 friends. The number of ways in which he may invite one or more of them to a dinner is.
(a) 250 **(b)** 255 **(c)** 200 **(d)** none of these

43. The number of ways in which the letters of 10 different things taken 4 at a time in which one particular thing always occurs is
(a) 2015 **(b)** 2016 **(c)** 2014 **(d)** none of these

44. The number of arrangements of 10 things taken 4 at a time in which one particular thing never occurs is
(a) 3,020 **(b)** 3,025 **(c)** 3,024 **(d)** none of these

45. The number of ways in which a person can chose one or more of the four electrical appliances: T.V. Refrigerator. Washing Machine and a cooler is?
(a) 15 **(b)** 25 **(c)** 24 **(d)** none of these

46. The number of ways in which 12 students can be equally divided into three groups is
(a) 5775 **(b)** 7575 **(c)** 7755 **(d)** none of these

47. The number of ways in which 15 mangoes can be equally divided among 3 students is
(a) $15!/5!^4$ **(b)** $15!/5!^3$ **(c)** $15!/5!^2$ **(d)** none of these

MISCELLANEOUS

48. In how many ways 5 Sanskrit 3 English and 3 Hindi books be arranged keeping the books of the same language together?
(a) 5!.3!.3!.3! **(b)** 5!.3!.3! **(c)** 11! **(d)** none

49. The number of ways a person can contribute to a fund out of 1 ten-rupee note. 1 five-rupee note 1 two-rupee and 1 one-rupee note is
(a)15 **(b)** 25 **(c)** 10 **(d)** none of these

50. In how many ways can a student choose 5 courses out of 9 courses, if 2 courses are compulsory?
(a) 35 **(b)** 25 **(c)** 45 **(d)** 15

51. 10 examination papers are arranged in such a way that the best and worst papers never come together. The numbers of arrangements is
(a) 9!8 **(b)** 10! **(c)** 8! 9 **(d)** none of these

52. If 12 school teams are participating in a quiz contest then the number of ways the first second and third positions may be won is
(a) 1,230 **(b)** 1,320 **(c)** 3,210 **(d)** none of these

53. Mr. X and Mr. Y enter into a railway compartment having six vacant seats. The number of ways in which they can occupy the seats is
(a) 25 **(b)** 31 **(c)** 32 **(d)** 30

54. The number of ways in which 6 men can be arranged in a row so that the particular 3 men sit together is
(a) 4_{P_4} **(b)** $4_{P_4} \times 3_{P_3}$ **(c)** 4_{C_4} **(d)** none of these

55. There are 5 speakers A, B, C D and E. The number of ways in which A will speak always before B is
(a) 24 **(b)** 4! 2 **(c)** 5 **(d)** none of these

56. Out of 7 gents and 4 ladies a committee of 5 is to be formed. The number of committees such that each committee includes at least one lady is
(a)400 **(b)** 440 **(c)** 441 **(d)** none of these

57. At an election there are 5 candidates and 3 members are to be elected. A voter is entitled to vote for any number of candidates not greater than the number to be elected. The number of ways a voter chooses to vote is
(a) 20 **(b)** 22 **(c)** 25 **(d)** none of these

58. A letter lock has three rings each marked with 10 different letters. In how many ways it is possible to make an unsuccessful attempt to open the lock?
(a) 999 **(b)** 899 **(c)** 799 **(d)** 1001

59. There are 10 trains plying between Calcutta and Delhi. The number of ways in which a person can go from Calcutta to Delhi and return by a different train is
(a) 92 **(b)** 90 **(c)** 80 **(d)** none of these

60. The number of ways in which 8 sweats of different sizes can be distributed among 8 persons of different ages so that the largest sweat always goes to be younger assuming that each one of then gets a sweat is
(a) $\lfloor 8$ **(b)** 5040 **(c)** 5039 **(d)** none of these

61. The total number of ways in which six '+' and four '-' signs can be arranged in a line such that no two signs occur together is
(a) $\lfloor 7 / \lfloor 3$ **(b)** $\lfloor 6 \times \lfloor 7 / \lfloor 3$ **(c)** 35 **(d)** none of these

62. The Supreme Court has given a 6 to 3 decision upholding a lower court; the number of ways it can give a majority decision reversing the lower court is
(a) 256 **(b)** 276 **(c)** 245 **(d)** 226.

63. Five bulbs of which three are defective are to be tried in two bulb points in a dark room. Number of trials the room shall be lighted is
(a) 6 **(b)** 8 **(c)** 5 **(d)** 7

64. The number of 4-digit numbers formed with the digits 1,1, 2, 2, 3, 4 is
(a) 100 **(b)** 101 **(c)** 201 **(d)** 102

65. 5 letters are written and there are five letter-boxes. The number of ways the letters can be dropped into the boxes, are in each
(a) 119 **(b)** 120 **(c)** 121 **(d)** none of these

Algebraic Based Problems

66. The value of 1.3.5.7.9…….. (2n – 1) is
(a) $\frac{2n!}{4!}$ **(b)** $\frac{2n!}{2.n!}$ **(c)** $\frac{(2n)!}{2^n.n!}$ **(d)** $\frac{(3n)!}{2^n.n!}$

67. The LCM of 6! 7! & 8! Is
(a) 8! **(b)** 7! **(c)** 6! **(d)** none

68. HCF of 3! 7! & 5! Is
(a) 5! **(b)** 7! **(c)** 3! **(d)** none

69. If $\frac{1}{4!}+\frac{1}{5!}=\frac{x}{6!}$; the value of x is
(a) 26 **(b)** 36 **(c)** 52 **(d)** none

70. If ${}^{18}C_r = {}^{18}C_{r+2}$ the value of ${}^{r}C_5$ is
(a) 55 **(b)** 50 **(c)** 56 **(d)** None

71. If ${}^{13}C_6 + 2\,{}^{13}C_5 + {}^{13}C_4 = {}^{15}C_x$, value of x is
(a) 6 or 7 **(b)** 6 or 8 **(c)** 6 or 9 **(d)** None

72. If ${}^{10}P_r = 604800$ and ${}^{10+C}{}_r = 120$. Find the value of r.
(a) 7 **(b)** 2 **(c)** 5 **(d)** 6

73. If ${}^{2n}C_3 : {}^{n}C_2 = 44 : 3$, then value of n is
(a) 8 **(b)** 6 **(c)** 18 **(d)** 5

74. If ${}^{167}C_{90} + {}^{167}C_x = {}^{168}C_x$ then value of x is
(a) 89 **(b)** 90 **(c)** 91 **(d)** 92

75. If ${}^{1000}C_{98} = {}^{999}C_{97} + {}^{x}C_{901}$, find the value of x
(a) 999 **(b)** 989 **(c)** 889 **(d)** 898

76. If ${}^{n+1}C_4 = 9 \times {}^{n}C_2$, find the value of n.
(a) n = 11 **(b)** n = 10 **(c)** n = 9 **(d)** n = - 10

77. Find $\sum_{r=1}^{5} C(5, r)$
(a) 41 **(b)** 31 **(c)** 51 **(d)** 61

78. If ${}^{n+1}C_{r+1} : {}^{n}C_r : {}^{n-1}C_{r-1} = 8 : 3 : 1$, then n is equal to:
(a) 20 **(b)** 16 **(c)** 10 **(d)** 15

79. If ${}^{n}P_r = 720$ and ${}^{n}C_r = 120$, then r is
(a) 3 **(b)** 4 **(c)** 5 **(d)** 6

Miscellaneous Problems

80. How many 3 letter words can be formed by using the letters of the word "SQUARE"
(a) 100 **(b)** 120 **(c)** 150 **(d)** none

81. 1st;2nd and 3rd prizes are to be awarded at a CA farewell in which 13 exhibits have been entered. In how many different ways can the prizes be awarded?
(a) 1716 **(b)** 1816 **(c)** 1516 **(d)** none

82. How many 3 digits numbers can be made by using digits 9, 8, 7, 6, 5, when repetitions of digits are (1) not allowed (2) allowed.
(a) 60 and 125 **(b)** 80 and 135 **(c)** 60 and 120 **(d)** none

83. How many 4 digits even numbers can be made by using digits 0, 3, 5, 7, 9 repetitions of digits are allowed.
(a) 100 **(b)** 625 **(c)** 120 **(d)** none of these

84. How many telephone connections may be allotted with 8 digits from the numbers 0, 1, 2,……9?
(a) 10^8 **(b)** 10! **(c)** 9! **(d)** ${}^{10}P_8$

85. In how many ways can three prizes be given away to 5 students when each student is eligible for any prizes?
(a) 125 **(b)** 729 **(c)** 625 **(d)** none

86. Six boys and five girls are to be seated for a photograph in a row such that no two girls sit together and no two boys sit together. Find the number of ways in which this can be done.
(a) 86400 **(b)** 14400 **(c)** 518400 **(d)** none

87. How many words can be made by using all letters of the word "TENDULKAR" so that each word starts with word TEN and ends with letter R and letters D, U, L are always together
(a) 5! **(b)** 36 **(c)** 6 **(d)** none

88. Find the number of different poker hands in a pack of 52 playing cards.
(a) 2598960 **(b)** 3585620 **(c)** 3298960 **(d)** none

89. In how many ways can a team of 11 be chosen from 14 football players, two of them can only be goalkeeper?
(a) 150 **(b)** 132 **(c)** 114 **(d)** none

90. A candidate is required to answer 6 out of 10 questions, which are divided into two groups each containing 5 questions and he is not permitted to attempt more than 4 from each group. In how many ways can he make up his choice?
(a) 315 **(b)** 250 **(c)** 450 **(d)** 200

91. Find the number of words which can be formed with two different consonants & one vowels out of 7 different consonants and 3 different vowels; the vowel should be between two consonants.
(a) 126 **(b)** 210 **(c)** 120 **(d)** none

92. In how many ways can zero or more letters be selected from the letters AAAAA.
(a) 4 **(b)** 5 **(c)** 6 **(d)** none

93. From 5 apples, 4 oranges and 3 mangoes how many selections of fruits can be made?
(a) 120 **(b)** 119 **(c)** 118 **(d)** none

94. Find the number of divisors of 21600
(a) 72 **(b)** 76 **(c)** 71 **(d)** none

Answer Sheet

1.	**b**	**2.**	**c**	**3.**	**a**	**4.**	**a**	**5.**	**b**	**6.**	**a**	**7.**	**a**	**8.**	**a**	**9.**	**c**	**10.**	**a**
11.	**a**	**12.**	**c**	**13.**	**c**	**14.**	**a**	**15.**	**a**	**16.**	**c**	**17.**	**b**	**18.**	**c**	**19.**	**a**	**20.**	**b**
21.	**a**	**22.**	**a**	**23.**	**a**	**24.**	**c**	**25.**	**a**	**26.**	**b**	**27.**	**a**	**28.**	**b**	**29.**	**c**	**30.**	**c**
31.	**a**	**32.**	**c**	**33.**	**c**	**34.**	**b**	**35.**	**b**	**36.**	**b**	**37.**	**c**	**38.**	**a**	**39.**	**c**	**40.**	**a**
41.	**b**	**42.**	**b**	**43.**	**b**	**44.**	**c**	**45.**	**a**	**46.**	**a**	**47.**	**b**	**48.**	**a**	**49.**	**a**	**50.**	**a**
51.	**a**	**52.**	**b**	**53.**	**d**	**54.**	**b**	**55.**	**a**	**56.**	**c**	**57.**	**c**	**58.**	**a**	**59.**	**b**	**60.**	**b**
61.	**c**	**62.**	**a**	**63.**	**d**	**64.**	**d**	**65.**	**b**	**66.**	**c**	**67.**	**a**	**68.**	**b**	**69.**	**b**	**70.**	**c**
71.	**c**	**72.**	**a**	**73.**	**b**	**74.**	**c**	**75.**	**a**	**76.**	**a**	**77.**	**b**	**78.**	**d**	**79.**	**a**	**80.**	**b**
81.	**a**	**82.**	**a**	**83.**	**a**	**84.**	**a**	**85.**	**a**	**86.**	**a**	**87.**	**b**	**88.**	**a**	**89.**	**b**	**90.**	**d**
91.	**a**	**92.**	**c**	**93.**	**b**	**94.**	**a**												

Summary Notes

Sequence and Series

Chapter 7

EXERCISE

Arithmetic Progression

1. Which term of the progression -1, -3, -5? ... Is-39
(a) 21st **(b)** 20th **(c)** 19th **(d)** none of these

2. The value of x such that 8x + 4, 6x – 2, 2x + 7 will form an AP is
(a) 15 **(b)** 2 **(c)** 15/2 **(d)** none of these

3. The mth term of an A.P. is n and nth term is m. The r the term of it is
(a) m + n + r **(b)** n + m – 2r **(c)** m + n + r/2 **(d)** none of these

4. The 20th term of the progression 1, 4, 7, 10.....is
(a) 58 **(b)** 52 **(c)** 50 **(d)** none of these

5. The last term of the series 5, 7, 9, ...to 21 terms is
(a) 44 **(b)** 43 **(c)** 45 **(d)** none of these

6. The last term of the A.P. 0.6, 1.2, 1.8, to 13 terms is
(a) 8.7 **(b)** 7.8 **(c)** 7.7 **(d)** none of these

7. The sum of the series 9, 5, 1....to 100 terms is
(a)-18900 **(b)** 18900 **(c)** 19900 **(d)** none of these

8. The number of numbers between 74 and 25556 divisible by 5 is
(a) 5090 **(b)** 5097 **(c)** 5095 **(d)** none of these

9. The first term of an A.P is 14 and the sums of the first five terms and the first ten terms are equal is magnitude but opposite in sign. The 3rd term of the AP is
(a) $6\frac{4}{11}$ **(b)** 6 **(c)** 4/11 **(d)** none of these

10. The sum of a certain number of terms of an AP series -8, -6, -4, ...is 52. The number of terms is
(a) 12 **(b)** 13 **(c)** 11 **(d)** none of these

11. The first and the last term of an AP are -4 and 146. The sum of the terms is 7171. The number of terms is
(a) 101 **(b)** 100 **(c)** 99 **(d)** none of these

12. The sum of three integers in AP is 15 and their product is 80. The integers are
(a) 2, 8, 5 **(b)** 8,2,5 **(c)** 2, 5, 8 **(d)** none of these

13. The sum of all positive integral multiples of 3 less than 100 is
(a) 1584 **(b)** 1665 **(c)** 1683 **(d)** None of these

14. In an A.P. 3rd term is 18 & 7th term is 30, the sum of its 17 terms is
(a) 600 **(b)** 612 **(c)** 624 **(d)** None of these

15. If the 9th term of an A.P. is zero, $\frac{t_{29}}{t_{19}}$ is
(a) 1 **(b)** 2 **(c)** 3 **(d)** 4

16. A person saved Rs. 16,500 in ten years. In each year after 1st year he saved Rs. 100 more than he did in the preceding year. The amount of money he saved in the 1st year was
(a) 1000 **(b)** 1500 **(c)** 1200 **(d)** None of these

17. If sum of n terms of an A.P. is $3n^2 + 5n$ & $T_m = 164$, then m = ?
(a) 26 **(b)** 27 **(c)** 28 **(d)** 29

18. In an A.P., if $S_{10} = 550$ and a = 100, then find d.
(a) 10 **(b)** -10 **(c)** 20 **(d)** -20

19. If 4, A_1, A_2, A_3, 28 are in A.P., then the value of A_3 is equal to
(a) 24 **(b)** 22 **(c)** 19 **(d)** 23

Arithmetic Mean

20. The arithmetic mean between 33 and 77 is
(a) 50 **(b)** 45 **(c)** 55 **(d)** none of these

21. The 4 arithmetic means between -2 and 23 are
(a) 3, 13, 8, 18 **(b)** 18, 3, 8, 13
(c) 3, 8, 13, 18 **(d)** none of these

22. The two-arithmetic means between -6 and 14 is
(a) 2/3, 1/3 **(b)** $2/3, 7\frac{1}{3}$
(c) $-2/3, -7\frac{1}{3}$ **(d)** none of these

Geometric Progression

23. The 7th term of the series 6, 12, 24, ...is
(a) 384 **(b)** 834 **(c)** 438 **(d)** none of these

24. t_8 of the series 6, 12, 24...is
(a) 786 **(b)** 768 **(c)** 867 **(d)** none of these

25. t_{12} of the series – 128, 64, -32....is
(a) -1/6 **(b)** 16 **(c)** 1/16 **(d)** none of these

26. The 4th term of the series 0.04, 0.2, 1.....is
(a) 0.5 **(b)** ½ **(c)** 5 **(d)** none of these

27. The last term of the series 1, 2, 4....to 10 terms is
(a) 512 **(b)** 256 **(c)** 1024 **(d)** none of these

28. The last term of the series 1, -3, 9, -27 up to 7 terms is
(a) 297 **(b)** 729 **(c)** 927 **(d)** none of these

29. The sum of the series -2, 6, -18.....to 7 terms is
(a) -1094 **(b)** 1094 **(c)** -1049 **(d)** none of these

30. The sum of the series 243, 81, 27, ... to 8 terms is
(a) 36 **(b)** $\left(36\frac{13}{30}\right)$ **(c)** $36\frac{1}{9}$ **(d)** none of these

31. The sum of the series $\frac{1}{\sqrt{3}} + 1 + \frac{3}{\sqrt{3}} + \cdots$ ... to 18 terms is
(a) $9841\frac{(1+\sqrt{3})}{\sqrt{3}}$ **(b)** 9841 **(c)** $\frac{9841}{\sqrt{3}}$ **(d)** none of these

32. The second term of a G P is 24 and the fifth term is 81. The series is
(a) 16, 36, 24, 54... **(b)** 24, 36, 53...
(c) 16, 24, 36, 54... **(d)**none of these

33. The sum of 3 numbers of a G P is 39 and their product is 729. The numbers are
(a) 3, 27, 9 **(b)** 9, 3, 27 **(c)** 3, 9, 27 **(d)** none of these

34. If you save 1 paise today, 2 paise the next day 4 paise the succeeding day and soon, then your total savings in two weeks will be
(a) Rs. 163 **(b)**Rs. 183 **(c)** Rs. 163.83 **(d)** none of these

35. Sum of the series $1 + 3 + 9 + 27 +$ ..... is 364. the number of terms is
(a) 5 **(b)** 6 **(c)** 11 **(d)** none of these

36. The product of 3 numbers in G P is 729 and the sum of squares is 819. The numbers are.
(a) 9, 3, 27 **(b)** 27, 3, 9 **(c)** 3, 9, 27 **(d)** none of these

37. The sum of the infinite GP 14, - 2, + 2/7, - 2/49, + ... is
(a) $4\frac{1}{12}$ **(b)** $12\frac{1}{4}$ **(c)** 12 **(d)** none of these

38. The number of terms to be taken so that $1 + 2 + 4 + 8 +$ will be 8191 is
(a) 10 **(b)** 13 **(c)** 12 **(d)** none of these

39. The sum of the infinite series $1 + 2/3 + 4/9 +$ ...is
(a) 1/3 **(b)** 3 **(c)** 2/3 **(d)** none of these

40. The sum of the first two terms of a G.P. is 5/3 and the sum to infinity of the series is 3. The common ratio is
(a) 1/3 **(b)** 2/3 **(c)** -2/3 **(d)** none of these

Geometric Mean

41. Four geometric means between 4 and 972 are
(a) 12 ,36 ,108 ,324 **(b)** 12, 24, 108, 320
(c) 10, 36, 108, 320 **(d)** none of these

42. If 40 GMs. are inserted between 2 and 40 then product of 10th GM from beginning and that of from end is
(a) 20 **(b)** 40 **(c)** 80 **(d)** None

Harmonic Progression

43. The10th term of H.P $\frac{1}{5}, \frac{4}{19}, \frac{2}{9}, \frac{14}{17} \ldots \ldots$
(a) $\frac{11}{4}$ **(b)** $\frac{14}{4}$ **(c)** $\frac{11}{9}$ **(d)** none of these

44. Calculate the sum of first 30 terms of the H.P. $-2,-5,-8,-11$....
(a) $-\frac{1}{1365}$ **(b)** $\frac{2}{1365}$ **(c)** $\frac{1}{1265}$ **(d)** none of these

Harmonic Mean

45. The Harmonic Mean of 2 and 13 is
(a)12/5 **(b)** 5/12 **(c)** 5/2 **(d)** none of these

46. The two H.M Between ½ and 4/17 are
(a)12/5 **(b)** 5/12 **(c)** 5/2 **(d)** none of these

47. If H be the Harmonic Mean Between a and b then $\frac{H}{a} + \frac{H}{b}$
(a)1 **(b)** 2 **(c)** ab **(d)** none of these

Relationship Between AM, GM, HM

48. If AM and HM of two numbers are 32 and 2 respectively then G.M. is
(a) 8 **(b)** $4\sqrt{2}$ **(c)** 64 **(d)** None

49. If two numbers x and y are such that their AM exceeds their GM by 3/2 and the GM exceeds their HM by 6/5, then the values of (x,y)
(a) 8,5 **(b)** 3,12 **(c)** 6,4 **(d)** none of these

Series Is Given & Formula Is Asked

Nth Term Formula Is Asked

50. The nth element of the sequence 1, 3, 5, 7, ...Is
(a)n **(b)** 2n – 1 **(c)** 2n + 1 **(d)** none of these

51. The nth element of the sequence -1,2, -4,8.....is
(a) $(-1)^n 2^{n-1}$ **(b)** 2^{n-1} **(c)** 2^{n+x} **(d)** none of these

52. Find the sum to n terms of the series. $\frac{1}{2\times5}+\frac{1}{5\times8}+\frac{1}{8\times11}+\cdots$ ... .
(a) $\frac{n}{2(3n+2)}$ **(b)** $\frac{n}{2(3n-2)}$ **(c)** $\frac{n}{(3n+2)}$ **(d)** $\frac{n}{(3n-2)}$

Sum Formula Is Asked

53. Sum of n terms of the series 4 + 44 + 444 + ... is
(a) $4/9\{10/9(10^n-1)-n\}$ **(b)** $10/9(10^n-1)-n$
(c) $4/9(10^n-1)-n$ **(d)** none of these

54. Sum of n terms of the series 0.1 + 0.11 + 0.111 + ... is
(a) $1/9\{n-(1-(0.1)^n)\}$ **(b)** $1/9\{(1-(0.1)^n)/9\}$
(c) $n-1-(0.1)^n/9$ **(d)** none of these

55. The sum of $1.03+(1.03)^{2+}(1.03)^{3+}$....to n terms is
(a) $103\{(1.03)^n-1\}$ **(b)** $103/3\{(1.03)^n-1\}$
(c) $(1.03)^n-1$ **(d)** none of these

Formula Is Given & Series Is Asked

Nth Term Formula Is Given

56. The first three terms of sequence when nth term t, is $n^2 - 2n$ are
(a) -1, 0, 3 **(b)** 1, 0, 2 **(c)** -1, 0, -3 **(d)** none of these

Sum Formula Is Given

57. The nth term of the series whose sum to n terms is $5n^2 + 2n$ is
(a) 3n - 10 **(b)** 10n – 2 **(c)** 10n - 3 **(d)** none of these

58. The sum of n terms of an AP is $3n^2 + 5n$. The series is.
(a) 8, 14, 20, 26 **(b)** 8, 22, 42, 68 **(c)** 22, 68, 114, .. **(d)**none of these

Advance Problems

59. If p, q and r are in A. P. and x, y, z are in G.P. then $x^{q-r}, y^{r-p}, z^{p-q}$ is equal to
(a) 0 **(b)** -1 **(c)** 1 **(d)** none of these

60. If a, b, c, d are in A.P. then:
(a) $a^2-3b^2+3c^2-d^2=0$ **(b)** $a^2-3b^2+3c^2+d^2=0$
(c) $a^2+3b^2+3c^2-d^2=0$ **(d)** None

61. Given x, y, z are in G.P. and $x^p = y^q = z^\sigma$, then $1/p, 1/q, 1/\sigma$ are in
(a) A.P. **(b)** G.P.
(c) Both A.P. and G.P. **(d)**none of these

62. If x, y, z are in G.P., then
(a) $y^2 = xz$ **(b)** $y(z^2 + x^2) = x(z^2 + y^2)$
(c) $2y = x + z$ **(d)** none of these

63. If x, y, z are in A.P. and x, y, $(z + 1)$ are in G.P. then
(a) $(x - z)^2 = 4x$ **(b)** $z^2 = (x - y)$
(c) $z = x - y$ **(d)** none of these

64. The numbers x, 8, y are in G.P. and the numbers x, y, - 8 are in A. P. The value of x and y are
(a) (-8, -8) **(b)** (16, 4) **(c)** (8, 8) **(d)** none of these

65. The sum of three numbers in G.P. is 70. If the two extremes by multiplied eachby4and the mean by 5, the products are in AP. The numbers are
(a) 12, 18, 40 **(b)** 10, 20, 40 **(c)** 40, 20, 10 **(d)** none of these

66. If S_1, S_2, S_3 are S_n of 3 A. P., where 'a' of all is 1 & 'd' is 1, 2, 3 resp. then $\frac{(s_1 + s_2)}{s_2}$ is.
(a) 1 **(b)** 2 **(c)** 3 **(d)** none of these

67. The sum of all-natural numbers from 100 to 300 which are exactly divisible by 4 or 5 is
(a) 10200 **(b)** 15200 **(c)** 16200 **(d)** None

68. If a, b, c, d are in geometric progression, then $(b - c)^2 + (c - a)^2 + (d - b)^2$ is equal to
(a) $(a - b)^2$ ` **(b)** $(c - d)^2$ **(c)** $(a - d)^2$ **(d)** $(b - d)^2$

69. If $\frac{1}{x + y}, \frac{1}{2y}, \frac{1}{y + z}$ are in A.P., then x,y,z are in
(a) G.P. **(b)** A.P.
(c) Both (a)&(b) **(d)** None

70. Let A_1, A_2 be two A. M's & G_1, G_2 be two G. M's between x & y then $\frac{A_1 + A_2}{G_1 G_2}$ is equal to
(a) $\frac{xy}{x+y}$ **(b)** $\frac{x+y}{xy}$ **(c)** $\frac{x-y}{xy}$ **(d)** $\frac{x-y}{x+y}$

71. If a, 4, b are in A.P., a,2, b are in G.P., then $\frac{1}{a}, 1, \frac{1}{b}$ are in
(a) A.P. **(b)** G.P. **(c)** H.P. **(d)** none of these

72. t_4 of a G.P. in x, $t_{10} = y$ and $t_{16} = z$, Then
(a) $x^2 = yz$ **(b)** $z^2 = xy$ **(c)** $y^2 = zx$ **(d)** none of these

73. If $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are in A.P., then a^2, b^2, c^2 are in:
(a) G.P. **(b)** A.P. **(c)** H.P. **(d)** none of these

74. Find n such that $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ may be the **AM** between a and b:
(a) 1/2 **(b)** 1 **(c)** -1/2 **(d)** 0

75. Find n such that $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ may be the **GM** between a and b:
(a) 1/2 **(b)** 1 **(c)** -1/2 **(d)** 0

76. Find n such that $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ may be the **HM** between a and b:
(a) 1/2 **(b)** -1 **(c)** -1/2 **(d)** 0

Divisibility Test

77. $2^{4n} - 1$ is divisible by
(a) 5 **(b)** 24 **(c)** 15 **(d)** 34

78. $3^n - 2n - 1$ is divisible by
(a) 25 **(b)** 4 **(c)** 36 **(d)** 24

Additional Question Bank

79. Given x, y, z are in G.P and $x^p = y^q = z^\sigma$, then 1/p, 1/q, 1/σ are in
(a) A. P **(b)** G.P
(c) Both A.P and G. P **(d)** none of these

80. The sum to ∞of the series -5, 25, -125, 625, ……. can be written as
(a) $\sum_{k=1}^{x}(-5)^k$ **(b)** $\sum_{k=1}^{x} 5^k$
(c) $\sum_{k=1}^{x} -5^k$ **(d)** none of these

81. If S_n the sum of first n terms in a series is given by $2n^2 + 3n$ the series is in _____.
(a) A.P **(b)** G.P
(c) H. P **(d)** none of these

82. The sum up to infinity of the series $(1 + 2^{-2}) + (2^{-1} + 2^{-4}) + (2^{-2} + 2^{-6}) + \ldots\ldots$
(a) 7/3 **(b)** 3/7
(c) 4/7 **(d)** none of these

83. The sum up to infinity of the series $4/7 - 5/7^2 + 4/7^3 - 5/7^4 + \ldots\ldots$ is
(a) 23/48 **(b)** 25/48
(c) ½ **(d)** none of these

84. If the third term of a G.P is the square of the first and the fifth term is 64 the series would be _____.
(a) 4 + 8 + 16 + 32 + ……. **(b)** 4 – 8 + 16 – 32 + ……
(c) both **(d)** none

85. Sum up to ∞ of the series $½ + 1/3^2 + ½^3 + 1/3^4 + ½^5 + 1/3^6 + \ldots\ldots$ is
(a) 19/24 **(b)** 24/19
(c) 5/24 **(d)** none of these

86. If $1 + a + a^2 + \ldots\ldots \infty = x$ and $1 + b + b^2 + \ldots\ldots\infty = y$ then $1 + ab + a^2b^2 + \ldots\ldots\ldots \infty = x$ is given by _____.
(a) (xy)/ (x + y-1) **(b)** (xy)/(x-y-1)
(c) (xy)/(x+y+1) **(d)** none of these

87. In a G.p if the $(p + q)^{th}$ term is m and the $(p-q)^{th}$ term is n then the p^{th} term is _____.
(a) $(mn)^{1/2}$ **(b)** mn
(c) (m+n) **(d)** (m-n)

88. The sum of p term of an A.P is q and the sum of q terms is p. The sum of p+q terms is _____.
(a) –(p+q) **(b)** p + q
(c) $(p - q)^2$ **(d)** $p^2 - q^2$

89. The sum of n terms of two A.P are in the ratio of (7n – 5)/(5n + 17). Then the _____ term of the two series are equal.

(a) 12 **(b)** 6
(c) 3 **(d)** none

90. If a, b, c are in A.P then $a^2(b + c)$, $b^2(c + a)$, $c^2(a + b)$ are in _____.

(a) A.P **(b)** G.P
(c) H.P **(d)** none

91. If S_1, S_2, S_3 be the respectively the sum of terms of n, 2n, 3n an A.P. the value of $S_3 \div (S_2 - S_1)$ is given by _____.

(a) 1 (b) 2 (c) 3 (d) None

92. If S_1, S_2 S_3 be the sums of **n** terms of three A.P.s the first term of each being unity and the respective common differences 1, 2, 3 then $(S_1 + S_3) / S_2$ is _____.

(a) 1 (b) 2 (c) -1 (d) None

93. The sum of **n** terms of $(x + y)^2$, $(x^2 + y^2)$, $(x - y)^2$, …….is

(a) $(x + y)^2 - 2(n - 1)xy$ (b) $n(x + y)^2 - n(n - 1)xy$
(c) both the above (d) None

94. The sum of **n** terms of (1/n)(n - 1), (1/n) (n - 2), (1/n) (n - 3) .....is

(a) 0 (b) (1/2)(n - 1) (c) (1/2)(n + 1) (d) None

95. The sum of n terms of the series 2.4.6 + 4.6.8 + 6.8.10 + ...is

(a) $2n(n^3+6n^2+11n+6)$ (b) $2n(n^3-6n^2+11n-6)$
(c) $n(n^3+6n^2+11n+6)$ (d) $n(n^3+6n^2+11n-6)$

96. The sum of **n** terms of the series $1+(1+1/3)+(1+1/3+1/3^2)+$ …….is

(a) $(3/2)(1-3^{-n})$ (b) $(3/2)[n-(1/2)(1-3^{-n})]$

(c) Both (d) None

97. The least value of n for which the sum of n terms of the series $1 + 3 + 3^2+$ …….is greater than 7000 is _____.

(a) 9 (b) 10 (c) 8 (d) 7

98. If 'S' be the sum, 'P' the product and 'R' the sum of the reciprocals of n terms in a G.P. then 'P' is the _____ of S^n and R^{-n}.

(a) Arithmetic Mean (b) Geometric Mean

(c) Harmonic Mean (d) None

99. Sum upto ∞ of the series $8+4\sqrt{2}+4+$ …….is

(a) $8(2+\sqrt{2})$ (b) $8(2-\sqrt{2})$ (c) $4(2+\sqrt{2})$ (d) $4(2-\sqrt{2})$

100. Sum upto ∞ of the series $1/2+1/3^2+1/2^3+1/3^4+1/2^5+1/3^6+$ …….is

(a) 19/24 (b) 24/19 (c) 5/24 (d) None

101. If $x = a + a/r + a/r^2 + \ldots..\infty$, $y = b - b/r + b/r^2 - \ldots..\infty$, and $z = c + c/r^2 + c/r^4 + \ldots..\infty$, then the value of $\frac{xy}{z} - \frac{ab}{c}$ is

(a) 0 (b) 1 (c) -1 (d) None

102. If S_1, S_2, S_3, S_n are the sums of infinite G.P.s whose first terms are 1, 2, 3 …..n and whose common ratios are 1 /2, 1 /3, …..1 /(n+1) then the value of $S_1 + S_2 + S_3 + \ldots . S_n$ is

(a) (n/2) (n + 3) (b) (n/2) (n + 2) (c) (n/2) (n+1) (d) $n^2/2$

103. If the sum of n terms of a G.P. with first term 1 and common ratio 1/2 is 1+127/128, the value of n is _____.

(a) 8 (b) 5 (c) 3 (d) None

104. The sum up to infinity of the series $\sqrt{2}+1/\sqrt{2}+1/(2\sqrt{2})+$ …….is

(a) $2\sqrt{2}$ (b) 2 (c) 4 (d) None

Answer Sheet

1.	**b**	**2.**	**c**	**3.**	**b**	**4.**	**a**	**5.**	**c**	**6.**	**b**	**7.**	**a**	**8.**	**b**	**9.**	**d**	**10.**	**b**
11.	**a**	**12.**	**c**	**13.**	**c**	**14.**	**b**	**15.**	**b**	**16.**	**c**	**17.**	**b**	**18.**	**b**	**19.**	**b**	**20.**	**c**
21.	**c**	**22.**	**b**	**23.**	**a**	**24.**	**b**	**25.**	**c**	**26.**	**c**	**27.**	**a**	**28.**	**b**	**29.**	**a**	**30.**	**d**
31.	**a**	**32.**	**c**	**33.**	**c**	**34.**	**c**	**35.**	**b**	**36.**	**c**	**37.**	**b**	**38.**	**b**	**39.**	**b**	**40.**	**c**
41.	**a**	**42.**	**c**	**43.**	**a**	**44.**	**a**	**45.**	**a**	**46.**	**a**	**47.**	**b**	**48.**	**a**	**49.**	**b**	**50.**	**b**
51.	**a**	**52.**	**a**	**53.**	**a**	**54.**	**a**	**55.**	**b**	**56.**	**a**	**57.**	**c**	**58.**	**a**	**59.**	**c**	**60.**	**a**
61.	**a**	**62.**	**a**	**63.**	**a**	**64.**	**b**	**65.**	**b**	**66.**	**b**	**67.**	**b**	**68.**	**c**	**69.**	**a**	**70.**	**b**
71.	**a**	**72.**	**c**	**73.**	**b**	**74.**	**d**	**75.**	**c**	**76.**	**b**	**77.**	**c**	**78.**	**b**	**79.**	**a**	**80.**	**a**
81.	**a**	**82.**	**a**	**83.**	**a**	**84.**	**a**	**85.**	**a**	**86.**	**a**	**87.**	**a**	**88.**	**a**	**89.**	**b**	**90.**	**a**
91.	**c**	**92.**	**b**	**93.**	**b**	**94.**	**b**	**95.**	**a**	**96.**	**b**	**97.**	**a**	**98.**	**b**	**99.**	**a**	**100.**	**a**
101.	**a**	**102.**	**a**	**103.**	**104**	**a**													

Sets, Relation & Function

Chapter **8**

EXERCISE

SETS

Basics

1. If A = {2, 5, 6, 8}, then n **(a)** is
(a) 2 **(c)** 5
(b) 4 **(d)** 1

2. If A has 70 elements, B has 32 elements and A ∩ B has 22 elements then A ∪ B is
(a) 60 **(c)** 80
(b)124 **(d)** none of these

3. E is a set of positive even number and O is a set of positive odd numbers, then E ∪ O is a
(a) Set of whole numbers **(c)** a set of rational number
(b) N **(d)** none of these

4. If A has 32 elements, B has 42 elements and A ∪ B has 62 elements, the number of elements in A ∩ B is
(a) 12 **(c)** 10
(b) 74 **(d)** none of these

5. If n (P) = 3 and n (Q) = 4, then n (P × Q) is
(a) 3 **(c)** 12
(b) 4 **(d)** 1

6. If the set P has 3 elements, Q four and R two then the set P × Q × R contains
(a) 9 elements **(c)** 24 elements
(b) 20 elements **(d)** none of these

Method to Write Set

7. Represent the following sets in set notation: - set of all alphabets in English language set of all odd integers less than 25 set of all integers set of positive integers x satisfying the equation $x^2 + 5x + 7 = 0$
(a) A = {x:x is an alphabet in English} I = {x:x is an odd integer > 25} = {2 4 6 8…} I = {x:$x^2 + 5x + 7 = 0$}
(b) A = {x:x is an alphabet in English} I = {x:x is an odd integers < 25} = {1 3 5 7…}I ={x:$x^2 + 5x + 7 = 0$}
(c) A = {x:x is an alphabet in English} I = {x:x is an odd integer ≤ 25} = {1 3 5 7…} I = {x:$x^2 + 5x + 7 = 0$}
(d) None of these

8. Rewrite the following sets in a set builder form: -
A = {a e i o u} B = {1 2 3 4…….} C is a set of integers between -15 and 15.
(a) A = {x:x is a constant} B = {x:x is an irrational number} C = {x: -15 < x < 15^x is a fraction}
(b) A = {x:x is a vowel} B = {x:x is an natural number} C = {x: -15 ≤ x ≤ 15^x is a whole number}
(c) A = {x:x is a vowel} B = {x:x is an natural number} C = {x: -15 < x < 15^x is a whole number}
(d) None of these

9. What is the relationship between the following sets?
A = {x:x is a letter in the word flower}
B = {x:x is a letter in the word flow}
C = {x:x is a letter in the word wolf}
D = {x:x is a letter in the word follow}

(a) B = C = B and all these are subsets of the set A
(b) B = C ≠D
(c) B ≠ C ≠ D
(d) None of these

10. Following set notations represent: A⊂ C B; x ∉ A; A ⊃ B; {0}; A⊄ B
(a) A is a proper subset of B; x is not an element of A; A contains B; singleton with an only element zero; A is not contained in B.
(b) A is a proper subset of B; x is an element of A; A contains B; singleton with an only element zero; A is contained in B.
(c) A is a proper subset of B; x is not an element of A; A does not contains B; contains elements other than zero; A is not contained in B.
(d) None

11. Represent the following sets in set notation: - Set of all alphabets in English language, set of all odd integers less than 25, set of all odd integers, set of positive integers x satisfying the equation $x^2+5x+7=0$:
(a) A = {x:x is an alphabet in English}, I = {x:x is an odd integer>25}, I = {2, 4, 6, 8 ....} I = {x: $x^2+5x+7=0$}
(b) A= {x:x is an alphabet in English}, I = {x:x is an odd integer<25}, I = {1, 3, 5, 7 ....} I = {x: $x^2+5x+7=0$}
(c) A = {x:x is an alphabet in English}, I = {x:x is an odd integer £ 25}, I = {1, 3, 5, 7 ....} I = {x: $x^2+5x+7=0$}
(d) None

12. Rewrite the following sets in a set builder form: - A= {a, e, i, o, u} B= {1, 2, 3, 4 ..} C is a set of integers between -15 and 15.
(a) A= {x:x is a consonant}, B= {x:x is an irrational number}, C= {x: -15<x<15^x is a fraction}
(b) A= {x:x is a vowel}, B= {x:x is a natural number}, C= {x: -15^{3}x^{3}15^x is a whole number}
(c) A= {x:x is a vowel}, B={x:x is a natural number}, C= {x: -15 <x<15^x is a whole number}
(d) None

13. What is the relationship between the following sets? A= {x:x is a letter in the word flower}
B= {x:x is a letter in the word flow} C={x:x is a letter in the word wolf} D={x:x is a letter in the word follow}
(a) B=C=D and all these are subsets of the set A
(b) B=C≠D
(c) B≠C≠D
(d) None

Types of Set

14. The null set is represented by
(a){φ} **(c)** Φ
(b){0} **(d)** none of these

15. If A = {1, 2, 3}, then P**(a)** is
(a) 3
(b) {{1, 2, 3}, {1, 2}, {1, 3}, {2, 3}, {1}, {2}, {3}, φ}
(c) {1, 2, 3}
(d) {{1, 2, 3}, {1, 2}, {1, 3}, {2, 3}, {1}, {2}, {3}}

16. If A = {a, b, c}, then n (p**(a)**) is
(a) 3 **(c)** 7
(b) 8 **(d)** 1

17. If N is the set of natural numbers and I is the set of positive integers, then
(a)N = I **(c)** N I
(b)N I **(d)** none of these

18. The set of cubes of the natural number is
(a)A finite set **(c)** a null set
(b)An infinite set **(d)** none of these

19. The set of squares of positive integers is
(a) A finite set **(c)** an infinite set
(b) Null set **(d)** none of these

20. The set $\{2^x | x$ is any positive rational number$\}$ is
(a) An infinite set **(c)** a finite set
(b)A null set **(d)** none of these

21. $\{\frac{n(n+1)}{2}$: n is a positive integer$\}$ is
(a) A finite set **(c)** is an empty set
(b) An infinite set **(d)** none of these

22. Equal sets are –
(a) Equivalent **(c)** null
(b) Equal **(d)** singleton

23. If cardinal number of two finite sets is same, then the sets are-
(a) Equivalent **(c)** null
(b) Equal **(d)** singleton

24. The range set of a constant function is a –
(a) Disjoint set **(c)** void set
(b) Singleton set **(d)** infinite set

25. The number of subsets of a set containing n elements is
(a) 2^n **(c)** n
(b) 2^{-n} **(d)** none of these

26. A set containing 4 elements have –

(a) 15 subsets **(c)** 14 subsets

(b) 16 subsets **(d)** 13 subsets

27. The number of subsets of the set {2, 3, 5} is

(a) 3 **(c)** 6

(b) 8 **(d)** none of these

28. Let A = {a, b} set of subsets of A is called power set of A denoted by P**(a)**. now n(P**(a)**) is

(a) 2 **(c)** 3

(b) 4 **(d)** none of these

29. State whether the following sets are finite, infinite or empty: -

(i) X = {1, 2, 3, 500}

(ii) Y ={y: y= a^2; a is an integer}

(iii) A = {x:x is a positive integer multiple of 2}

(iv) B = {x:x is an integer which is a perfect root of 26<x<35}

(a) finite infinite infinite empty (b) infinite infinite finite empty

(c) infinite finite infinite empty (d) None

30. If A = {a, b, c, d} list the element of power set P (a)

(a) {ϕ {a} {b}({c} {d} {a, b} {a, c} {a, d} {b, c} {b, d} {c, d}

(b) {a, b, c} {a, b, d} {a, c, d} {b, c, d}

(c) {a, b, c, d}

(d) All the above elements are in P (a)

Algebra on Set

31. If A = (1, 2, 3, 5, 7) and B = (1, 3, 6, 10, 15) then cardinal number of A – B is

(a) 3 **(c)** 6

(b) -4 **(d)** none of these

32. If f(x)= x + 3, g(x) = x^2 then f(x).g(x) is

(a) $(x + 3)^2$ **(c)** $x^3 + 3x^2$

(b) $X^2 + 3$ **(d)** none of these

Operation on Set

33. A ∪ A is equal to

(a) A **(c)**φ

(b) E **(d)** none of these

34. A ∪ A` is equal to

(a) A **(c)** φ

(**b**) Sample space **(d)** none of these

35.A ∪ E is equal to

(a) A **(c)** φ

(b) E **(d)** none of these

36. If P = {1, 2, 3, 4}: Q = {2, 4, 6} then P ∪ Q

(a) {1, 2, 3, 4, 6} **(c)** {1, 2, 3, 6}

(b) {1, 4, 6} **(d)** none of these

37. If P = {1, 2, 3, 4}: Q = {2, 4, 6} then P ∪ Q

(a) {1, 2, 3, 6} **(c)**{1, 2, 3, 4, 6}

(b) {1, 4, 6} **(d)** none of these

38.(A ∪ B) is equal to

(a) (A ∩ B) **(c)** A` ∩ B`

(b) A ∪ B` **(d)** none of these

39.(A∩ B) ` is equal to

(a) (A` ∪ B`) **(c)** A`∩ B`

(b) A ∪ B` **(d)** none of these

40. If V= {0, 1, 2, …9}, X= {0, 2, 4, 6, 8}, Y= {3, 5, 7} and Z= {3 7} then

(i) Y ∪ Z, (V ∪ Y) ∩ X, (X ∪ Z) ∪ V are respectively: -

(a) {3, 5, 7}, {0, 2, 4, 6, 8}, {0, 1, 2, .9}

(b) {2, 4, 6}, {0, 2, 4, 6, 8}, {0, 1, 2, .9}

(c) {2, 4, 6}, {0, 1, 2, …9}, {0, 2, 4, 6, 8}

(d) None

(ii) (X ∪ Y) ∩ Z and (ϕ∪ V) ∩ϕ are respectively: -

(a) {0, 2, 4, 6, 8}, ϕ (b){3, 7}, ϕ (c) {3, 5, 7}, ϕ (d) None

41. If A = {0, 1} state which of the following statements are true: - (i) {1} ⊂ A (ii) {1} ∈ A (iii) ϕ∈ A (iv) 0 ∈ A (v) 1 ⊂ A (vi) {0} ∈ A (vii) ϕ⊂ A

(a) (i) (iv) and (vii) only are true (b) (i) (iv) and (vi) only are true

(c) (ii) (iii) and (vi) only are true (d) None

42. If four members a, b, c, d of a decision-making body are in a meeting to pass a resolution And given that a, b, c, d own 50%, 20%, 15%, 15% shares each.

(i) list the wining coalitions (majority prevails)

(a) {a, b} {a, c} {a, d} {a, b, c} {a, b, d} {a, b, c, d}
(b) {b, c, d}
(c) {b, c} {b, d} {c, d} {a, c, d} {b, c, d} {a} {b} {c} {d} ϕ
(d) None

(ii) As per above question with same order of options (a) (b) (c) and (d) list the blocking conditions.

(iii) As per above question with same order of options (a) (b) (c) and (d) list the losing conditions.

Venn Diagram

43. At a certain conference of 100 people there are 29 Indian women and 23 Indian men. Out of these Indian people 4 are doctors and 24 either men or doctors. There are no foreign doctors. The number of women doctors attending the conference is

(a) 2 **(c)** 1
(b) 4 **(d)** none of these

44. Solve the below Questions using following directions.
Out 2000 staff 48% preferred coffee 54% tea and 64% cocoa. Of the total 28% used coffee and tea 32% tea and cocoa and 30% coffee and cocoa. Only 65 did none of these

(i) Find the number having all the three
(a) 360 **(c)** 160
(b) 280 **(d)** none

(ii) Find the number having tea and cocoa but not coffee.
(a) 360 **(c)** 160
(b) 280 **(d)** none

(iii) Find the number having only coffee.
(a) 360 **(c)** 160
(b) 280 **(d)** none

45. Solve the below Questions using following directions.
Complaints about works canteen had been about Mess(M) Food(F) and Services(S). total complaints 173 were received as follows – n (M) = 110; n(F) = 55; n(S) = 67; n (M ∩ S ∩ F`) = 11; n (M ∩ $F$ ∩ $S$`) = 20; n (F ∩ S ∩ M`) = 16.

(i) Determine the complaints about all three
(a) 6 **(c)** 35
(b) 43 **(d)** none

(ii) Determine the complaints about two or more than two.
(a) 6 **(c)** 35
(b) 43 **(d)** none

46. Out of a total population of 50,000 only 28,000 read Telegraph and 23,000 read Times of India while 4,000 read the both. How many do not read any paper?

(a) 3,000 (b) 2,000 (c) 4,000 (d) None

47. Out 2000 staff 48% preferred coffee 54% tea and 64% cocoa. Of the total 28% used coffee and tea 32% tea and cocoa and 30% coffee and cocoa. Only 6% did none of these.

(i) Find the number having all the three.

(a) 360 (b) 280 (c) 160 (d) None

(ii) As per above question with the same order of options (a), (b), (c) and (d) find the number having tea and cocoa but not coffee.

(iii) As per above question with the same order of options (a), (b), (c) and (d) find the number having only coffee.

48. Out of total 150 students 45 passed in Accounts 50 in Maths. 30 in Costing 30 in both Accounts and Maths. 32 in both Maths and Costing 35 in both Accounts and Costing. 25 students passed in all the three subjects. Find the number who passed at least in any one of the subjects.

(a) 63 (b) 53 (c) 73 (d) None

49. After qualifying out of 400 professionals, 112 joined industry, 120 started practice and 160joined as paid assistants. There were 32, who were in both practice and service 40 in both practice and assistantship and 20 in both industry and assistantship. There were 12 who did all the three.

(i) Find how many could not get any of these.

(a) 88 (b) 244 (c) 122 (d) None

(ii) As per above question with the same order of options (a) (b) (c) and (d) find how many of them did only one of these.

50. Out of 60 students 25 failed in paper (1), 24 in paper (2), 32 in paper (3), 9 in paper (1) alone, 6 in paper (2) alone, 5 in papers (2) and (3) and 3 in papers (1) and (2). Find how many failed in all the three papers.

(a) 10 (b) 60 (c) 50 (d) None

51. As per above question how many passed in all the three papers?

(a) 10 (b) 60 (c) 50 (d) None

FUNCTIONS

Identify the Function

52. {(x, y), Y = x^2} is
(a) Not a function **(c)** inverse mapping
(b) A function **(d)** none of these

53. {(x, y) x = 4} is a
(a) Not a function **(c)** one – one mapping
(b) Function **(d)** none of these

54. If A = {1, 2, 3} and B = {4, 6, 7} then the relation R = {(2, 4) (3, 6)} is
(a) A function from A to B **(c)** A function from B to A
(b) both **(a)** and **(b)** **(d)** not a function

55. {(x, y)|x<y} is a
(a) Not a function **(c)** one-one mapping
(b) A function **(d)** none of these

Domain & Range

56. The domain of {(1, 7), (2, 6)} is
(a) (1, 6) **(c)** (1, 2)
(b) (7, 6) **(d)** (6, 7)

57. The domain and range of {(x, y) : y =x^2 } is
(a) (reals, natural numbers) **(c)** (reals, reals)
(b) (reals, positive reals) **(d)** none of these

58. The range of {(3, 0), (2, 0), (1, 0), (0, 0)} is
(a) (0, 0) **(c)** {0, 0, 0, 0}
(b) (0) **(d)** none of these

59. The range of {(1, 6), (2, 7)} is –
(a) (6, 7) **(c)** (1, 2)
(b) (1, 7) **(d)** (6, 2)

60. Range of function f(x) = 1/(1 – x) is –
(a) Set of rational numbers
(b) Set of real numbers(except zero)
(c) Set of natural numbers
(d) Set of integers

61. The range of the function f(x) = $\log_{10}(1+x)$ for the domain of real values of x when $0 \le x \le 9$ is
(a) {0} **(c)** {0, 1}
(b) {0, 1, 2} **(d)** none of these

62. For the function h(x) = 10^{1+x} the domain of real values of x where $0 \le h(x) \le 9$, the range is
(a) $10 \le x(x) \le 10^{10}$ **(c)** $0 < h(x) < 10$
(b) **(b)** $0 \le h(x) \le 10^{10}$ **(d)** none of these

One-One / Many One

63. If f(x) = x^2, x >0, then the function is -
(a) Not one to one function **(c)** into function
(b) One to one function **(d)** none of these

64. A function is invertible if and only if f is –
(a) One – one **(c)** one-one, onto
(b) One-one, into **(d)** many-one, into

65. N is the set of all-natural numbers and E is the set of all even numbers. If f: N E defined by f(x) = 2x, for all x ε N is:
(a) One – one and onto **(c)** Many one onto
(b) one – one into **(d)** can't say

66. The function f(x) = 2^x is
(a) One one mapping **(c)** many one
(b) One many **(d)** none of these

67. {(x, y) I x + y = 5} is
(a) Not a function **(c)** one – one mapping
(b) A composite function **(d)** none of these

68. . Let f: A → B f (x) = x^2, A= {-1,1, -2,2}, and B {1,4,9,16}, then f is
(c) One-One **(b)** many one
(d) Onto **(d)** none

69. Let f: Z → Z f (x) = $x^2 + x \; for \; all \; x \in z$, then f is:
(a) Many-one **(b)** One-One
(b) Onto **(d)** None

70. Let f: Z → Z f (x) = 3x+2 for all $x \in z$, then f is
(a) Onto (surjective) **(b)** One-One
(b) Injective **(d)** None

71. Let f: R → R, f (x) = $3x^3 + 5 \; for \; all \; x \in R$, then f is:
(a) Into **(b)** One-One Onto
(b) One-One into **(d)** None

Onto / Into Function

72. Let A = {2, 3, 5, 7} and B = {0, 1, 3, 5, 7}. If f is a mapping from A to B such that f(x) = x – 2 then f is
(a) An into function **(c)** constant function
(b) An onto function **(d)** identical function

Odd / Even Function

73. A function f(x) is an even function if
(a) –f(x) = f(x) **(c)** f(-x) = f(x)
(b) F(-x) = -f(x) **(d)** none of these

74. If $g(x) = 3 - x^2$ then g(x) is
(a) An odd function **(c)** an even function
(b) A periodic function **(d)** none of these

Composite Function

75. Given the function $f(x) = x^2 - 5$, f (5) is
(a) 0 **(c)** 10
(b) 5 **(d)** none of these

76. If f (x + 1) = 2x + 7 then f (0) is equal to
(a) 5 **(c)** 3
(b) 4 **(d)** 0

77. If $f(x) = x^2 + 3x$ then f(2) – f(4) is equal to
(a) – 15 **(c)** 18
(b) – 18 **(d)** 12

78. If f(x) = x 3, $g(x) = x^2$ then fog (x) is
(a) $X^2 + 3$ **(c)** $(x + 3)^2$
(b) $X^2 + x + 3$ **(d)** none of these

79. If $f(x) = x^2 + 3$, g(x) = (x) then fog (x) is –
(a) $x^2 + 3$ **(c)** $(x + 3)^2$
(b) $(x)^2 + (x^2 + 3)$ **(d)** $(x)^2 (x^2 + 3)$

Inverse Function

80. If f(x) = 100 x then f^{-1} (x) =
(a) $\frac{x}{100}$ **(c)** $\frac{1}{100}$
(b) $\frac{1}{100x}$ **(d)** none of these

81. The reverse f^{-1} when $f(x) = x^2$ is
(a) $1/x^2$ **(c)** 1/x
(b) X **(d)** none of these

82. The inverse h^{-1} (x) when $h(x) = \log_{10}x$ is
(a) $\text{Log}_{10}x$ **(c)** $\log_{10}(1/x)$
(b) 10^x **(d)** none of these

83. If f(x) = 1/1-x, then f^{-1} (x) is
(a) 1-x **(c)** x/x-1
(b) (x-1)/x **(d)** none of these

84. If $f(x) = x^2$ then f inverse is –
(a) 1/x **(c)** $1/x^2$
(b) $\sqrt{x}$ **(d)** $\sqrt[3]{x}$

Types of Relations

85. "is equal to" over the set of all rational numbers is
(a) Transitive **(c)** reflexive
(b) Symmetric **(d)** equivalence

86. "is smaller than" over the set of eggs in a box is
(a) Transitive(T) **(c)** reflexive(R)
(b) Symmetric(S) **(d)** equivalence(E)

87. "is greater than" over the set of all-natural number if known as
(a) Transitive **(c)** reflexive
(b) Symmetric **(d)** equivalence

88. The relation "is parallel to" on the set of all straight lines are plane is –
(a) An equivalence relation **(c)** reflexive relation
(b) An equal relation **(d)** transitive relation

89. "is perpendicular to" over the set of straight lines in a given plane is
(a) Symmetric **(c)** transitive
(b) Reflexive **(d)** equivalence

90. 'is the reciprocal of' …… over the set of non-zero real numbers is
(a) Symmetric **(c)** transitive
(b) Reflexive **(d)** none of these

91. "is the squares of" over n set of real numbers is
(a) Reflexive **(c)** transitive
(b) Symmetric **(d)** none of these

92. "has the same father as" ….. over the set of children
(a) Reflexive **(c)** transitive
(b) Symmetric **(d)** equivalence

93. If A = {1, 2, 3} then R = {(1, 1), (2, 2), (3, 3), (1, 2)} is
(a) Reflexive and transitive but not symmetric
(b) Reflexive and symmetric but nor transitive
(c) Symmetric and transitive but not reflexive
(d) Identity relation

94. If a = {1, 2, 3} then a relation {(1, 1), (2, 2), (3, 3)} is-
(a) An into relation
(b) An identity relation
(c) Symmetric relation
(d) Transitive relation

Answer Sheet

1.	b	2.	c	3.	b	4.	a	5.	c	6.	c	7.	b	8.	c	9.	a	10.	a
11.	b	12.	c	13.	a	14.	c	15.	b	16.	b	17.	a	18	b	19.	b	20.	a
21.	b	22.	a	23.	a	24.	b	25.	a	26.	b	27.	b	28	b	29.	a	30.	d
31.	a	32.	c	33.	a	34..	b	35.	b	36.	a	37.	c	38.	c	39.	a	40 i.	a
40 ii.	b	41.	a	42 i.	a	42 ii.	b	42 iii.	c	43	c	44 i.	a	44 ii.	b	44 iii.	c	45 i.	a
45 ii	a	46.	a	47 i.	a	47 ii.	b	47 iii.	c	48.	b	49 i.	a	49 ii.	b	50.	b	51.	a
52.	b	53.	a	54.	d	55.	a	56.	c	57.	b	58.	a	59.	a	60.	b	61.	c
62.	a	63.	b	64.	c	65.	c	66.	a	67.	c	68.	b	69.	a	70.	b	71.	b
72.	b	73.	c	74.	a	75.	a	76.	a	77.	b	78.	a	79.	c	80.	a	81.	d
82.	b	83.	b	84.	b	85.	d	86.	a	87.	a	88.	a	89.	a	90.	a	91.	d
92.	d	93.	a	94.	b														

Differential Calculus

Chapter 9

EXERCISE

Basic Problems

1. If y= 2x+x^2 then dy/dx is:
(a) 2(x+1) **(b)** 2(x-1) **(c)** x+1 **(d)** x-1

2. The gradient of the curve y= $2x^3 - 5x^2 - 3x \; at \; = 0 \; is$:
(a) 3 **(b)** -3 **(c)** 1/3 **(d)** none

3. if y= x (x-1) (x-2) then $\frac{dy}{dy}$is:
(a)$3x^2 - 6x + 2$ **(b)**$-6x + 2$ **(c)**$3x^2 + 2$ **(d)** none

4. if y=$\frac{1}{\sqrt{x}} then \; \frac{dy}{dy}$is equal to:
(a)$\frac{1}{2x\sqrt{x}}$ **(b)**$\frac{-1}{x\sqrt{x}}$ **(c)**$\frac{-1}{2x\sqrt{x}}$ **(d)** none

5. if y= $(3x^3 - 5x^2 + 8)^3 then \; dyldx \; is$:
(a)$3(3x^3 - 5x^2 + 8)^3(9x^2 + 10x)$
(b) $3(3x^3 - 5x^2 + 8)^2(9x^2 - 10x)$
(c)$3(3x^3 - 5x^2 + 8)^3(9x^2 + 10x)$
(d) None

6. If y= $e^{\sqrt{2x}}$then $\frac{dy}{dx}$ is equal to
(a)$\frac{e^{\sqrt{2x}}}{\sqrt{2x}}$ **(b)**$e^{\sqrt{2x}}$ **(c)**$\frac{e^{\sqrt{2x}}}{\sqrt{2x}}$ **(d)** none

7. If f(x) = x^k and f′(1) = 10, then the value of k is:
(a) 10 **(b)** -10 **(c)** 1/10 **(d)** None

8. The derivative of (x^2-1)/x is:
(a)$1 + \frac{1}{x^2}$ **(b)**$1 - \frac{1}{x^2}$ **(c)**$\frac{1}{x^2}$ **(d)** none

9. If y=$(3x^2 + 1) \; (x^3 + 2x)$ then $\frac{dy}{dx}$ is:
(a) $15x^4 + 21x^2 + 2$ **(b)**$15x^3 + 21x^2 - 2$
(c)$15x^3 - 21x + 2$ **(d)** none

10. If $(x) = \; e^{3 \log x}$, then $f'(x)$is:
(a)$3 \log x$ **(b)**$3x$ **(c)**$3x^2$ **(d)** none

11. If (x) = $e^{ax^2+bx+c}, the \; f'(x) is$:
(a)e^{ax^2+bx+c} **(b)**e^{ax^2+bx+c} (2ax+b)
(c) 2ax+b **(d)** none

12. If f(x) = $^xC_3$; then f′(1) = ?
(a) $\frac{1}{6}$ **(b)** $\frac{5}{6}$ **(c)** $\frac{-1}{6}$ **(d)** $\frac{-5}{6}$

13. The derivative of y $=\sqrt{x+1}$ is:
(a) $1/\sqrt{x+1}$ **(b)** $-1/\sqrt{x+1}$
(c) $(1/2)\sqrt{x+1}$ **(d)** None

14. If $y^2 = 4ax, then\ dy/dx\ is$:
(a) a/y **(b)** $2a/y$ **(c)** za **(d)** a

15. $If\ y = log_3 x + 3\ log_e x, then\ dy/dx\ is$:
(a) $(1/x)log_3 e + (3/x)$ **(b)** $log_3 e + 3/x$
(c) $log_3 e + x$ **(d)** none of these

16. If y= 1+x+ $\frac{x^2}{2!}+\frac{x^3}{3!}+\cdots+\frac{x^n}{n!}$ $then\ \frac{dy}{dx} - y\ is\ proved\ to\ be$
(a)1 **(b)** -1 **(c)** 0 **(d)** none

17. If f (x) $=x^k$ and f '(1) =10 then the value of k is:
(a) 10 **(b)** -10 **(c)** 1/10 **(d)** none

18. Differentiate $e^{(x^x)}$:
(a) (1 + log x) **(b)** x^x (1 + log x)
(c) $e^{x^x}(1 + \log x)\ x^x$ **(d)** $e^{x^x}(1 + \log x)$

19. The derivative of the function $\sqrt{x+\sqrt{x}}$ is
(a) $\frac{1}{2\sqrt{x+\sqrt{x}}}$ **(b)** $1+\frac{1}{2\sqrt{x}}$ **(c)** $\frac{1}{2\sqrt{x+\sqrt{x}}}(1+\frac{1}{2\sqrt{x}})$ **(d)** none of these

20. Let $y = \sqrt{2x} + 3^{2x}$ then $\frac{dy}{dx}$ is equal to
(a) $(1/\sqrt{2x}) + 2.3^{2x}\ \log_e 3$ **(b)** $1/\sqrt{2x}$
(c) 2. 3^{2x} log44-++++*34441*$_e$3 **(d)** none of these

Multiplication Rule

21. The derivative of x^2log x is:
(a) 1+2log x **(b)** x (1+2logx) **(c)** 2logx **(d)** None

22. If y= $xy, then\ dx/dy\ is$:
(a) $\frac{y}{1-x}$ **(b)** $\frac{y}{1+x}$ **(c)** $\frac{x}{1+y}$ **(d)** none

23. If y= $5xy, then\ dx/dy\ is$:
(a) $\frac{5y}{1-5x}$ **(b)** $\frac{4y}{1+x}$ **(c)** $\frac{x}{1+5y}$ **(d)** none

24. If $y = a^x log\ x, then\ dy/dx\ is$:
(a) $a^x(log\ x \log a + 1/x)$ **(b)** $log\ x \log a + a^x$
(c) $a^x(log\ x + 1/x)$ **(d)** $log\ x \log a + a^x$

Division Rule

25. If f (x)= $\frac{x^2+1}{x^2-1}$ then f' (x) is:
(a) -4x/ $(x^2-1)^2$ **(b)** 4x $(x^2-1)^2$ **(c)** x$(x^2-1)^2$ **(d)**None

26. The derivative of $(x^2$-1)/x is:
(a) $1+\frac{1}{x^2}$ **(b)** $1-\frac{1}{x^2}$ **(c)** $\frac{1}{x^2}$ **(d)** none

27. If f (x) $=\frac{x^2}{e^x}$ then f (- 1) is equal to
(a)-1/e **(b)** $1/e$ **(c)** -3e **(d)** none

28. The slope of the tangent to the curve y = $\frac{x-1}{x+2}$ at x = 2 is:

(a) $\frac{3}{16}$ **(b)** $-\frac{3}{16}$ **(c)** $\frac{1}{4}$ **(d)** $-\frac{1}{4}$

Parametric Equation

29. If x= $3t^2-1$, $y = t^3 - t$ *them* $\frac{dy}{dy}$ is equal to

(a) $\frac{3t^2-1}{6t}$ **(b)** $3t^2$-1 **(c)** $\frac{3t-1}{6t}$ **(d)** none

30. Given x= t+ t^{-1} *and* y = t − t^{-1} then the value of $\frac{dy}{dx}$ at t = 2 is:

(a) 3/5 **(b)** -3/5 **(c)** 5/3 **(d)** none

31. Given x = 2t+5: y=t^2- 2 then $\frac{dy}{dx}$ is calculated as:

(a) t **(b)** $\frac{-1}{t}$ **(c)** $\frac{1}{t}$ **(d)** none

32. If x=$(1-t^2)(1+t^2)$, $y = \frac{2t}{1+t^2}$ *then dyldx at* $t = 1$ *is*:

(a)1 **(b)** 2 **(c)** 0 **(d)** none

33. If x = log t, y = e^t, then $\frac{dy}{dx}$ =

(a)1/t **(b)**t.e^t **(c)** -1/t2 **(d)** none of these

34. If x = $at^3 + bt^2$ – t and y = at^2 – 2bt, then the value of $\frac{dy}{dx}$ at t = 0 is:

(a) 2b **(b)**– 2b **(c)** $\frac{1}{2b}$ **(d)** $-\frac{1}{2b}$

Geometry Based Problems

35. The slope of the tangent to the curve y=$2x^3 - 3x^2 - 12x + 8$
at $x = 0$ *is*:

(a)-12 **(b)** 12 **(c)** 0 **(d)** none

36. The gradient of the curve y+px+qy =0 at (1,1) is 1/2 The values of p and q are:

(a) (0, -1) **(b)** (2, -1) **(c)**(1,2) **(d)** none

37. The slope of the tangent to the curve y= $\sqrt{4-x^2}$ at the point where the ordinate and the abscissa are equal is:

(a) -1 **(b)** 1 **(c)** 0 **(d)** None

38. The gradient of the curve y =$3x^2 - 5x + 4$ at the point (1,2) is:

(a) 1 **(b)** 0 **(c)** -1 **(d)**2

39. The gradient of the curve y-xy+2px+3qy=0 at the point (3,2) is-2/3 The values of p and q are:

(a) (1/2,1/2) **(b)** (2,2) **(c)** (-1/2, -1/2) **(d)** (1/2, 1/6)

40. The slope of the tangent to the curve y=x^2- x at the point where the line y=2 cuts the curve in the lst quadrant is:

(a) 2 **(b)** 3 **(c)** -3 **(d)** none

41. The slope of the tangent at the point (2, 2) to the curve x^2+xy+ y^2-4=0 is given by:

(a) 0 **(b)** 1 **(c)** -1 **(d)** none

42. The points on the curve y = x^3 – x^2 – x + 1, where the tangent is parallel to x – axis are

(a) $\left(\frac{-1}{3}, \frac{32}{27}\right)$ *and* $(1, 0)$ **(c)** (1, 0) and (1, 1)

(b)$(0, 0)$, *and* $(1, 0)$ **(d)** (0, 1) and (1, 1)

Special Problems

43. If f (x) = x^2- 6x+8 then f' (5) -f' (8) is equal to:
(a) f'(2) **(b)** 3f'(2) **(c)** 2f' (2) **(d)** None

44. if $y = x.e^x, then\ dy/dx\ is$:
(a) $e^x(x+1)$ **(b)** $e^x(x-1)$ **(c)** $2e^x(x-1)$ **(d)** none

45. If $y = \sqrt{\frac{1-x}{1+x}}$ then $\frac{dy}{dx}$ is equal to –
(a) $\frac{y}{x^2-1}$ **(b)** $\frac{y}{1-x^2}$ **(c)** $\frac{y}{1+x^2}$ **(d)** $\frac{y}{y^2-1}$

46. If f(x) = $\log_e\left(\frac{x-1}{x+1}\right)$, then the value of x at which f'(x) = 1, is
(a) 0 **(b)** 1 **(c)** $\pm\sqrt{3}$ **(d)** $\pm\sqrt{2}$

47. If $y = e^x + e^{-x}$ the $\frac{dy}{dx}$ - $\sqrt{y^2-4}$ is equal to
(a) 1 **(b)** -1 **(c)** 0 **(d)** none

Logarithmic Problems

48. If $x^y, y^x = m$ where m is constant then $\frac{dy}{dy}$ is equal to
(a) $\frac{-y}{x}$ **(b)** $\frac{-y(y+x\log y)}{x(y\log x+x)}$ **(c)** $\frac{y+x\log y}{y\log x+x}$ **(d)** none

49. If y= $\sqrt{x}^{\sqrt{x}\ldots\infty}$ then $\frac{dy}{dx}$ is equal to
(a) $\frac{y^2}{2-y\log x}$ **(b)** $\frac{y^2}{x(2-y\log x)}$
(c) $\frac{y^2}{\log x}$ **(d)** none

50. Given $e^{-xy} - 4xy$=0 then $dyldx$ can be proved to be equal to
(a) -y/x **(b)** y/x **(c)** x/y **(d)** none

51. If $x^{x^x}\ then\ the\ value\ of\ (dyldx)is$:
(a) y $[x^{x-1} + \log x\ (1 + logx)]$
(b) y $[x^{x-1} + (\log x)\ (x)^2(1 + logx)]$
(c) y $[x^{x-1} + x^2 \log x\ (logx - 1)]$
(d) none of these

52. $If\ y = (1+x)^x, then\ dy/dx\ is$:
(a) $(1+x)^x\left[\log(1+x) + \frac{x}{1+x}\right]$ **(b)** $x\ (1+x)^{x-1}$
(c) $\left(\log(1+x) + \frac{x}{1-x}\right)(1+x)^x$ **(d)** none

53. If $x^y = e^{x-y}$ then find dy/dx ?
(a) $\frac{y(1-x)}{x(1+y)}$ **(b)** $\frac{\log x}{(1+\log x)^2}$ **(c)** $\frac{2\log x}{(1+\log x)^2}$ **(d)** None

Implicit Function

54. If xy= 1 then y^2+ dy/dx is equal to
(a) 1 **(b)** 0 **(c)** -1 **(d)** none

55. If y = $\sqrt{x^2+m^2}$ then y y_1(where y_1 = dy/dx) is equal to
(a) -x **(b)** x **(c)** 1/x **(d)** None

56. If $x^y = e^{x-y}$ then $\frac{dy}{dx}$ is equal to:

(a) $\frac{2\log x}{(1+\log x)^2}$ **(b)** $\frac{\log x}{(1+\log x)^2}$ **(c)** $\frac{\log x}{1+\log x}$ **(d)** none

57. If log (x/y) =x+y then $\frac{dy}{dy}$ is proved to be

(a) $\frac{y(1-x)}{x(1+y)}$ **(b)** $\frac{y}{x}$ **(c)** $\frac{1-x}{1+y}$ **(d)** none

58. If $\frac{x^2}{a^2} - \frac{y^2}{a^2} = 1$ then $\frac{dy}{dx}$cam be exprese as:

(a) $\frac{x}{a}$ **(b)** $\frac{x}{\sqrt{x^2-a^2}}$ **(c)** $\frac{x}{y}$ **(d)** none

59. If $x^3 - 2x^2y^2 + 5x + y - 5 = 0$ then$\frac{dy}{dy}$ at x =1 y=1 is equal to:

(a) 4/3 **(b)** -4/3 **(c)** 3/4 **(d)** none

60. If$x^5 + y^5 = 5xy, then\ dx/dy\ is$:

(a) $\frac{y-x^4}{y^4-x}$ **(b)** $\frac{y+x^4}{y^4+x}$ **(c)** $\frac{x^4-y}{x-y4}$ **(d)** none

61. If $x^3 y^2 = (x - y)^5$. Find $\frac{dy}{dx}$ at (1, 2).

(a) -7/9 **(b)** 7/9 **(c)** 9/7 **(d)** -9/7

Higher Order Derivation

62. If $x^2 + y^2 + 4\ then$

(a) $y\frac{d^2y}{dx^2} + \left(2\frac{dy}{dx}\right)^2 + 1 = 0$ **(b)** $y\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^2 + 1 = 0$

(c) $y\frac{d^2y}{dx^2}\left(\frac{dy}{dx}\right)^2 + 1 = 0$ **(d)** $y\frac{d^2y}{dx^2} + 2\left(\frac{dy}{dx}\right)^2 + 1 = 0$

63. If $Y = X^X$ then $\frac{d^2y}{dx^2} =$ _____

(a) $\frac{dy}{dx}(1 + \log x) + Y\frac{d}{dx}(1 + \log x)$

(b) $\frac{dy}{dx}(1 + \log x) + \frac{d}{dx}(1 + \log x)$

(c) $\frac{dy}{dx}(1 + \log x) - Y\frac{d}{dx}(1 + \log x)$

(d) $\frac{dy}{dx}(1 + \log x) - \frac{d}{dx}(1 + \log x)$

64. For the functions $y = x^3 - 3x$, the value of $\frac{d^2y}{dx^2}$ at which $\frac{dy}{dx}$ is zero, is

(a) ± 1 **(b)** ± 6

(c) ± 3 **(d)** none

65. If $y = ae^{nx} + be^{-nx}$, then $\frac{d^2y}{dx^2}$ is equal to _____.

(a) n^2y **(b)** ny

(c) $-n^2y$ **(d)** none

66. If $y = 2x + \frac{4}{x}$ then $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx}$- y yields

(a) 3 **(b)** 1

(c) 0 **(d)** 4

Application of Derivative

Cost Function

67. The total cost function of a commodity is given by $C(x) = 0.5x^2 + 2x + 20$. Where C denotes the total cost and x denotes the quantity produced. Find the average cost and the marginal cost

(a) AC $=0.8x + \frac{20}{x} + 2$; M.C $= x + 5$

(b) AC $=0.5x + \frac{20}{x} + 2$; M.C $= x + 2$

(c) AC $=0.5x + 20x + 2$; M.C $= x + 2$

(d) None

68. If $C = 0.05q^2 + 16 + \frac{100}{q}$ is the manufacturer's average cost function, what is the marginal cost when 50 units are produced?

(a) 300 **(b)** 350

(c) 391 **(d) 450**

69. The total cost C(x) of a firm is $C(x) = 0.0005x^3 - 0.02x^2 - 30x + 5000$, where x is the output. determine value of x, for which MVC = AVC, where VC denotes the variable cost

(a) 30 **(b)** 20

(c) 40 **(d)** none

70. The cost of manufacturing a particular type of a cricket ball is given by $C(x) = x^2 - 1200x + 360040$.Where x denotes the number of balls produced. How many balls should the company manufacture at which cost is minimum, and what would be cost per ball at this level of production?

(a) x = 600; Cost per ball = Rs. 40 per ball

(b) x = 800; Cost per ball = Rs. 40 per ball

(c) x = 600; Cost per ball = Rs.80 per ball

(d) x = 800; Cost per ball = Rs. 60 per ball

Revenue Function

71. Let p be the price per unit of a certain product, when there is a sale of q units. The relation between p and q is given by $p = \frac{100}{3q+1} - 4$ Find the marginal revenue function

(a) $\frac{100q}{(3q+1)^2} - 4$ **(b)** $\frac{100q}{(3q+1)^3} - 5$ **(c)** $\frac{100q}{(3q+1)^2} + 4$ **(d)** none

72. The revenue R due to the sale of x units of a product is given by $R = 25x - 0.5x^2$. When x= 10, find the relative rate of change of R and the percentage rate of change of R.

(a) $\frac{7}{50}$ **(b)** $\frac{3}{49}$ **(c)** $\frac{4}{63}$ **(d)** none

73. The total revenues received from the sale of x units of product is given by: $R(x) = 200 + \frac{x^2}{5}$ find the marginal revenue when x=25 and also calculate the actual revenue from the sale of 26^{th} unit.

(a) 10 and 10.20 **(b)** 20 and 20.50

(c) 12 and 10.20 **(d)** none

74. A company charges Rs. 550 for a transistor set on orders of 50 or less sets. The charge is reduced by Rs. 5 per set for each set ordered in excess of 50. Find the largest size order company should allow so as to receive maximum revenue.

(a) 60 **(c)** 80

(b) 70 **(d)** none of these

Profit Function

75. The profit P(x) due to advertising x, in hundreds of rupees is given by $p(x) = 120 + 80x - x^2$. what amount of advertising fetches maximum profit and what is the maximum profit?

(a) x= 40, 172000 **(c)** x= 50, 170000

(b)x= 40, 165000 **(d)** none of these

76. A manufacture can sell x items per day at a price p rupee each, where $p = 125 - (5/3)x$. The cost of production for x items is $500 + 13x + 0.2x^2$. Find how much he should produce to have a maximum profit assuming that all items produced can be sold. What's the maximum profit.
(a) 30 units, Rs.1180 **(c)** 40 units, Rs.1280
(b) 60 units, Rs.1300 **(d)** none of these

77. A firm finds that if can sell all that is produced (within limits).The demand function is $p = 260 - 3x$, where p is the price per unit at which it can sell x units. The cost function is $C = 500 + 20x$, where x is the number of units produced. Find x so that profit is maximum.
(a) 40 **(b)** 50
(c) 60 **(d)** 5

Advance Questions – Level-1

***Tutorial Note:** This Questions are Inspired from Additional Question Bank of Institute Module, there are very few Chance That Questions Come from This Category As they are Very Lengthy and Time Consuming, we are Covering Some Questions of this Category So that we can cover 100 % and Students Don't Lose Their Confidence.*

78. If $y=2x^{3/2}(x^{1/2}+2)(x^{1/2}-1)$ then dy/dx is
(a) $4x+5x(x-6)^{1/2}x^{1/2}$ **(b)** $4x+5x(x-3)^{1/2}x^{1/2}$
(c) $4x+5x(x-2)^{1/2}x^{1/2}$ **(d)** None

79. If $y=(5x^4-6x^2-7x+8)/(5x-6)$ then dy/dx is
(a) $(75x^4-120x^3-30x^2+72x+2)(5x-6)^{-2}$
(b) $(75x^4-120x^3+30x^2-72x+2)(5x-6)^{-2}$
(c) $(75x^4-120x^3-30x^2+72x-2)(5x-6)^{-2}$
(d) None

80. If $y=(2x+1)(3x+1)(4x+1)^{-1}$ then dy/dx is
(a) $(24x^2+12x+1)(4x+1)^{-2}$ **(b)** $(24x^2+12x+3)(4x+1)^{-2}$
(c) $(24x^2+12x+5)(4x+1)^{-2}$ **(d)** None

81. If $y=\log\sqrt{x+\sqrt{x^2+a^2}}$ then dy/dx is
(a) $(1/2)(x^2+a^2)^{-1/2}$ **(b)** $(-1/2)(x^2+a^2)^{-1/2}$
(c) $(1/2)(x^2+a^2)^{1/2}$ **(d)** None

82. If $y=\log[e^{3x}(5x-3)^{1/3}(4x+2)^{-1/3}]$ then dy/dx is
(a) $3+(1/3)[5/(5x-3)-4/(4x+2)]$ **(b)** $3-(1/3)[5/(5x-3)-4/(4x+2)]$
(c) $3+(1/3)[5/(5x-3)+4/(4x+2)]$ **(d)** None

83. If $y=(2-x)(3-x)^{1/2}(1+x)^{-1/2}$ then the value of [dy/dx]/y is
(a) $(x-2)^{-1}+(1/2)(x-3)^{-1}-(1/2)(1+x)^{-1}$
(b) $(x-2)^{-1}+(x-3)^{-1}-(1+x)^{-1}$
(c) $(x-2)^{-1}-(1/2)(x-3)^{-1}+(1/2)(1+x)^{-1}$
(d) None

84. If $y=\log[e^x[x-2)/(x+3)]^{3/4}$ then dy/dx is
(a) $1+(3/4)(x-2)^{-1}-(3/4)(x+3)^{-1}$ **(b)** $1-(3/4)(x-2)^{-1}+(3/4)(x+3)^{-1}$
(c) $1+(3/4)(x-2)^{-1}+(3/4)(x+3)^{-1}$ **(d)** None

85. If $y=x^2e^{5x}(3x+1)^{-1/2}(2x-1)^{-1/3}$ then the value of [dy/dx]/y is
(a) $5+2x^{-1}-(3/2)(3x+1)^{-1}-(2/3)(2x-1)^{-1}$
(b) $5+2x^{-1}-(2/3)(3x+1)^{-1}-(3/2)(2x-1)^{-1}$
(c) $5+2x^{-1}-(2/3)(3x+1)^{-1}+(3/2)(2x-1)^{-1}$
(d) None

86. If $y=x^{1/2}(5-2x)^{2/3}(4-3x)^{-3/4}(7-4x)^{-4/5}$ then the value of $[dy/dx]/y$ is
(a) $(1/2)x^{-1}-(4/3)(5-2x)^{-1}+(9/4)(4-3x)^{-1}+(16/5)(7-4x)^{-1}$
(b) $(1/2)x^{-1}-(3/4)(5-2x)^{-1}+(9/4)(4-3x)^{-1}+(16/5)(7-4x)^{-1}$
(c) $(1/2)x^{-1}+(4/3)(5-2x)^{-1}+(9/4)(4-3x)^{-1}+(16/5)(7-4x)^{-1}$
(d) None

87. If $y=x^m e^{nx}$ then d^2y/dx^2 is
(a) $m(m-1)x^{m-2}e^{nx}+2mnx^{m-1}e^{nx}+n^2x^m e^{nx}$
(b) $m(1-m)x^{m-2}e^{nx}+2mnx^{m-1}e^{nx}+n^2x^m e^{nx}$
(c) $m(m+1)x^{m"2}e^{nx}+2mnx^{m-1}e^{nx}+n^2x^m e^{rK}$
(d) None

88. If $y=(\log x)/x$ then d^2y/dx^2 is
(a) $(2\log x-3)/x^3$ **(b)** $(3\log x-2)/x^3$ **(c)** $(2\log x+3)/x^3$ **(d)** None

89. If $y=ae^{mx}+be^{-mx}$ then d^2y/dx^2 is
(a) m^2y **(b)** my **(c)** $-m^2y$ **(d)** $-my$

90. If $y=ae^{2x}+bxe^{2x}$ where a and b are constants the value of the expression $d^2y/dx^2-4dy/dx+4y$ is _____.
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

91. If $y=(x+1)^{1/2}-(x-1)^{1/2}$ the value of the expression $(x^2-1)d^2y/dx^2+xdy/dx-y/4$ is given by
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

92. If $y=\log[x+(1+x^2)^{1/2}]$ the value of the expression $(x^2+1)d^2y/dx^2+xdy/dx$ is ____.
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

93. If $x=(1-t)/(1+t)$ and $t=(2t)/(1+t)$ then d^2y/dx^2 is
(a) 0 **(b)** 1 **(c)** -1 **(d)** None

Answer Sheet

1.	a	2.	b	3.	a	4.	c	5.	b	6.	a	7.	a	8.	a	9.	a	10.	c
11.	b	12.	c	13.	c	14.	b	15.	a	16.	c	17.	a	18.	c	19.	c	20.	a
21.	b	22.	a	23.	a	24.	a	25.	a	26.	a	27.	b	28.	a	29.	a	30.	c
31.	a	32.	c	33.	b	34.	a	35.	a	36.	a	37.	a	38.	a	39.	d	40.	b
41.	c	42.	a	43.	b	44.	a	45.	a	46.	c	47.	c	48.	b	49.	b	50.	a
51.	a	52.	a	53.	b	54.	b	55.	b	56.	b	57.	a	58.	c	59.	a	60.	c
61.	a	62.	b	63.	a	64.	b	65.	a	66.	c	67.	b	68.	c	69.	b	70.	a
71.	a	72.	b	73.	a	74.	c	75.	a	76.	a	77.	a	78	a	79	a	80	a
81.	a	82.	a	83.	a	84.	a	85.	a	86.	a	87.	a	88.	a	89.	a	90.	a
91.	a	92.	a	93.	a														

Tutorial Note

This ALP Sheets are designed for Students Self Practice if any difficulty arrives then students Should Refer Lectures This Will Develop There Mind to Deal with New Problems in Exams

ALP-NO-9A

1. If $f(x) = {}^{x}C_3$; then $f'(1) = ?$

(a) $\frac{1}{6}$ (c) $\frac{5}{6}$

(b) $\frac{-1}{6}$ (d) $\frac{-5}{6}$

2. If $Y = X^X$ then $\frac{d^2y}{dx^2} =$ _____

(a) $\frac{dy}{dx}(1+\log x) + Y\frac{d}{dx}(1+\log x)$

(b) $\frac{dy}{dx}(1+\log x) + \frac{d}{dx}(1+\log x)$

(c) $\frac{dy}{dx}(1+\log x) - Y\frac{d}{dx}(1+\log x)$

(d) $\frac{dy}{dx}(1+\log x) - \frac{d}{dx}(1+\log x)$

3. if $y = e^{a\log x} + e^{x\log a}$, then $\frac{dy}{dx} =$

(a) $x^a + a^x$ (c) $a\,x^{a-1} + x\,a^{x-1}$

(b) $a\,x^{a-1} + a^x \log a$ (d) $x^x + a^a$

4. For the functions $y = x^3 - 3x$, the value of $\frac{d^2y}{dx^2}$ at which $\frac{dy}{dx}$ is zero, is

(a) ± 1 (c) ± 6

(b) ± 3 (d) none of these

5. The equation of the tangent to the curve, $f = x^2 - 3x + 2$, at the point (2, 7) is –

(a) $Y = 2x - 13$ (c) $y = 10x - 13$

(b) $Y = 10x$ (d) $y = 10$

6. If $y = \log\left(\frac{5-4x^2}{3+5x^2}\right)$, *then* $\frac{dy}{dx} =$ ____

(a) $\frac{8}{4x-5} - \frac{10}{3+5x}$

(b) $(4x^2 - 5) - (3 + 5x^2)$

(c) $\frac{8x}{4x^2-5} - \frac{10x}{3+5x^2}$

(d) $8x - 10$

7. If $y = \log_y x$, then $\frac{dy}{dx}$ is equal to :

(a) $\frac{1}{x+\log y}$ (c) $\frac{1}{1+x\log y}$

(b) $\frac{1}{x+x\log y}$ (d) $\frac{1}{y+\log x}$

8. If $x = \log t$, $y = e^t$, then $\frac{dy}{dx} =$

(a) $1/t$ (c) $-1/t2$

(b) $t.e^t$ (d) none of these

9. The points on the curve $y = x^3 - x^2 - x + 1$, where the tangent is parallel to x – axis are

(a) $\left(\frac{-1}{3}, \frac{32}{27}\right)$ *and* $(1, 0)$

(b) $(0, 0)$, *and* $(1, 0)$

(c) (1, 0) and (1, 1)

(d) (0, 1) and (1, 1)

10. If $y = 1 + \frac{x}{\underline{|1}} + \frac{x^2}{\underline{|2}} + \cdots\ldots\ldots\ldots + \frac{x^n}{\underline{|n}} + \cdots\ldots\ldots$ then the value of $\frac{dy}{dx} - y =$ _____

(a) 1 (c) 2

(b) 0 (d) -1

Answers

1.	**b**	2.	**a**	3.	**b**	4.	**c**	5.	**c**
6.	**c**	7.	**b**	8.	**b**	9.	**a**	10.	**b**

ALP-NO-9B

1. If $x^p y^q = (x + y)^{p+q}$, then $\frac{dy}{dx}$ is equal to _____

(a) $\frac{q}{p}$ (c) $\frac{y}{x}$

(b) $\frac{x}{y}$ (d) $\frac{p}{q}$

2. If $e^{xy} - 4xy = 4$ then $\frac{dy}{dx} =$ _____

(a) $\frac{y}{x}$ (c) $\frac{x}{y}$

(b) $\frac{-y}{x}$ (d) $\frac{-x}{y}$

3. If $u = 3t^4 + 5t^3 + 2t^2 + t + 4$, then the value of $\frac{du}{dt}$ at $t = -1$ is:

(a) 0 (c) 2

(b) 1 (d) 5

4. If $y = ae^{nx} + be^{-nx}$, then $\frac{d^2y}{dx^2}$ is equal to _____.

(a) n^2y (c) ny

(b) $-n^2y$ (d) none of these

5. The slope of the tangent to the curve $y = \frac{x-1}{x+2}$ at $x = 2$ is :

(a) $\frac{3}{16}$ (c) $\frac{1}{4}$

(b) $-\frac{3}{16}$ (d) $-\frac{1}{4}$

6. If $y = \sqrt{\frac{1-x}{1+x}}$, then $\frac{dy}{dx}$ is equal to –

(a) $\frac{y}{x^2-1}$ (c) $\frac{y}{1+x^2}$

(b) $\frac{y}{1-x^2}$ (d) $\frac{y}{y^2-1}$

7. The equation of the curve which passes through the point (1, 2) and has the slope 3x – 4 at any point (x, y) is :
(a) $2y = 3x^2 - 8x + 9$
(b) $y = 6x^2 - 8x + 9$
(c) $y = x^2 - 8x + 9$
(d) $2y = 3x^2 - 8x + c$

8. If $x = at^3 + bt^2 - t$ and $y = at^2 - 2bt$, then the value of $\frac{dy}{dx}$ at t = 0 is :
(a) 2b (c) $\frac{1}{2b}$
(b) – 2b (d) $-\frac{1}{2b}$

9. If $x^y = e^{x-y}$ then $\frac{dy}{dx}$ is equal to :
(a) $\frac{2\log x}{(1+\log x)^2}$ (c) $\frac{\log x}{(1+\log x)^2}$
(b) $\frac{\log x}{1+\log x}$ (d) none of the above

10. If $y = 1 + \frac{x}{\underline{|1}} + \frac{x^2}{\underline{|2}} + \frac{x^3}{\underline{|3}} + \cdots \ldots \ldots \infty$ then the value of $\frac{dy}{dx}$ is equal to :
(a) x (c) 1
(b) y (d) 0

Answers

1.	**c**	2.	**b**	3.	**a**	4.	**a**	5.	**a**
6.	**a**	7.	**a**	8.	**a**	9.	**c**	10.	**b**

ALP-NO-9C

1. If $f(x) = \log_e\left(\frac{x-1}{x+1}\right)$, then the value of x at which $f'(x) = 1$, is
(a) 0 (c) $\pm\sqrt{3}$
(b) 1 (d) $\pm\sqrt{2}$

2. If $x = at^2$, $y = 2at$ then the value of $\frac{dy}{dx}$ at t = 2 is :
(a) 2 (c) $\frac{1}{2}$
(b) 4 (d) $\frac{1}{4}$

3. If $y = \log x^x$ then $\frac{dy}{dx}$ is equal to :
(a) log ex (c) $\log\frac{x}{e}$
(b) $\log\frac{e}{x}$ (d) 1

4. $\frac{d}{dx}\left[2^{\log_2 x}\right] =$ _____
(a) 1 (c) ½
(b) 0 (d) $2^x.\log_2 x$

5. If x = c t, y = c/t, then $\frac{dy}{dx}$ is equal to :
(a) 1/t (c) -1/t2
(b) $t.e^t$ (d) none of these

Answers

1.	**c**	2.	**c**	3.	**a**	4.	**a**	5.	**c**

ALP-NO-9D

1. If $y = 2x + \frac{4}{x}$ then $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx}$ y yields
(a) 3 (b) 1
(c) 0 (d) 4

2. If $f(x) = x^k$ and $f'(1) = 10$, then the value of k is:
(a) 10 (b) -10
(c) 1/10 (d) None

3. If $y = \left(x + \sqrt{x^2 + m^2}\right)^n$ then $\frac{dy}{dx} =$:
(a) $\frac{ny}{\sqrt{x^2+m^2}}$ (b) n y
(c) $-\frac{ny}{\sqrt{x^2+m^2}}$ (d) None

4. Differentiate $e^{(x^x)}$:
(a) (1 + log x) (b) x^x (1 + log x)
(c) $e^{x^x}(1 + \log x)\, x^x$ (d) $e^{x^x}(1 + \log x)$

5. If $x^3 y^2 = (x - y)^5$. Find $\frac{dy}{dx}$ at (1, 2).
(a) -7/9 (b) 7/9
(c) 9/7 (d) -9/7

Answers

1.	**c**	2.	**a**	3.	**a**	4.	**c**	5.	**a**

Integral Calculus

Chapter **10**

EXERCISE

Basic Problems

1. Evaluate $=\int 5x^2 dx$:

(a) $5/3x^3$+K **(b)** $\frac{5x^3}{3} + K$ **(c)** $5x^3$ **(d)** none of these

2. Integration of 3-2x-x^4 will become

(a) -$x^2 - x^5$+5x **(b)** $3x - x^2 - \frac{x^5}{5} + K$

(c) $12x^2$+6x-$2x^2$ **(d)** none of these

3. Given f (x) = $4x^3$+$3x^2$-2x+5 and $\int f\ (x)dx$ is

(a) $x^4 + x^3 - x^2 + 5x + k$ **(b)** $x^4 + x^3 - x^2 + 5x$

(c) $12x^2 + 6x - 2x^2$ **(d)** none of these

4. $\int \left(x^4 + \frac{3}{x}\right) dx$ *is equal to*

(a) $x^5/5$ + log |x| **(b)** $1/5x^5$+3log |x|+ k

(c) $1/5x^5$+k **(d)** none of these

5. Evaluate $\int (x^2 - 1)\ dx$

(a) $x^5/5$ -$2/3x^3$+x+k **(b)** $\frac{x^3}{3}$ - x+k

(c) 2x **(d)** none of these

6. $\int (1 - 3x)(1 + x)$dx is equal to

(a) x-$x^2 - x^3$ **(b)** $x^3 - x^2 + x$

(c) x- $x^2 - x^3 + k$ **(d)** none of these

7. Evaluate the integral $\int (1 - x)^3$/x dx and the answer is equal to

(a) log |x| -3x+$3/2x^2$+k **(b)** log x -2+$3x^2$ +k

(c) log x + $3x^2$ +k **(d)** none of these

Method of Substitution

8. Use method of substitution of integrate the function f (x) = $(4x+5)^6$ .dx and the answer is

(a) $1/28\ (4x+5)^7$+K **(b)** $(4x+5)^{7/7}$+k

(c) $(4x+5)^7/7$ **(d)** none of these

9. Use method of substitution to evaluate $\int x(x^2 + 4)^5\ dx$and the answer is

(a) $(x^2 + 4)^6 + k$ **(b)** $1/12\ (x^2 + 4)^6$+k

(c) $(x^2$+4)$^{6/}$+k **(d)** none of these

10. $\int 8x^2/(x^3 + 2)^3$ dx is equal to

(a) -$4/3(x^3 + 2)^2$+k **(b)** $\frac{4}{3(x^3+2)^2}$+k

(c) $\frac{4}{3(x^3+2)^2} + k$ **(d)** none of these

11. $\int x^x(1+\log x)\,dx$ is equal to

(a) $x^2\log x+k$ **(b)** $e^{x2}+k$

(c) $\frac{x^2}{2}+k$ **(d)** x^x+c

12. $\int (e^x+e^{-x})^2\,(e^x-e^{-x})\,dx$ is

(a) $1/3\,(e^x+e^x)^3+k$ **(b)** ½ $(e^x-e^{-x})^2+k$

(c) e^x+k **(d)** none of these

13. $\int \frac{\log(logx)}{x}xdx$ *is*

(a) log (logx-1) +k **(b)** log x-1+k

(c) [log (log^x-1)] log x +k **(d)** none of these

14. Evaluate $\int(\frac{e^x-e^{-x}}{e^x+e^{-x}})\,dx$ and the value is

(a) $\log_e|e^x+e^{-x}|$ **(b)** $\log_e|e^x+e^{-x}|+k$

(c) $\log_e|e^{x-}e^{-x}|+k$ **(d)** none of these

15. Integrate w.r.t x, $(x^3+1)^2 3x^2 dx$ to get

(a) $\left(\frac{1}{3}\right)(x^3+1)^3+k$ **(b)** $3(x^3+2)^3+k$ **(c)** $3x^2(x^3+2)^3+k$ **(d)** $9x^2(x^3+2)^3+k$

16. $\int \frac{dx}{x(x^3+1)}=$

(a) $[\log|x|-(1/3)\log|x^3+1|+k$

(b) $(1/3)[\log|x|+\log|x^3+1|]+k$

(c) $(1/3)\log(\frac{x^3}{x^3-1})+c$

(d) None of these.

By Parts

17. Use integration by parts to evaluate $\int x^2e^{3x}dx$

(a) $\frac{x^2e^{3x}}{3}-2x\frac{e^{3x}}{9}+\frac{2}{27}e^{3x}+K$

(b) $x^2e^{3x}-2xe^{3x}+2e^{3x}+k$

(c) $\frac{e^{3x}}{3}-\frac{xe^{3x}}{9}+2e^{3x}+k$

(d) none of these

18. $\int logx\;dx$ *is equal to*

(a) x logx + k **(b)** xlogx-x^2+k

(c) xlogx +k **(d)** none of these

19. $\int xe^x\;dx$ is

(a) (x-1)e^x+k **(b)** (x-1)e^x

(c) xe^x +k **(d)** none of these.

20. $\int(logx)^2x\;dx$ *and the result is*

(a) $\frac{x^2}{2}[(logx)^2-\log+½]+K$

(b) x $(\log)^2$ -2x+k

(c) 2x $(\log x-1)$ +k

(d) None of these

21. $\int \log x^2$ dx is equal to

(a) x (log x -1)+k **(b)** 2x (logx -1)+k
(c) 2 (log x- 1)+k **(d)** none of these

22. Using integration by parts $\int x^3 \log x$ dx

(a) $x^4/16$ +k **(b)** $x^4/16$ (4 log x -1)+k
(c) 4 log x-1+k **(d)** none of these

Geometry Based Problem

23. The equation of the curve which passes through the point (1,3) and has the slope 4x-3 at any point (x,y) is

(a) $y = 2x^3$- 3x+4 **(b)** $y=2x^2$ −3x+4
(c) $x = 2y^2$-3y+4 **(d)** none of these

24. If f '(x) =2x-1then the equation of a curve y= f(x) passing through the point (1,0) is given by

(a) $y=x^2$-x **(b)** $y = x^2/2$-x+1
(c) $y=x^2/2$-x+1/2 **(d)** none of these

Problems on Partial Fraction

25. x $(x-1)^{-1}(2x+1)^{-1}dx$ *is*:

(a) (1/3)[log |x-1|+log|2x+1|] +k
(b)(1/3)[log |x-1|+(1/6) log|2x+1|] k
(c)(1/3)[log |x-1| + (1/2) log|2x+1|] +k
(d)none of these.

26. Evaluate using partial fraction $\int (x+5)dx/(x+1)(x+2)^2$ we get

(a) 4 log (x+1) - 4 log (x+2) + $\frac{3}{x}$ +2+ K
(b) 1 log (x+2)-3/x+2)+K
(c) 4log (x+1)-4log (x+2)
(d) none of these

27. By the method of partial fraction $\int \frac{3x}{x^2-x-2}$ dx is

(a) 2 $\log_e$ |x-2|+ $\log_e$ |x+1|+k
(b) 2 $\log_e$|x-2|- $\log_e$|x+1|+k
(c) $\log_e$|x-2|+ $\log_e$|x+1| +k
(d) none of these

Exponential (e^x) Based Problems

28. $\int (x-1)e^x/x^2$dx is equal to

(a) e^x/x + k **(b)** e^{-x}/x+k **(c)** -e^x/x + k **(d)** none of these

29. $\int \frac{e^x(x\log x+1)}{x}$ dx is equal to

(a) $e^x \log x + k$ **(b)** e^x+k **(c)** logx +k **(d)** none of these

30. Evaluate $\int \frac{(2-x)e^x}{(1-x)^2}$dx and the value is

(a) $\frac{e^x}{1-x}$+k **(b)** $e^x + k$ **(c)** $\frac{1}{1-x}$+k **(d)** none of these

Problems on Definite Integration

31. Evaluate $\int_0^1 (2x^2 - x^3)$ dx and the value is

(a) 4/3+k **(b)** 5/12 **(c)** -4/3 **(d)** none of these

32. Evaluate $\int_2^4 (3x - 2)^2$ dx and the value is

(a) 104 **(b)** 100 **(c)** 10 **(d)** none of these

33. Evaluate $\int_0^1 xe^x\, dx$ dx and the value is

(a) -1 **(b)** 10 **(c)** 10/9 **(d)** +1

34. $\int_0^a [f(x) + f(-x)]$ dx is equal to

(a) $\int_0^a 2\, f(x)dx$ **(b)** $\int_{-a}^a f(x)dx$ **(c)** 0 **(d)** $\int_{-a}^a -f(-x)\, dx$

35. Evaluate $\int_1^4 (2x + 5)$ dx and the value is

(a) 3 **(b)** 10 **(c)** 30 **(d)** none of these

36. $\int_1^2 \frac{2x}{1+x^2}$ dx is equal to

(a) $log(5/2)$ **(b)** $log_e 5$ -log_e 2+k

(c) $\log_e (2/5)$ **(d)** none of these

37. $\int_0^2 \sqrt{3x + 4}$ dx is equal to

(a) 9/112 **(b)** 112/9 **(c)** 11/9 **(d)** none of these

38. $\int_0^2 \frac{x+2}{x+1}\, dx$ is equal to

(a) $2 + \log_e 2$ **(b)** 2+$\log_e 3$ **(c)** $\log_e 3$ **(d)** none of these

39. Evaluate $\int_1^{e^2} \frac{\text{dx}}{\text{x}(1+\text{logx})^2}$ and the value is

(a) 3/2 **(b)** 1/3 **(c)** 26/3 **(d)** ½ ($\log_e 5$)

40. The value of $\int_2^3 f(5 - x)\, dx - \int_2^3 f(x)\, dx$ *is*

(a) 1 **(b)** 0 **(c)** -1 **(d)** none of these

41. $\int_1^2 x\, logx\, dx$ is equal to

(a) 2 log 2 **(b)** -3/4 **(c)** 2 log 2 -3/4 **(d)** none of these

42. Evaluate $\int_0^2 3x^2$dx is

(a) 8 **(b)** 7

(c) 5 **(d)** none of these

43. The value of $\int_0^{1/2} \frac{dx}{\sqrt{3-2x}}$ is

(a)1 **(b)** $\sqrt{3} - \sqrt{2}$

(c)1 -$\sqrt{3/2}$ **(d)** $\sqrt{2} - \sqrt{3}$

Problems on Standard Function

44. Integrate w.r.t x, $(3x+7)(2x^2+3x-2)^{-1}$

(a) $(3/4)\log(2x^2+3x-2)+(19/20)\log[(2x-1)/\{2(x+2)\}]+k$
(b) $(3/4)\log(2x^2+3x-2)+\log[(2x-1)/\{2(x+2)\}]+k$
(c) $(3/4)\log(2x^2+3x-2)+(19/20)\log[2(2x-1)(x+2)]+k$
(d) None

45. Integrate w.r.t x, $1/(2x^2-x-1)$

(a) $(1/3)\log[2(x-1)/(2x+1)]+c$
(b) $-(1/3)\log[2(x-1)/(2x+1)]+c$
(c) $(1/3)\log[2(1-x)/(2x+1)]$
(d) None

46. Integrate w.r.t x, $(x+1)(3+2x-x^2)^{-1}$

(a) $-(1/2)\log(3+2x-x^2)+(1/2)\log[(x+1)/(x-3)]+c$
(b) $(1/2)\log(3+2x-x^2)+(1/2)\log[(x+1)/(x-3)]+c$
(c) $-(1/2)\log(3+2x-x^2)+(1/2)\log[(x-3)/(x+1)]+c$
(d) None

47. Integrate w.r.t x, $(5x^2+8x+4)^{-1/2}$

(a) $(1/\sqrt{5})\log[\{\sqrt{5}x+4/\sqrt{5}+(5x^2+8x+4)^{1/2}\}]+c$
(b) $\sqrt{5}\log[\{\sqrt{5}x+4/\sqrt{5}+(5x^2+8x+4)^{1/2}\}]+c$
(c) $(1/\sqrt{5})\log[\{\sqrt{5}x+4/\sqrt{5}+(5x^2+8x+4)^{-1/2}\}]+c$
(d) None

48. Integrate w.r.t x, $(x+1)(5x^2+8x-4)^{-1/2}$

(a) $(1/5)(5x^2+8x-4)^{1/2}+[1/(5\sqrt{5})]\log[5\{x+4/5+(x^2+8x/5-4/5)^{1/2}(1/6)\}]+c$
(b) $(1/5)(5x^2+8x-4)^{1/2}+[1/(5\sqrt{5})]\log[5\{x+4/5+(x^2+8x/5-4/5)^{-1/2}(1/6)\}]+c$
(c) $(1/5)(5x^2+8x-4)^{1/2}+[1/(5\sqrt{5})]\log[5\{x+4/5+(x^2+8x/5-4/5)^{1/2}\}]+c$
(d) None

49. Integrate w.r.t x, $(x^2-1)(x^4-x^2+1)^{-1}$

(a) $[1/(2\sqrt{3})]\log[(x^2-\sqrt{3}x+1)/(x^2+\sqrt{3}x+1)]+c$
(b) $[1/(2\sqrt{3})]\log[(x^2+\sqrt{3}x+1)/(x^2-\sqrt{3}x+1)]+c$
(c) $[3/(2\sqrt{3})]\log[(x^2-\sqrt{3}x+1)/(x^2+\sqrt{3}x+1)]+c$
(d) None

Additional Questions

Tutorial Note

Below Questions are Based on Above Discussed Methods Only But Presentation of Questions Are Changed And Students Get Confused So Lets Deal with them

Basics

50. Integrate w.r.t x, $(x^{1/2}-x/2+2x^{-1/2})$

(a) $(2/3)x^{3/2}-(1/4)x^2+4x^{1/2}+k$
(b) $(3/2)x^{3/2}-(1/4)x^2+4x^{1/2}$
(c) $(2/3)x^{3/2}+(1/4)x^2+4x^{1/2}$
(d) None

51. Integrate w.r.t x, $(3x^{-1}+4x^2-3x+8)$

(a) $3\log x-(4/3)x^3+(3/2)x^2-8x+k$
(b) $3\log x+(4/3)x^3-(3/2)x^2+8x+k$
(c) $3\log x+(4/3)x^3+(3/2)x^2+8x+k$
(d) None

52. Integrate w.r.t x, $(ax^2+bx^{-3}+cx^{-7})x^2$

(a) $(1/4)ax^4+b\log x-(1/4)cx^{-4}+k$
(b) $4ax^4+b\log x-4cx^{-4}+k$
(c) $(1/4)ax^4+b\log x+(1/4)cx^{-4}+k$
(d) None

53. Integrate w.r.t x, $(x^{1/2}-x^{-1/2})$
(a) $(2/3)x^{3/2}-2x^{1/2}+k$
(b) $(3/2)x^{3/2}-(1/2)x^{1/2}+k$
(c) $-(1/2)x^{-1/2}-(3/2)x^{-3/2}+k$
(d) None

54. Integrate w.r.t x, $(7x^2-3x+8-x^{-1/2}+x^{-1}+x^{-2})$
(a) $(7/3)x^3-(3/2)x^2+8x-2x^{1/2}+\log x-x^{-1}+k$
(b) $(3/7)x^3-(2/3)x^2+8x-(1/2)x^{1/2}+\log x+x^{-1}+k$
(c) $(7/3)x^3+(3/2)x^2+8x+2x^{1/2}+\log x+x^{-1}+k$
(d) None

55. Integrate w.r.t x, $x^{-1}[ax^3+bx^2+cx+d]$
(a) $(1/3)ax^3+(1/2)bx^2+cx+d\log x+k$
(b) $3ax^3+2bx^2+cx+d\log x+k$
(c) $2ax+b-dx^{-2}+^k$
(d) None

56. Integrate w.r.t x, $x^{-3}[4x^6+3x^5+2x^4+x^3+x^2+1]$
(a) $x^4+x^3+x^2+x+\log x-(1/2)x^{-2}+k$
(b) $x^4+x^3+x^2+x+\log x+(1/2)x^{-2}+k$
(c) $x^4+x^3+x^2+x+\log x+2x^{-2}+k$
(d) None

57. Integrate w.r.t x, $[2^x+(1/2)e^{-x}+4x^{-1}-x^{-1/3}]$
(a) $2^x/\log 2-(1/2)e^{-x}+4\log x-(3/2)x^{2/3}+k$
(b) $2^x/\log 2+(1/2)e^{-x}+4\log x+(3/2)x^{2/3}+k$
(c) $2^x/\log 2-2e^{-x}+4\log x-(2/3)x^{2/3}+k$
(d) None

Method of Substitution

58. Integrate w.r.t x, $(x^3+2)^{1/2}x^2$
(a) $(2/9)(x^3+2)^{3/2}+k$
(b) $(2/3)(x^3+2)^{3/2}+k$
(c) $(9/2)(x^3+2)^{3/2}+k$
(d) None

59. Integrate w.r.t x, $(x^3+2)^{-3}8x^2$
(a) $-(4/3)(x^3+2)^{-2}+k$
(b) $(4/3)(x^3+2)^{-2}+k$
(c) $(2/3)(x^3+2)^{-2}+k$
(d) None

60. Integrate w.r.t x, $(x^3+2)^{-1/4}x^2$
(a) $(4/9)(x^3+2)^{3/4}+k$
(b) $(9/4)(x^3+2)^{3/4}+k$
(c) $(3/4)(x^3+2)^{3/4}+k$
(d) None

61. Integrate w.r.t x, $(x^2+1)^{-n}3x$
(a) $(3/2)\ (x^2+1)^{1-n}/\ (1-n)+k$
(b) $(3/2)(x^2+1)^{n-1}/(1-n)$
(c) $(2/3)\ (x^2+1)^{1-n}/\ (1-n)+k$
(d) None

62. Integrate w.r.t x, $(x^2 + 1)^{-3}x^3$

(a) $-(1/4)\ (2x^2+1)/(x^2+1)^2+k$
(b) $(1/4)(2x^2 + 1)/(x^2 + 1)^2+k$
(c) $-(1/4)\ (2x^2 + 1)/(x^2 + 1)+k$ (d) $(1/4)\ (2x^2+1)/(x^2+1) +k$

63. Integrate w.r.t x, 1/[xlogxlog(logx)]

(a) log[log(logx)]+k (b) log(logx) +k
(c) logx+k (d) x^{-1}

64. Integrate w.r.t x, $1/[x(\log x)^2]$

(a) -1/logx+k (b) 1/logx+k
(c) logx (d) None

65. Integrate w.r.t x, $x(x^2+3)^{-2}$

(a) $-(1/2)\ (x^2+3)^{-1}+k$ (b) $(1/2)\ (x^2+3)^{-1}+k$
(c) $2(x^2+3)^{-1}+k$ (d) None

Partial Fraction

66. Integrate w.r.t x, $x(x-1)^{-1}(2x+1)^{-1}$

(a) (1/3)[log(x-1)+(1/2)log(2x+1)]+k (b) (1/3)[log(x-1)+log(2x+1)]+k
(c) (1/3)[log(x-1)-(1/2)log(2x+1)]+k (d) None

67. Integrate w.r.t x, $(x-x^3)^{-1}$

(a) $(1/2)\log[x^2/\ (1-x^2)]$ +k (b) $(1/2)\log[x^2/(1-x)^2]+k$
(c) $(1/2)\log[x^2/(1+x)^2]+k$ (d) None

Answer Sheet

1.	b	2.	b	3.	b	4.	b	5.	b	6.	c	7.	d	8.	a	9.	b	10.	b
11.	d	12.	a	13.	c	14.	b	15.	a	16.	c	17.	a	18.	d	19.	a	20.	a
21.	b	22.	b	23.	b	24.	a	25.	c	26.	a	27.	a	28.	a	29.	a	30.	a
31.	b	32.	a	33.	d	34.	b	35.	c	36.	b	37.	b	38.	b	39.	d	40.	b
41.	c	42.	a	43.	b	44.	A	45.	A	46.	A	47.	A	48.	A	49.	A	50.	A
51.	B	52.	A	53.	A	54.	A	55.	A	56.	A	57.	A	58.	A	59.	A	60.	A
61.	A	62.	A	63.	A	64.	A	65.	A	66.	A	67.	A						

ALP-NO-10A

1. $\int 2^{3x}.3^{2x}.5^{x}.dx =$

(a) $\frac{2^{3x}.3^{2x}.5^{x}}{\log(720)}+c$ (c) $\frac{2^{3x}.3^{2x}.5^{x}}{\log(180)}+c$

(b) $\frac{2^{3x}.3^{2x}.5^{x}}{\log(360)}+c$ (d) $\frac{2^{3x}.3^{2x}.5^{x}}{\log(90)}+c$

2. $\int (a)^{2x}dx$_____

(a) $\frac{a^{2x}}{2\log a}$ (c) $\frac{a^{2x}.\log a}{2}$

(b) $\frac{2.a^{2x}}{\log a}$ (d) none of these

3. $\int_0^5 \frac{x^2dx}{x^2+(5-x)^2}$ is equal to _____.

(a) 5 (c) 1

(b) $\frac{5}{2}$ (d) none of these

4. The value of definite integral $\int_0^2 |1-x|\,dx =$ _____

(a) 0 (c) 3/2

(b) ½ (d) 1

5. The value of $\int_0^{1/2} \frac{dx}{\sqrt{3-2x}}$ is

(a) 1 (c) $\sqrt{3}-\sqrt{2}$

(b) $1-\sqrt{3/2}$ (d) $\sqrt{2}-\sqrt{3}$

6. The value of $\int_0^2 xe^{x^2}$ dx is

(a) 1 (c) (e/2) – 1

(b) e – 1 (d) $\frac{1}{2}(e^4-1)$

7. The value of $\int_1^2 \frac{1-x}{1+x}$ dx is equal to :

(a) $\log\frac{3}{2}-1$ (c) $\frac{1}{2}\log\frac{3}{2}-1$

(b) $2\log\frac{3}{2}-1$ (d) $\frac{1}{2}\log\frac{2}{3}-1$

8. $\int_0^2 \frac{3^{\sqrt{x}}}{\sqrt{x}}$ dx is equal to _____

(a) $\frac{2\sqrt{2}}{\log_e 3}$ (c) $\frac{2\left(3^{\sqrt{2}}-1\right)}{\log_e 3}$

(b) 0 (d) $\frac{3^{\sqrt{2}}}{\sqrt{2}}$

9. $\int \frac{x}{(x^2+1)(x^2+2)}$ dx is equal to _____

(a) $\log\left(\frac{x^2+1}{x^2+2}\right)+c$ (c) $\frac{1}{2}\log\left(\frac{x^2+2}{x^2+1}\right)+c$

(b) $\frac{1}{2}\log\left(\frac{x^2+1}{x^2+2}\right)+c$ (d) $-\log\left(\frac{x^2+1}{x^2+2}\right)+c$

10. The value of $\int_1^2 \frac{x}{x^2+1}$ dx is equal to :

(a) $\log_e\left(\frac{5}{2}\right)$ (c) $\log_e(5)-\log_e 2+c$

(b) $\frac{1}{2}\log_e\left(\frac{5}{2}\right)$ (d) none of these

Answers

1.	**b**	2.	**a**	3.	**b**	4.	**d**	5.	**c**
6.	**d**	7.	**b**	8.	**c**	9.	**b**	10.	**b**

ALP-NO-10B

1. The value of $\int e^x[f(x)+f^1(x)]$dx =_____

(a) $e^x f(x)+c$ (c) $\left|\frac{f^1(x)}{f(x)}\right|+c$

(b) $e^x f^1(x)+c$ (d) $e^x\left|\frac{f(x)}{f^1(x)}\right|+c$

2. $\int x.e^{x^2}dx$ is equal to :

(a) $2e^{x^2}+c$ (c) $\frac{1}{2}e^{x^2}+c$

(b) $e^{x^2}+c$ (d) $xe^{x^2}+c$

3. The value of $\int_1^2 \frac{1-x}{1+x}$ dx is equal to :

(a) $\log\frac{3}{2}-1$ (c) $\frac{1}{2}\log\frac{3}{2}-x$

(b) $2\log\frac{3}{2}-1$ (d) $\frac{1}{2}\log\frac{2}{3}-x$

4. $\int_0^2 \frac{3^{\sqrt{x}}}{\sqrt{x}}$ dx is equal to _____

(a) $\frac{2\sqrt{2}}{\log_e 3}$ (c) $\frac{2\left(3^{\sqrt{2}}-1\right)}{\log_e 3}$

(b) 0 (d) $\frac{3^{\sqrt{2}}}{\sqrt{2}}$

5. $\int_0^2 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{2-x}}$ dx is :

(a) 0 (c) 2

(b) 3 (d) 1

6. Solve: $\int_{-1}^1 (e^x-e^{-x})dx$

(a) 0 (c) 12

(b) 1 (d) none of the above

7. If $f'(x) = 3x^2 - \frac{2}{x^3}$, $f'(1) = 0$ and $f(x) =$ _____.

(a) $\frac{x^6}{3}-x^{-2}-2$ (c) $x^3+x^{-2}-2$

(b) x^3+x^2+2 (d) none of these

8. $\int_{-1}^1 \frac{|x|}{x}dx =$ _____

(a)-1 (c) 1

(b) 0 (d) 2

Answers

1.	**a**	2.	**c**	3.	**b**	4.	**c**	5.	**d**
6.	**a**	7.	**c**	8.	**b**				

Statistical Description of Data

Chapter 11

EXERCISE

1. Marks of a student is an example of:

(a) a continuous variable **(b)** a discrete variable

(c) an attribute **(d)** None of these.

2. In tabulation source of the data, if any is shown in the;

(a) Footnote **(b)** Body **(c)** Stub **(d)** caption.

3. The unit of measurement in tabulation is shown in:

(a) Box head **(b)** body **(c)** Caption **(d)** stub.

4. 'Stub' of a table is the:

(a) right part of the table describing the columns.

(b) left part of the table describing the columns

(c) right part of the table describing the rows

(d) left part or the table describing the rows.

5. The quicker method to collect primary data is:

(a) personal interview **(b)** by observation

(c) telephone interview **(d)** indirect interview

6. The best method to collect data, in case of a natural calamity, is:

(a) Personal interview **(b)** Questionnaire method

(c) Indirect interview **(d)** Direct observation method.

7. The frequency distribution of a continuous variable is known as:

(a) Grouped frequency distribution

(b) Simple frequency distribution

(c) Either **(a)** or **(b)**

(d) Both **(a)** and **(b)**.

8. For determining the class frequencies it is necessary that these classes are:

(a) Mutually exclusive **(b)** Not mutually exclusive

(c) Independent **(d)** None of these.

9. Cumulative Frequency Distribution is a

(a) Frequency **(b)** Graph

(c) Statistical table **(d)** Distribution

10. Divided bar chart is considered for

(a) the relation of different components to the table.

(b) Comparing different components o0f a variable

(c) Either **(a)** or **(b)**

(d) Both **(a)** and **(b)**

11. An approximate idea of the shape of frequency curve is given by:

(a) Both **(a)** and **(b)**

(d) None of these.

12. To find the number of observations less than any given value, we use:

(a) Grouped frequency distribution.

(b) Single frequency distribution

(c) Cumulative frequency distribution

(d) None of these.

13. Difference between the lower and upper class boundaries is:

(a) Size **(b)** Width

(c) Both **(a)** and **(b)** **(d)** None of these.

14. Frequency density is used in the construction of:

(a) Histogram **(b)** Frequency Polygon

(c) Ogive **(d)** None of these.

15. Frequency density corresponding to a class interval is the ratio of:

(a) Class length to the total frequency.

(b) Class frequency to the class length

(c) Class frequency to the total frequency

(d) Class frequency to the cumulative frequency.

16. When one end of a class is not specified, the class is called:

(a) Closed-end class **(b)** Open-end class

(c) Both **(a)** and **(b)** **(d)** None of these.

17. A comparison among the class frequencies is possible only in:

(a) Ogive **(b)** Histogram

(c) Frequency Polygon **(d)** Either **(a)** or **(b)**

18. In Histogram if the classes are of unequal width then the heights of the rectangle must be proportional to the frequency densities.

(a) True **(b)** False

(c) Both **(a)** and **(b)** **(d)** None of these.

19. The curve obtained by joining the points, whose x-coordinates are the upper limits of the class-intervals and y-coordinates are corresponding cumulative frequencies is called:

(a) Ogive **(b)** Frequency Polygon

(c) Histogram **(d)** Frequency curve.

20. Difference between the maximum and minimum value of given data is called:

(a) Size **(b)** Width **(c)** Range **(d)** None

21. In 1995out of total of 4,0000 worker in a factory 3,300 were members of a trade union. The number of women workers was 500 out of which 400 did not belong to the union. In 1994, the number of workers in the union was 3,450 of which 3,2000 were men. The number of workers not belonging to the union was 760 of which 300 were women.

On the basis of this information the ratio of women members of the union in 1994 and 1995 is:

(a) 2:5 **(b)** 5;2 **(c)** 1:2 **(d)** 2:1.

22. The number of accidents for seven days in a locality is given below:

No. of accidents:	0	1	2	3	4	5	6
Frequency:	15	19	22	31	9	3	2

What is the number of cases when 3 or less accidents occurred?

(a) 56 **(b)** 6 **(c)** 68 **(d)** 87

23. The marks obtained by 30 students in a class test, out of 50 marks, according to their roll numbers are:

41, 25,33,12,21,19, 39, 19, 21, 12, 1, 19, 17, 12, 17, 17, 41, 41, 19, 41, 33, 12, 21, 33, 5, 1, 21.

If the data are arranged in the form of a frequency distribution with classes 1-10, 11-20, 21-30, 31-40, 41-50 then the frequency of these 5 days intervals are:

(a) 4, 13, 5, 4, 4 **(b)** 5, 12, 5, 4, 4

(c) 4, 13, 4, 5, 4 **(d)** 4, 11, 7, 4, 4.

24. Whether classification is done first or tabulations?

(a) Classification follows tabulations

(b) Classification precedes tabulations

(c) Both are done simultaneously

(d) No criterion.

25. In a exclusive type distribution , the limits excluded are:

(a) Upper limits **(b)** Lower limits

(c) Either of the lower or upper limits **(d)** Lower limit and upper limits both.

26. As the numbers of observations and classes increases, the shape of a frequency polygon:

(a) Tends to become increasingly smooth.

(b) Stays the same.

(c) tends to become jagged.

(d) Varies only if data become more reliable.

27. A series showing the sets of all values in classes with their corresponding frequencies is known as:

(a) Grouped frequency distribution.

(b) cumulative frequency distribution.

(c) Simple frequency distribution.

(d) None of the above.

28. Which of the following statement is true?

(a) The size of a sample can never be as large as the size of the population from which it is taken.

(b) Classes describe only one characteristic of the data being organized.

(c) As a rule statisticians generally use between six and fifteen classes.

(d) All of these.

29. If a data can take on only limited number of values, the classes of these data are called:

(a) Discrete **(b)** continuous

(c) Both discrete and continuous **(d)** none of these.

30. A relative frequency distribution presents frequencies in terms of:

(a) Fractions **(b)** Whole numbers

(c) Percentages **(d)** Both **(a)** and **(c)**

31. The following frequency distribution,

x:	12	17	24	36	45	48	52
y:	4	0	7	8	9	6	3

Is classified as:

(a) Continuous distribution.

(b) discrete distribution

(c) cumulative frequency distribution

(d) None of these.

32. The class interval of the continuous grouped data:

10-19, 20-29, 30-39, 40-49 is:

(a) 7 **(b)** 10 **(c)** 9 **(d)** 4.5

33. If a collection of data is called a data set, a single observation would be called:

(a) An element **(b)** data point

(c) Data point or an element **(d)** None of these.

34. The class interval of the distribution

15-18	18-21	21-24
4	2	5

Is:

(a) 4 **(b)** 3 **(c)** 2 **(d)** None of these

35. The following frequency distribution

Classes	Frequency
0-30	27
0-20	15
0-10	9

Is classified ……cumulative distribution.

(a) more than type **(b)** less than type

(c) discrete **(d)** None of these.

36. If you are interested in how the earnings of a company have fluctuated over time, it would be best to use:

(a) Bar graph **(b)** time series graph

(c) pie chart **(d)** Histogram.

37. It is best to use a sample when conducting a survey if:

(a) the population is small.

(b) we have a limited amount of time to conduct the survey.

(c) we would like to keep the costs of the survey low.

(d) All of the above except **(b)**

38. The number of observations in the current class intervals plus all previous class interval is known as:

(a) Frequency

(b) relative frequency

(c) Cumulative frequency

(d) Cumulative relative frequency.

39. It is always possible to construct a histogram from the:

(a) Data

(b) frequency polygon

(c) Both from the data and frequency polygon

(d) None of these.

40. In a bar diagram , the base line is:

(a) Horizontal **(b)** Vertical

(c) False base line **(d)** Any of the above.

41. In a column chart, bars are:

(a) horizontal **(b)** vertical

(c) Slanting **(d)** None of these.

42. If there is a decrease in a series at constants rate, the graph will be a:

(a) hyperbola

(b) A straight line from left top to right bottom.

(c) a convex curve

(d) None of these.

43. Pictograms are shown by:

(a) Dots **(b)** lines **(c)** circles **(d)** pictures.

44. A simple table represents:

(a) Only one factor or variable

(b) Always two factors or variables

(c) two or more number of factors or variables

(d) All the above

45. Graphs and charts facilitate:

(a) Comparison of values **(b)** to know the trend

(c) to know relationship **(d)** All the above.

46. To show the maximal and minimal values in a time series, the suitable chart is:

(a) deviation bar diagram **(b)** range curve

(c) hostorigram **(d)** All the above.

47. Which of the following statement is not correct?

(a) The bars in a histograms touch each other.

(b) The bar in column chart touch each other.

(c) There are bar diagrams which are known as broken bar diagrams.

(d) Multiple bar diagrams also exist.

48. In a histogram with equal class intervals; height of bar are proportional to:

(a) mid-values of the classes

(b) frequencies of respective classes

(c) Either **(a)** or **(b)**

(d) Neither **(a)** or **(b)**

49. When for some countries, the magnitudes are small and for other, the magnitudes are very large, to portray the data, it is preferred to construct:

(a) deviation bar diagram

(b) duo-directional bar diagram

(c) broken bar diagram

(d) Any of the above.

50. A histogram can be draws for the distribution with unequal class intervals by considering:

(a) Heights of bars proportional to class intervals.

(b) class frequency

(c) height of bars proportional frequency density.

(d) None of these.

51. In a study relating to the laborers of a jute mill in West Bengal, the following information was collected.

Twenty per cent of the total employees were females and forty per cent of them were married. Thirty female workers were not members of Trade Union. Compared to this, out of 600 male workers 500 were members of trade Union and fifty per cent of the male workers were married. The unmarried non-member male employees were 60 which formed ten per cent of the total male employees. The unmarried non-members of the employees were 80. On the basis of this information, the ratio of married male non-members to the married female non-members is:

(a) 1:3 **(b)** 3:1 **(c)** 4:1 **(d)** 5:1

Answers Sheet

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B.	**A.**	**A.**	**D.**	**C.**	**A.**	**A.**	**A.**	**C.**	**D.**	**B.**	**C.**	**C.**	**A.**	**B.**
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B.	**B.**	**A.**	**A.**	**C.**	B	D	A	**B.**	**C.**	**A.**	**A.**	**C.**	**C.**	**D.**
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
B.	**B.**	**C.**	**B.**	**A.**	**B.**	**D.**	**C.**	**C.**	**B.**	**B.**	**B.**	**D.**	**A.**	**D.**
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
B.	**B.**	**B.**	**C.**	**C.**	**C.**									

Measures of Central Tendency & Dispersion

Chapter **12**

EXERCISE

Mean

1. If there are 3 observations 15, 20, 25 than the sum of deviation of the observation from their AM is
(a) 0 **(c)** -5
(b) 5 **(d)** none of these

2. If there are two groups containing 30 and 20 observations and having 50 and 60 as arithmetic means, then the combined arithmetic mean is
(a)55 **(c)** 54
(b)56 **(d)** 52

3. The average salary of a group of unskilled workers is Rs 10,000 and that of a group of skilled workers is Rs 15,000. If the combined salary is Rs 12,000, then what is the percentage of skilled workers?
(a)40% **(c)** 60%
(b)50% **(d)** none of these

4. If a variable assumes the values 1, 2, 3..5 with frequencies as 1, 2, 3….5, then what is the AM?
(a)$\frac{11}{3}$ **(c)** 4
(b)5 **(d)** 4.50

Median

5. What is the median for the following observations?
5, 8, 6, 9, 11, 4.
(a)6 **(c)** 8
(b)7 **(d)** none of these

Mode

6. What is the modal value for the numbers 5, 8, 6, 4, 10, 15, 18, 10?
(a)18 **(c)** 14
(b)10 **(d)** none of these

Partition Value

7. What is the value of the first quartile for observations 15, 18, 10, 20, 23, 28, 12, 16?
(a)17 **(c)** 12.75
(b)16 **(d)** 12

8. The third decile for the numbers 15, 10, 20, 25, 18, 11, 9, 12 is
(a)13 **(c)** 11
(b)10.70 **(d)** 11.50

Geometric Mean

9. What is the GM for the numbers 8, 24 and 40?

(a)24 **(c)** $8.\sqrt[3]{15}$

(b)12 **(d)** 10

10. If GM of x is 10 and GM of y is 15, then the GM of xy is

(a)150 **(c)** log 150

(b) Log 10 × log 15 **(d)** none of these

Harmonic Mean

11. The harmonic mean for the numbers 2, 3, 5 is

(a) 2. 00 **(c)** 2.90

(b) 3.33 **(d)** $-\sqrt[3]{30}$

12. If there are two groups with 75 and 65 as harmonic means and containing 15 and 13 observation then the combined HM is given by

(a) 65 **(c)** 70

(b) 70.36 **(d)** 71

13. What is the HM of 1, ½, 1/3,……..1/n?

(a)n **(c)** $\frac{2}{(n+1)}$

(b)2n **(d)** $\frac{n(n+1)}{2}$

14. An aero plane flies from A to B at the rate of 500 km/hour and comes back from B to A at the rate of 700 km/hour. The average speed of the aero plane is

(a) 600 km/hr **(c)** $100\sqrt{35}$ km/hr

(b) 583.33 km/hr **(d)** 620 km/hr

Problems Based on Common Property

15. Two variables x and y are given by y = 2x – 3. If the median of x is 20, what is the median of y?

(a)20 (**c)** 37

(b)40 **(d)** 35

16. If the relationship between two variables u and v are given by 2u + v + 7 = 0 and if the AM of u is 10, then the AM of v is

(a) 17 **(c)** -27

(b) -17 **(d)** 27

17. If x and y are related by x – y – 10 = 0 and mode of x is known to be 23, then the mode of y is

(a)20 **(c)** 3

(b)13 **(d)** 23

Relation Between AM GM & HM

18. If the AM and GM for two numbers are 6.50 and 6 respectively then the two numbers are
(a) 6 and 7 **(c)** 10 and 3
(b) 9 and 4 **(d)** 8 and 5

19. If the AM and HM for two numbers are 5 and 3.2 respectively then the GM will be
(a)16.00 **(c)** 4.05
(b)4.10 **(d)** 4.00

20. If the AM and GM for 10 observations are both 15, then the value of HM is
(a) Less than 15 **(c)** 15
(b) More than 15 **(d)** cannot be determined

Mixed Problems

21. If the difference between mean and mode is 63, then the difference between mean and median will be_____.
(a)63 **(c)** 21
(b)31.5 **(d)** none of the above

22. If the Arithmetic mean between two numbers is 64 and the geometric mean between them is 16. The Harmonic mean between them is _____.
(a)64 **(c)** 16
(b)4 **(d)** 40

23. The average of 5 quantities is 6 and the average of 3 is 8. What is the average of the remaining two?
(a)4 **(c)** 3
(b)5 **(d)** 3.5

24. The average age of a group of 10 students was 20 years. The average age increased by two years when two new students joined the group. What is the average age of two new students who joined the group?
(a)22 years **(c)** 44 years
(b)30 years **(d)** 32 years

25. Geometric Mean of three observations 40, 50 and X is 10. The value of X is
(a)2 **(c)** ½
(b)4 **(d)** none of the above

26. The mean of first three term is 14 and mean of next two terms is 18. The mean of all five term is :
(a)14.5 **(c)** 14
(b)15 **(d)** 15.6

27. The mean salary of a group of 50 persons is Rs 5,850. Later on it is discovered that the salary of one employee has been wrongly taken as Rs 8,000 instead of Rs 7,800. The corrected mean salary is
(a) Rs 5,854 **(c)** Rs 5,650
(b) Rs 5,846 **(d)** none of the above

28. If the mode of a data is 18 and mean is 24, then median is –

(a)18 **(c)** 22

(b)24 **(d)** 21

29. A man travels from Agra to Gwalior at an average speed of 30 km per hour and back at an average speed of 60 km per hour. What is his average speed?

(a)38 km per hour **(c)** 45 km per hour

(b)40 km per hour **(d)** 35 km per hour

30. Geometric mean of 8, 4, 4, 2 is

(a)4 **(c)** 8

(b)2 **(d)** none of these

31. The average age of 15 students of a class is 15 years. Out of them, the average age of 5 students is 14 years and that of other 9 students is 6 years. The age of the 15^{th} students is:

(a)11 years **(c)** 15 years

(b)14 years **(d)** none of these

32. The mean of the following data is 6. Find the value of 'P'.

X:	2	4	6	10	P +5
Y:	3	2	3	1	2

(a)4 **(c)** 8

(b)6 **(d)** 7

33. The harmonic mean H of two numbers is 4 and their arithmetic mean A and the geometric mean G satisfy the equation $2A + G^2 = 27$, then the numbers are

(a)(1, 3) **(c)** (6, 3)

(b)(9, 5) **(d)** (12, 7)

34. In a class of 50 students, 10 have failed and their average marks in 2.5. the total marks secured by the entire class were 281. The average marks who have passed is :

(a)5.32 **(c)** 6.40

(b)7.25 **(d)** none of the above

35. For moderately skewed distribution of marks in commerce for a group of 200 students the mean marks and mode marks were found to be 55.60 and 46. What is the median marks?

(a)55.5 **(c)** 52.4

(b)60.5 **(d)** none of these

36. Mean for the data 6, 4, 1, 6, 5, 10, 3 is 5 when each observation added by 2, what is mean of the data

(a)5 **(c)** 7

(b)6 **(d)** 10

37. If the mean of two numbers is 30 and geometric mean is 24 then what will be these two numbers?

(a)36 and 24 **(c)** 48 and 12

(b)30 and 30 **(d)** none of these

Theory Based Questions

38. Measures of central tendency for a given set of observations measures
(a) The scatterings of the observations
(b) The central location of the observations
(c) Both **(a)** and **(b)**
(d) None of these

39. While computing the AM from a grouped frequency distribution, we assume that
(a) The classes are of equal length
(b) The classes have equal frequency
(c) All the values of a class are equal to the mid-value of that class
(d) None of these

40. Which of the following statements is wrong?
(a) Mean is rigidly defined
(b) Mean is not affected due to sampling fluctuations
(c) Mean has some mathematical properties
(d) All these

41. Which of the following statements is true?
(a) Usually mean is the best measure of central tendency
(b) Usually median is the best measure of central tendency
(c) Usually mode is the best measure of central tendency
(d) Normally, GM is the best measure of central tendency

42. For open-end classification, which of the following is the best measure of central tendency?
(a) AM **(b)** GM
(c) Median **(d)** Mode

43. The presence of extreme observations does not affect
(a) AM **(b)** Median
(c) Mode **(d)** Any of these

44. In case of an even number of observations which of the following is median?
(a) Any of the two middle-most value
(b) The simple average of these two middle values
(c) The weighted average of these two middle values
(d) Any of these

45. The most commonly used measure of central tendency is
(a) AM **(b)** Median
(c) Mode **(d)** Both GM and HM

46. Which one of the following is not uniquely defined?
(a) Mean **(b)** Median
(c) Mode **(d)** All of these measures

47. Which of the following measure of the central tendency is difficult to compute?
(a) Mean **(b)** Median
(c) Mode **(d)** GM

48. Which measure(s) of central tendency is (are) considered for finding the average rates?
(a) AM **(b)** GM
(c) HM **(d)** Both **(a)** and **(c)**

49. For a moderately skewed distribution, which of the following relationship holds?
(a) Mean – Mode = 3(Mean – Median)
(b) Median – Mode = 3 (Mean – Median)
(c) Mean – Median = 3 (Mean – Mode)
(d) Mean – Median = 3(Median – Mode)

50. Weighted averages are considered when
(a) The data are not classified
(b) The data are put in the form of grouped frequency distribution
(c) All the observations are not of equal importance
(d) Both **(a)** and **(c)**

51. Which of the following results hold for a set of distinct positive observations?
(a) AM ≥ GM ≥ HM **(b)** HM ≥ GM ≥ AM
(c) AM > GM > HM **(d)** GM > AM > HM

52. When a firm register both profits and losses, which of the following measure of central tendency cannot be considered?
(a) AM **(b)** GM
(c) Median **(d)** Mode

53. Quartiles are the values dividing a given set of observations into
(a) Two equal parts **(b)** Four equal parts
(c) five equal parts **(d)** None of these

54. Quartiles can be determined graphically using
(a) Histogram **(b)** Frequency Polygon
(c) Ogive **(d)** Pie chart

55. Which of the following measure(s) possesses (possess) mathematical properties?
(a) AM **(b)** GM
(c) HM **(d)** All of these

56. Which of the following measure(s) satisfies (satisfy) a linear relationship between two variables?
(a) Mean **(b)** Median
(c) Mode **(d)** All of these

57. Which of the following measures of central tendency is based on only fifty percent of the central values?
(a) Mean **(b)** Median
(c) Mode **(d)** both **(a)** and **(b)**

Answer Sheet

1.	**a**	**2.**	**c**	**3.**	**a**	**4.**	**a**	**5.**	**b**	**6.**	**b**	**7.**	**c**	**8.**	**b**	**9.**	**c**	**10.**	**a**
11.	**c**	**12.**	**c**	**13.**	**c**	**14.**	**b**	**15.**	**c**	**16.**	**c**	**17.**	**b**	**18.**	**b**	**19.**	**d**	**20.**	**d**
21.	**c**	**22.**	**b**	**23.**	**c**	**24.**	**a**	**25.**	**c**	**26.**	**d**	**27.**	**b**	**28.**	**c**	**29.**	**b**	**30.**	**c**
31.	**a**	**32.**	**d**	**33.**	**c**	**34.**	**c**	**35.**	**c**	**36.**	**c**	**37.**	**c**	**38.**	**b**	**39.**	**c**	**40.**	**b**
41.	**a**	**42.**	**c**	**43.**	**b**	**44.**	**b**	**45.**	**a**	**46.**	**c**	**47.**	**d**	**48.**	**d**	**49.**	**a**	**50.**	**c**
51.	**c**	**52.**	**b**	**53.**	**b**	**54.**	**c**	**55.**	**d**	**56.**	**d**	**57.**	**b**						

Measure of Dispersion

EXERCISE

Range

1. What is the coefficient of range for the following wages of 8 workers?
Rs 80, Rs 65, Rs 90, Rs 60, Rs 75, Rs 70, Rs 72, Rs 85.

(a) Rs 30 (c) 30

(b) Rs 20 (d) 20

2. If R_x and R_y denote ranges of x and y respectively where x and y are related by $3x + 2y + 10 = 0$, what would be the relation between x and y?

(a) $R_x = R_y$ (c) $3 R_x = 2 R_y$

(b) $2 R_x = 3R_y$ (d) $R_x = 2 R_y$

3. What is the coefficient of range for the following distribution?

Class interval:	10 - 19	20 - 29	30 - 39	40 - 49	50 – 59
Frequency:	11	25	16	7	3

(a) 22 (c) 72.46

(b) 50 (d) 75.82

4. If the range of x is 2, what would be range of -3x + 50?

(a) 2 (c) -6

(b) 6 (d) 44

Mean Deviation

5. What is the value of mean deviation about mean for the numbers?
5, 8, 6, 3, 4.

(a) 5.20 (c) 1.44

(b) 7.20 (d) 2.23

6. What is the value of mean deviation about for the following observations?
50, 60, 50, 50, 60, 60, 60, 50, 50, 50, 60, 60, 60, 50.

(a) 5 (c) 35

(b) 7 (d) 10

7. The coefficient of mean deviation about mean for the first 9 natural numbers is

(a) 200/9 (c) 400/9

(b) 80 (d) 50

8. If the relation between x and y is $5y – 3x = 10$ and the mean deviation about mean for x is 12, then the mean deviation of y about mean is

(a) 7.20 (c) 20

(b) 6.80 (d) 18.80

9. If two variables x and y are related by $2x + 3y – 7 = 0$ and the mean and mean deviation about mean of x are 1 and 0.3 respectively, then the coefficient of mean deviation of y about its mean is

(a) -5 (c) 50

(b) 12 (d) 4

10. The mean deviation about mode for the numbers 4/11, 6/11, 8/11, 9/11, 12/11, 8/11 is

(a) 1/6 (c) 6/11

(b) 1/11 (d) 5/11

Quartile Deviation

11. The quartiles of a variable are 45, 52 and 65 respectively. Its quartile deviation is

(a) 10 (c) 25

(b) 20 (d) 8.30

12. If x and y are related as 3x + 4y = 20 and the quartile deviation of x is 12, then the quartile deviation of y is

(a) 16 (c) 10

(b) 14 (d) 9

Standard Deviation

13. What is the standard deviation of 5, 5, 9, 9, 9, 10, 5, 10, 10?

(a) $\sqrt{14}$] (c) 4.50

(b) $\frac{\sqrt{42}}{3}$ (d) 8

14. If the mean and SD of x are a and b respectively, then the SD of $\frac{x-a}{b}$ is

(a) -1 (c) ab

(b) 1 (d) a/b

15. What is the coefficient of variation of the following numbers?
53, 52, 61, 60, 64.

(a) 8.09 (c) 20.23

(b) 18.08 (d) 20.45

16. If the SD of x is 3, what is the variance of (5-2x) ?

(a)36 (c) 1

(b)6 (d) 9

17. If x and y are related by 2x + 3y + 4 = 0 and SD of x is 6, then SD of y is

(a)22 (c) $\sqrt{5}$

(b)4 (d) 9

18. If the SD of the 1st n natural numbers is 2, then the value of n must be

(a)2 (c) 6

(b)7 (d) 5

19. If x and y are related by y = 2x + 5 and the SD and AM of x are known to be 5 and 10 respectively, then the coefficient of variation is

(a)25 (c) 40

(b)30 (d) 20

20. The mean and SD for a, b and 2 are 3 and $\frac{2}{\sqrt{3}}$ respectively. The value of ab would be

(a)5 (c) 11

(b)6 (d) 3

21. The mean and SD for a group of 100 observations are 65 and 7.03 respectively. If 60 of these observations have mean and SD as 70 and 3 respectively, what is the SD for the group comprising 40 observations?

(a)16 (c) 4

(b)25 (d) 2

22. If two samples of sizes 30 and 20 have means as 55 and 60 and vacancies as 16 and 25 respectively, then what would be the SD of the combined sample of size 50?

(a)5.00 (c) 5.23

(b)5.06 (d) 5.35

23. The mean and SD of a sample of 100 observations were calculated as 40 and 5.1 respectively by a CA student who took one of the observations as 50 instead of 40 by mistake. The current value of SD would be

(a)4.90 (c) 4.88

(b)5.00 (d) 4.85

Mixed Problems

24. If sum of squares of the values = 3390, N = 30 and standard deviation = 7, find out the mean.

(a)113 (c) 8

(b)210 (d) none of these

25. If standard deviation of first 'n' natural numbers is 2 then value of 'n' is

(a)10 (c) 6

(b)7 (d) 5

26. The standard deviation is independent of change of

(a)Scale (c) both origin and scale

(b)Origin (d) none of these

27. If the mean of a frequency distribution is 100 and coefficient of variation is 45% then standard deviation is:

(a)45 (c) 4.5

(b)0.45 (d) 450

28. Which of the following measures of central tendency cannot be calculated by graphical method?

(a)Mean (c) median

(b)Mode (d) Quartile

29. Find at the variance given that the Arithmetic Mean = (8 + 4) /2

(a)2 (c) 1

(b)6 (d) 4

30. In normal distribution mean, median and mode are

(a)Equal (c) zero

(b)Not equal (d) none of above

31. Coefficient of mean deviation about mean for the first 9 natural numbers is

(a)200/9 (c) 400/9

(b)80 (d) 50

32. If mean = 5, standard deviation = 2.6, median = 5 and quartile deviation = 1.5, then the coefficient of quartile deviation equals

(a)35 (c) 30

(b)39 (d) 32

33. What is value of mean deviation about mean from the number 5, 8, 6, 3 and 4?

(a)5.20 (c) 1.44

(b)7.20 (d) 2.23

34. For the observation of 6, 4, 1, 6, 5, 10, 4, 8 the range is :

(a)10 (c) 8

(b)9 (d) none

35. If a variance of a random variable 'x' is 23, then what is variance of 2x + 10?

(a)56 (c) 46

(b)33 (d) 92

36. If variance = 148.6 and $\overline{x}$ = 40, then the coefficient of variation is :

(a)37.15 (c) 33.75

(b)30.48 (d) none of the above

37. The SD of first n natural number is _____

(a) $\sqrt{\frac{n^2-1}{12}}$ (c) $\sqrt{\frac{n(n-1)}{6}}$

(b) $\sqrt{\frac{n(n+1)}{12}}$ (d) none of these

38. If mean and coefficient of variation of the marks of 10 students is 20 and 80 respectively. What will be variance of them?

(a)256 (c) 25

(b)16 (d) none of these

39. If same amount is added to or subtracted from all the values of individual series then the standard deviation and variance both shall be _____

(a)Changed (c) same

(b)Unchanged (d) none of these

40. The sum of the squares of deviations of a set of observations has the smallest value, when the deviations are taken from their:

(a) A.M (b) H.M

(c) G.M (d) None

41. If two samples of sizes 30 and 20 have means as 55 and 60 and variances as 16 and 25 respectively, then what would be the S.D of the combined sample size 50?

(a) 5.33 (b) 5.17

(c) 5.06 (d) 5

42. _____ are used for measuring central tendency, dispersion and skewness:

(a) Median (b) Deciles

(c) Percentiles (d) Quartiles

43. Which of the following companies A or B is more consistent so far as the payment of dividend is concerned?
Dividend paid by A: 5 9 6 12 15 10 8 10
Dividend paid by B: 4 8 7 15 18 9 6 6
(a) A (b) B
(c) Both A & B (d) Neither A nor B

44. A lady travel at a speed of 20 km/h and returned at quicker speed. If her average speed of the whole journey is 24 km/h, find the speed of return journey (in km/h)
(a) 25 (b) 30
(c) 35 (d) 38

45. If Standard deviation of x is σ, then Standard deviation of ax + b, where a, b and c (c ± 0) are arbitrary constants, will be
(a) σ (b) $\frac{a\sigma+b}{c}$
(c) $\frac{a}{c}.\sigma$ (d) $\left|\frac{a}{c}\right|\sigma$

46. The quartile deviation is:
(a) 2/3 of S.D (b) 4/5 of S.D
(c) 5/6 of S.D (d) None of these

47. If a variance of a random variable 'x' is 23, then what is variance of 2x + 10?
(a) 56 (b) 33
(c) 46 (d) 92

48. If variance = 148.6 and $\overline{x}$ = 40, then the coefficient of variation is:
(a) 37.15 (b) 30.48
(c) 33.75 (d) None

Theory Based Questions

49. Which of the following statements is correct?
(a) Two distributions may have identical measures of central tendency and dispersion.
(b) Two distributions may have the identical measures of central tendency but different measures of dispersion
(c) Two distributions may have the different measures of central tendency but identical measures of dispersion.
(d) All the statements (a), (b) and (c)

50. Dispersion measures
(a) The scatternes of a set of observations
(b) The concentration of a set of observations
(c) Both (a) and (b)
(d) Neither (a) and (b)

51. When it comes to comparing two or more distributions, we consider
(a) Absolute measures of dispersion
(b) Relative measures of dispersion
(c) Both (a) and (b)
(d) Either (a) or (b)

52. Which one is easier to compute?
(a) Relative measures of dispersion
(b) Absolute measures of dispersion
(c) Both (a) and (b)
(d) Range

53. Which one is an absolute measure of dispersion?
(a) Range (b) Mean Deviation
(c) Standard Deviation (d) All these measures

54. Which measure of dispersion is most useful?
(a) Standard Deviation (b) Quartile deviation
(c) Mean Deviation (d) Range

55. Which measures of dispersions is not affected by the presence of extreme observations?
(a) Range (b) Mean deviation
(c) Standard deviation (d) Quartile deviation

56. Which measure of dispersion is based on the absolute deviations only?
(a) Standard Deviation (b) Mean deviation
(c) Quartile deviation (d) Range

57. Which measure is based on only the central fifty percent of the observations?
(a) Standard deviation (b) Quartile deviation
(c) Mean deviation (d) All these measures

58. Which measure of dispersion is based on all the observations?
(a) Mean deviation (b) Standard deviation
(c) Quartile deviation (d) (a) and (b) but not (c)

59. The appropriate measure of dispersion for open-end classification is
(a) Standard deviation (b) Mean deviation
(c) Quartile deviation (d) All these measures

60. The most commonly used measure of dispersion is
(a) Range (b) Standard deviation
(c) Coefficient of variation (d) Quartile deviation

61. Which measure of dispersion has some desirable mathematical properties?
(a) Standard deviation (b) Mean deviation
(c) Quartile deviation (d) All these measure

62. If the profits of a company remain the same for the last ten months, then the standard deviation of profits for these ten months would be?
(a) Positive (b) Negative
(c) Zero (d) (a) or (c)

63. Which measure of dispersion is considered for finding a pooled measure of dispersion after combining several groups?
(a) Mean deviation (b) Standard deviation
(c) Quartile deviation (d) Any of these

64. A shift of origin has no impact on
(a) Range (b) Mean deviation
(c) Standard deviation (d) All these and quartile deviation

65. The range of 15, 12, 10, 9, 17, 20 is
(a) 5 (b) 12
(c) 13 (d) 11

66. For any two numbers SD is always
(a) Twice the range (b) Half of the range
(c) square of the range (d) None of these

67. If all the observations are increased by 10, then
(a) SD would be increased by 10
(b) Mean deviation would be increased by 10
(c) Quartile deviation would be increased by 10
(d) All these three remain unchanged

68. If all the observations are multiplied by 2, then
(a) New SD would be also multiplied by 2
(b) New SD would be half of the previous SD
(c) New SD would be increased by 2
(d) New SD would be decreased by 2

Answer Sheet

1.	**d**	**2.**	**c**	**3.**	**c**	**4.**	**b**	**5.**	**c**	**6.**	**a**	**7.**	**c**	**8.**	**a**	**9.**	**b**	**10.**	**b**
11.	**a**	**12.**	**d**	**13.**	**b**	**14.**	**b**	**15.**	**a**	**16.**	**a**	**17.**	**b**	**18.**	**b**	**19.**	**c**	**20.**	**c**
21.	**c**	**22.**	**b**	**23.**	**b**	**24.**	**c**	**25.**	**a**	**26.**	**b**	**27.**	**a**	**28.**	**a**	**29.**	**b**	**30.**	**a**
31.	**c**	**32.**	**c**	**33.**	**c**	**34.**	**b**	**35.**	**d**	**36.**	**b**	**37.**	**a**	**38.**	**a**	**39.**	**b**	**40.**	**a**
41.	**c**	**42.**	**d**	**43.**	**a**	**44.**	**b**	**45.**	**d**	**46.**	**a**	**47.**	**d**	**48.**	**b**	**49.**	**d**	**50.**	**a**
51.	**b**	**52.**	**d**	**53.**	**d**	**54.**	**a**	**55.**	**d**	**56.**	**b**	**57.**	**b**	**58.**	**d**	**59.**	**c**	**60.**	**b**
61.	**a**	**62.**	**c**	**63.**	**b**	**64.**	**d**	**65.**	**d**	**66.**	**b**	**67.**	**d**	**68.**	**a**				

Correlation Analysis

Chapter 13

EXERCISE

Practical Questions

Basic Problems

1. If y = a + bx, then what is the coefficient of correlation between x and y?

(a) 1
(b) -1
(c) 1 or -1 according as b > 0 or b < 0
(d) none of these

Karl Pearson Correlation Coefficient

2. Compute the co-efficient between x & y from the following data n = 10, $\sum xy = 220, \sum x^2 = 200, \sum y^2 = 262, \sum x = 40, \sum y = 50$

(a) 0.91
(b) 0.625
(c) 0.4
(d) 0.5

3. If for two variables x and y, the covariance, variance of x and variance of y are 40, 16 and 256 respectively, what is the value of the correlation coefficient?

(a) 0.01
(b) 0.625
(c) 0.4
(d) 0.5

4. If cov (x, y) = 15, what restrictions should be put for the standard deviations of x and y?

(a) No restriction
(b) The product of the standard deviations should be more than 15.
(c) The product of the standard deviations should be less than 15.
(b) The sum of the standard deviations should be less than 15.

5. If the covariance between two variables is 20 and the variance of one of the variables is 16, what would be the variance of the other variable?

(a) More than 100
(b) More than 10
(c) less than 10
(d) more than 1.25

6. What is the value of correlation coefficient due to Pearson on the basis of the following data:

X:	-5	-4	-3	-2	-1	0	1	2	3	4	5
Y:	27	18	11	6	3	2	3	6	11	18	27

(a) 1
(b) -1
(c) 0
(d) -0.5

Spearman Rank Correlation

7. If the sum of squares of difference of ranks, given by two judges A and B, of 8 students in 21, what is the value of rank correlation coefficient?

(a) 0.7 **(c)** 0.75
(b) 0 .65 **(d)** 0.8

8. If the rank correlation coefficient between marks in management and mathematics for a group of students in 0.6 and the sum of squares of the differences in ranks in 66, what is the number of students in the group?

(a) 10 **(c)** 8
(b) 9 **(d)** 11

9. While computing rank correlation coefficient between profit and investment for the last 6 years of a company the difference in rank for a year was taken 3 instead of 4. What is the rectified rank correlation coefficient if it is known that the original value of rank correlation coefficient was 0.4?

(a) 0.3 **(c)** 0.25
(b) 0.2 **(d)** 0.28

Coefficient of Concurrent Deviation

10. For 10 pairs of observations no. of concurrent deviations was found to be 4. What is the value of the coefficient of concurrent deviation?

(a) $\sqrt{0.2}$ **(c)** $1/3$
(b) $-\sqrt{0.2}$ **(d)** $-1/3$

11. The coefficient of concurrent deviation for p pairs of observations was found to be $1/\sqrt{3}$. If the number of concurrent deviations was found to be 6, then the value of p is

(a) 10 **(c)** 8
(b) 9 **(d)** none of these

Property Based Problems

12. If $u + 5x = 6$ and $3y - 7v = 20$ and the correlation coefficient between x and y is 0.58 then what would be the correlation coefficient between u and v?

(a) 0.58 **(c)** -0.84
(b) -0.58 **(d)** 0.84

13. If the relation between x and u is $3x + 4u + 7 = 0$ and the correlation coefficient between x and y is -0.6, then what is the correlation coefficient between u and y?

(a) -0.6 **(c)** 0.6
(b) 0.8 **(d)** -0.8

14. From the following data

X:	2	3	5	4	7
Y:	4	6	7	8	10

Two coefficients of correlation were found to be 0.93. what is the correlation between u and v as given below?

U:	-3	-2	0	-1	2
V:	-4	-2	-1	0	2

(a) -0.93 **(c)** 0.57
(b) 0.93 **(d)** -0.57

15. Referring the data presented in Q.no 8, what would be the correlation between u and v?

U:	10	15	25	20	35
V:	-24	-36	-42	-48	-60

(a) -0.6 **(c)** -0.93
(b) 0.6 **(d)** 0.93

16. If r = 0.6 then the coefficient of non-determination is
(a) 0.4 **(c)** 0.36
(b) -0.6 **(d)** 0.64

Mixed Problems

17. When each individual gets the exactly opposite rank by the two judges, then the rank correlation will be_____.
(a) 0 **(c)** +1
(b) -1 **(d)** $\frac{1}{2}$

18. If the coefficient of correlation between X and Y variables is +0.90 then what will be the coefficient of determination?
(a) 0.30 **(c)** 0.94
(b) 0.81 **(d)** none of these

19. In a beauty contest there were 10 competitions. Rank of these candidates are assigned by two judges A and B. the sum of squares of differences of ranks is 44. The value of rank correlation is:
(a) 0.70 **(c)** 0.80
(b) 0.73 **(d)** 0.60

20. The coefficient of correlation between x and y is 0.6. If x and y values are multiplied by -1, then the coefficient of correlation will be:
(a) 0.6 **(c)** $\frac{1}{0.6}$
(b) -0.6 **(d)** 1 – 0.6

21. If two regression lines are 5y = 9x – 22 and 20x = 9y + 350, then the value of correlation coefficient (r) will be:
(a) 0.10 **(c)** -0.90
(b) -0.10 **(d)** 0.90

22. If r = 0.6 then the coefficient of non-determination will be:

(a)0.40 **(c)** 0.36

(b)-0.60 **(d)** 0.64

23. The correlation coefficient (r) is the _____ of the two regression coefficients (b_{yx} and b_{xy})

(a)AM **(c)** HM

(b)GM **(d)** median

24. The coefficient of determination is defined by the formula

(a) $r^2 = \frac{1-unexplained\ variance}{total\ variance}$ **(c)** both (a) and (b)

(b) $r^2 = \frac{1-explained\ \ variance}{total\ variance}$ **(d)** none

25. A relationship $r^2 = 1 - \frac{500}{300}$ is not possible

(a) True **(c)** both

(b) False **(d)** none

Theory Based Questions

26. Bivariate Data are the data collected for

(a) Two variables

(b) More than two variables

(c) Two variables at the same point of time

(d) Two variables at different points of time

27. For a bivariate frequency table having (p + q) classification the total number of cells is

(a) p **(b)** p + q

(c) q **(d)** pq

28. Some of the cell frequencies in a bivariate frequency table may be

(a) Negative **(b)** Zero

(c) a or b **(d)** None of these

29. For a p × q bivariate frequency table, the maximum number of marginal distributions is

(a) p **(b)** p + q

(c) 1 **(d)** 2

30. For a p × q classification of bivariate data, the maximum number of conditional distributions is

(a) p **(b)** p + q

(c) pq **(d)** p or q

31. Correlation analysis aims at

(a) Predicting one variable for a given value of the other variable

(b) Establishing relation between two variables

(c) Measuring the extent of relation between two variables

(d) Both **(b)** and **(c)**

32. What is spurious correlation?
(a) It is a bad relation between two variables
(b) It is very low correlation between two variables
(c) It is the correlation between two variables having no causal relation
(d) It is a negative correlation

33. Scatter diagram is considered for measuring
(a) Linear relationship between two variables
(b) Curvilinear relationship between two variables
(c) Neither **(a)** or **(b)**
(d) Both **(a)** and **(b)**

34. If the plotted points in a scatter diagram lie from upper left to lower right, then the correlation is
(a) Positive **(b)** Zero
(c) Negative **(d)** None of these

35. If the plotted points in a scatter diagram are evenly distributed, then the correlation is
(a) Zero **(b)** Negative
(c) Positive **(d) (**a) or (b)

36. If all the plotted points in a scatter diagram lie on a single line, then the correlation is
(a) Perfect positive **(b)** Perfect negative
(c) Both **(a)** and **(b)** **(d)** Either (a) or (b)

37. The correlation between shoe-size and intelligence is
(a) Zero **(b)** Positive
(c) Negative **(d)** None of these

38. The correlation between the speed of an automobile and the distance travelled by it after applying the brakes is
(a) Negative **(b)** Zero
(c) Positive **(d)** None of these

39. Scatter diagram helps us to
(a) Find the nature correlation between two variables
(b) Compute the extent of correlation between two variables
(c) Obtain the mathematical relationship between two variables
(d) Both **(**a) and (c)

40. Pearson's correlation coefficient is used for finding
(a) Correlation for any type of relation
(b) Correlation for linear relation only
(c) Correlation for curvilinear relation only
(d) Both (b) and (c)

41. Product moment correlation coefficient is considered for
(a) Finding the nature of correlation
(b) Finding the amount of correlation
(c) Both (a) and (b)
(d) Either (a) and (b)

42. If the value of correlation coefficient is positive, then the points in a scatter diagram tend to cluster
(a) From lower left corner to upper right corner
(b) From lower left corner to lower right corner
(c) From lower right corner to upper left corner
(d) From lower right corner to upper right corner

43. Product moment correlation coefficient may be defined as the ratio of
(a) The product of standard deviations of the two variables to the covariance between them
(b) The covariance between the variables to the product of the variances of them
(c) The covariance between the variables to the product of their standard deviations
(d) Either (b) or (c)

44. The covariance between two variables is
(a) Strictly positive **(b)** Strictly negative
(c) Always 0 **(d)** Either positive or negative or zero

45. The coefficient of correlation between two variables
(a) Can have any unit
(b) Is expressed as the product of units of the two variables
(c) Is a unit free measure
(d) None of these

46. What are the limits of the correlation coefficient?
(a) No limit
(b) -1 and 1
(c) 0 and 1, including the limits
(d) -1 and 1, including the limits

47. In case the correlation coefficient between two variables is 1, the relationship between the two variables would be
(a) $y = a + bx$
(b) $y = a + bx, b > 0$
(c) $y = a + bx, b < 0$
(d) $y = a + bx$, both a and b being positive

48. If the relationship between two variables x and y in given by $2x + 3y + 4 = 0$, then the value of the correlation coefficient between x and y is
(a) 0 **(b)** 1
(c) -1 **(d)** negative

49. For finding correlation between two attributes, we conside
(a) Pearson's correlation coefficient
(b) Scatter diagram
(c) Spearman's rank correlation coefficient
(d) Coefficient of concurrent deviations.

50. For finding the degree of agreement about beauty between two judges in a beauty contest, we use
(a) Scatter diagram
(b) coefficient of rank correlation
(c) Coefficient of correlation
(d) Coefficient of concurrent deviation

51. If there is a perfect disagreement between the marks in Geography and Statistics, then what would be the value of rank correlation coefficient?

(a) Any value **(b)** Only 1

(c) Only -1 **(d)** (b) or (c)

52. When we are not concerned with the magnitude of the two variables under discussion, we consider

(a) Rank correlation coefficient

(b) product moment correlation coefficient

(c) Coefficient of concurrent deviation

(d) (a) or (b) but not (c)

53. What is the quickest method to find correlation between two variables?

(a) Scatter diagram

(b) Method of concurrent deviation

(c) Method of rank correlation

(d) Method of product moment correlation

54. What are the limits of the coefficient of concurrent deviations?

(a) No limit

(b) Between -1 and 0, including the limiting values

(c) Between 0 and 1, including the limiting values

(d) Between -1 and 1, the limiting values inclusive

55. The method applied for deriving the regression equations is known as

(a) Least squares **(b)** Concurrent deviation

(c) Product moment **(d)** Normal equation

Answer Sheet

1.	c	2.	a	3.	b	4.	b	5.	a	6.	c	7.	c	8.	a	9.	b	10.	d
11.	a	12.	b	13.	c	14.	b	15.	c	16.	d	17.	b	18.	b	19.	b	20.	a
21.	d	22.	d	23.	b	24.	c	25.	a	26.	c	27.	d	28.	b	29.	d	30.	b
31.	d	32.	c	33.	d	34.	c	35.	a	36.	d	37.	a	38.	a	39.	a	40.	b
41.	c	42.	a	43.	c	44.	d	45.	c	46.	d	47.	b	48.	c	49.	c	50.	b
51.	c	52.	c	53.	b	54.	d	55.	a										

Summary Notes

Regression Analysis

Chapter **14**

EXERCISE

PRACTICAL QUESTIONS

Regression Coefficient

1. You are given the following information's:

	Price (Rs.) (X)	Amounts demanded ('000 units) (y)
Arithmetic Mean	20	55
Standard deviation	2	5

correlation coefficient r = 0.6

The regression coefficient of y on x (b_{yx}) is

(a) -3 **(b)** +3

(c) 1.5 **(d)** None

2. The regression coefficient of X on Y of the following data.

N = 10; $\Sigma X = 250$; $\sum Y = 210$; $\Sigma(X-25)^2 = 262$;

$\Sigma(Y - 21)^2 = 322$, $\Sigma(X - 25)(Y - 21) = 192$ is

(a) 0.596 **(b)** -0.414

(c) 0.568 **(d)** None

3. The regression coefficient of Y on X (b_{yx}) of the following data cov. (X ; Y) = 121; $\sigma x = 15$; $\sigma y = 14$ is

(a) 0.54 **(b)** 0.55

(c) 0.6875 **(d)** None

4. The regression coefficient b_{xy} for the following data:

{(x, y) : (6,4), (8, 3), (5, 2), (7, 4), (4,2)} is :

(a) 0.4. **(b)** 0.3

(c) 0.8 **(d)** None

5. Given the following data :

$\Sigma(X - \overline{X})(Y - \overline{Y}) = 3900$, $\Sigma(X - \overline{X})^2 = 6360$,

$\Sigma(Y - \overline{Y})^2 = 2668$

then the regression coefficient b_{xy} is :

(a) 1-46 **(b)** 2.363

(c) 4.363 **(d)** None

6. Given below the information about the capita! employed and profit earned by a company over the last twenty-five years:

Particulars	Mean	SD
Capital employed ('0000 Rs.)	62	5
Profit earned ('000 Rs.)	25	6

Correlation Coefficient between capital and profit = 0.69. The sum of the regression coefficients for the above data would be :

(a) 1.403 **(b)** 2.958

(c) 3.241 **(d)** None

7. In a correlation study of two variables X and Y, the following values are obtained: $\overline{X} = 45$, $\overline{Y} = 54$, $\sigma_x = 4$; $\sigma_y = 5$; $r = 0.8$, The two regression coefficients (b_{xy}, b_{yx}) are
(a) (5 . 57,3. 12) **(b)** (0.64, 1.00)
(c) (7.12,2.67) **(d)** None of these

8. Regression equation of Y on X is $4X - 5Y + 31 = 0$ and $\sigma_x = 9$. Hence Cov.(X, Y) is equal to :
(a) 9.25 **(b)** 7.2
(c) 5.4 **(d)** None of these.

9. Following are the two normal equations obtained for deriving the regression line of y and x:
$5a + 10b = 40$
$10a + 25b = 95$
The regression line of y on x is given by
(a) $2x + 3y = 5$ **(b)** $y = 2 + 3x$
(c) $2y + 3x = 5$ **(d)** $y = 3 + 5x$

10. Given the regression equations as $3x + y = 13$ and $2x + 5y = 20$, which one is the regression equation of y on x?
(a) 1st equation **(b)** both (a) and (b)
(c) 2nd equation **(d)** none of these

11. Find the regression equation from the following data:
If $\sum X = 34$, $\Sigma Y = 56$, $\Sigma XY = 351$, $\Sigma X^2 = 234$, $\Sigma Y^2 = 554$, $N = 6$
Hence estimate Y when X is 10 and estimate also x when Y is 12.
(a) 12 & 13 **(b)** 12.60 & 15.89
(c) 11.76 & 15.30 **(d)** none of these

Property Based Problem

12. If $u = 2x + 5$ and $v = -3y - 6$ and regression coefficient of y on x is 2.4, what is the regression coefficient of v on u?
(a) 3.6 **(b)** 2.4
(c) -3.6 **(d)** -2.4

13. If $4y - 5x = 15$ is the regression line of y on x and the coefficient of correlation between x and y is 0.75, what is the value of the regression coefficient of x on y?
(a) 0.45 **(b)** 0.6
(c) 0.9375 **(d)** none of these

14. If $y = 3x + 4$ is the regression line of y on x and the arithmetic mean of x is -1, what is the arithmetic mean of y?
(a) 1 **(b)** 7
(c) -1 **(d)** none of these

15. If the regression line of y on x and of x on y are given by $2x + 3y = -1$ and $5x + 6y = -1$ then the arithmetic means of x and y are given by
(a) (1, -1) **(b)** (-1, -1)
(c) (-1, 1) **(d)** (2, 3)

Correlation & Regression

16. If the regression line of y on x and that of x on y are given by y = -2x + 3 and 8x = -y + 3 respectively, what is the coefficient of correlation between x and y?

(a) 0.5 **(b)** -0.5

(c) $-1/\sqrt{2}$ **(d)** none of these

17. If the regression coefficient of y on x, the coefficient of correlation between x and y and variance of y are -3/4, $\frac{\sqrt{3}}{2}$ and 4 respectively, what is the variance of x?

(a) $2/\sqrt{3/2}$ **(b)** 4/3

(c) 16/3 **(d)** 4

18. In a bivariate distribution $b_{xy} = 0.49$ and $b_{yx} = 0.25$, then the coefficient of determination is given by:

(a) 0.1313 **(b)** 0.1225

(c) 0.1523 **(d)** None

19. In a bivariate data $b_{xy} = 0.14$ and $b_{yx} = 0.38$, then the coefficient of non-determination is given by:

(a) 0.3425 **(b)** 0.9468

(c) 0.5729 **(d)** None

20. In a bivariate data: σ x = 15, r = 0.60, then the standard error of estimate of X on Y is given by :

(a) 24 **(b)** 14

(c) 12 **(d)** None

21. For a bivariate data, the two lines of regression are 4x - y + 13=0 and 4x - 9y + 17=0. For this data r =

(a) 1/9 **(b)** 1/3

(c) 3/4 **(d)** None

22. If the correlation coefficient between two variables X and Y is 0.5 and the regression coefficient of X on Y is 0.2, then the regression coefficient of Y on X is:

(a) 0.7 **(b)** ±0.5

(c) 1.25 **(d)** None of these.

Mixed Problems

23. Two regression equations are as follows:

Regression equation of x on y: 5x – y = 22

Regression equation of y on x: 64x – 45y = 24

What will be the mean of x and y?

(a) $\overline{x} = 8, \overline{y} = 6$ **(b)** $\overline{x} = 6, \overline{y} = 8$

(c) $\overline{x} = 6, \overline{y} = 6$ **(d)** $\overline{x} = 8, \overline{y} = 8$

24. The two lines of regression become identical when

(a) R = 1 **(b)** r = 0

(c) R=-1 **(d)** (a) or (b)

25. If r = 0.6, then the coefficient of determination is

(a) 0.4 **(b)** 0.36

(c) -0.6 **(d)** 0.64

26. The two regression lines passing through
(a) Represent means **(b)** (a) and (b)
(c) Represent S.Ds **(d)** none of these

27. Out of the following the one which effects the regression coefficient is
(a) Change of origin only
(b) Change of scale and origin both
(c) change of scale only
(d) neither change in origin nor change of scale

28. The regression equation x and y is $3x + 2y = 100$, the value of b_{xy}
(a) $-\frac{2}{3}$ **(b)** $\frac{3}{2}$
(c) $\frac{100}{3}$ **(d)** $\frac{2}{3}$

29. The equation of two lines of regression for 'x' and 'y' are $5x = 22 + y$ and $64x = 24 + 45y$ then the value of regression coefficient of 'y' on 'x' will be _____.
(a) 5 **(b)** $\frac{64}{45}$
(c) $\frac{1}{5}$ **(d)** $\frac{45}{64}$

30. If the correlation coefficient between two variables is zero, then the lines of regression are :
(a) Parallel **(b)** coincide
(c) Perpendicular **(d)** none of these

31. If the value of correlation between x & y is 1, then the value of correlation coefficient between $x - 2$ and $\frac{-y}{2} + 1$ is :
(a) 1 **(b)** $-1/2$
(c) -1 **(d)** ½

32. The equations of two regression lines are $x + y = 6$ and $x + 2y = 10$, then the value of correlation coefficient between x and y is :
(a) $-1/2$ **(b)** $-1/\sqrt{2}$
(c) $+1/2$ **(d)** $+1/\sqrt{2}$

33. Two regression lines are
$16x - 20y + 132 = 0$
$80x - 36y - 428 = 0$
The value of the correlation coefficient is
(a) 0.6 **(b)** 0.54
(c) -0.6 **(d)** 0.45

34. When the correlation coefficient r is equal to + 1, all the points in a scatter diagram would be
(a) On a straight line directed from upper left to lower right
(b) On a straight line directed from lower to upper right
(c) On a straight line
(d) Both (a) and (b)

35. Out of following which is correct?
(a) $b_{yx} = r\frac{\sigma_x}{\sigma_y}$ **(b)** $b_{yx} = \frac{\pi.\sum xy}{\sigma_x}$
(c) $b_{yx} = r\frac{\sigma_y}{\sigma_x}$ **(d)** $b_{yx} = \frac{\pi.\sum xy}{\sigma_y}$

Theory Based Questions

36. Regression analysis is concerned with
- **(a)** Establishing a mathematical relationship between two variables
- **(b)** Measuring the extent of association between two variables
- **(c)** Predicting the value of the dependent variable for a given value of the independent
- **(d)** Both (a) and (c)

37. If there are two variables x and y, then the number of regression equations could be
- **(a)** 1 **(b)** 2
- **(c)** Any number **(d)** 3

38. Since Blood Pressure of a person depends on age, we need consider
- **(a)** The regression equation of Blood Pressure on age
- **(b)** The regression equation of age on Blood Pressure
- **(c)** Both (a) and (b)
- **(d)** Either (a) or (b)

39. The difference between the observed value and the estimated value in regression analysis is known as
- **(a)** Error **(b)** Residue
- **(c)** Deviation **(d)** (a) or (b)

40. The errors in case of regression equations are
- **(a)** Positive **(b)** Negative
- **(c)** Zero **(d)** All these

41. The regression line of y on x is derived by
- **(a)** The minimization of vertical distances in the scatter diagram
- **(b)** The minimization of horizontal distances in the scatter diagram
- **(c)** Both (a) and (b)
- **(d)** (a) or (b)

42. The two lines of regression become identical when
- **(a)** $r = 1$ **(b)** $r = -1$
- **(c)** $r = 0$ **(d)** (a) or (b)

43. What are the limits of the two regression coefficients?
- **(a)** No limit
- **(b)** Must be positive
- **(c)** One positive and the other negative
- **(d)** Product of the regression coefficient must be numerically less than unity

44. The regression coefficients remain unchanged due to a
- **(a)** Shift of origin **(b)** Shift of scale
- **(c)** Both (a) and (b) **(d)** (a) or (b)

45. The method of least squares dictates that we choose a regression line where the sum of the square of deviations of the points from the lie is:
- **(a)** Maximum **(b)** Minimum
- **(c)** Zero **(d)** Positive

46. A relationship where the flow of the data points is best represented by a curve is called:

(a) Linear relationship
(b) Nonlinear relationship
(c) Linear positive
(d) Linear negative

47. What are the limits of the two regression coefficients?

(a) Both positive or both negative.
(b) Must be positive,
(c) No limit.
(d) One positive and the other negative

48. The value we would predict for the dependent variable when the independent variables are all equal to zero is called:

(a) Slope **(b)** Sum of residual
(c) Intercept **(d)** Difficult to tell

Answer Sheet

1.	**c**	**2.**	**a**	**3.**	**a**	**4.**	**a**	**5.**	**a**	**6.**	**a**	**7.**	**b**	**8.**	**b**	**9.**	**c**	**10.**	**c**
11.	**c**	**12.**	**c**	**13.**	**a**	**14.**	**a**	**15.**	**a**	**16.**	**b**	**17.**	**c**	**18.**	**b**	**19.**	**b**	**20.**	**c**
21.	**b**	**22.**	**c**	**23.**	**a**	**24.**	**d**	**25.**	**b**	**26.**	**a**	**27.**	**b**	**28.**	**a**	**29.**	**b**	**30.**	**c**
31.	**c**	**32.**	**b**	**33.**	**a**	**34.**	**b**	**35.**	**c**	**36.**	**d**	**37.**	**b**	**38.**	**a**	**39.**	**d**	**40.**	**d**
41.	**a**	**42.**	**d**	**43.**	**d**	**44.**	**a**	**45.**	**b**	**46.**	**a**	**47.**	**a**	**48.**	**c**				

Probability

Chapter 15

Exercise

Subjective Problems

Problems on Sample Space

1. From a group of 2 boys and 3 girls, two children are selected. Find the sample space associated to this random experiment.

2. A coin is tossed. If it shows head, we draw a ball from a bag consisting of 3 red and 4 black balls; if it shows tail, we throw a die. What is the sample associated to this experiment?

3. An experiment consists of rolling a die and then tossing a coin once if the number on the die is even. If the number on the die is odd, the coin is tossed twice. Write the sample space for this experiment.

4. A coin is tossed. If the result is a head, a die is thrown. If the die shows up an even number, the die is thrown again. What is the sample space for this experiment?

Single Event

5. Find the probability of getting a head in a toss of an unbiased coin.

6. Ina simultaneous toss of two coins, find the probability of getting:
(i) 2 heads (ii) exactly one head (iii) exactly 2 tails
(iv) exactly one tail (v) no tails.

7. Three coins are tossed once. Find the probability of getting
(i) all heads (ii) at least two heads (iii) at most two head
(iv) no head (v) exactly one tail (vi) exactly 2 tails
(vii) a head on first coin

8. One card is drawn from a pack of 52 cards, each of the 52 cards being equally likely to be drawn. Find the probability that the card drawn is:
(i) an ace,
(ii) red,
(iii) either red or king,
(iv) red and a king.

9. An urn contains 9 red, 7 white and 4 black balls. If two balls are drawn at random, find the probability that:
(i) both the balls are red, (ii) one ball is white
(iii) the balls are of the same color (iv) one is white and other red.

10. A box contains 10 red marbles, 20 blue marbles and 30 green marbles. 5 marbles are drawn from the box, what is the probability that **(i)** all will be blue?

11. A box contains 10 bulbs, of which just three are defective. If a random sample of five bulbs is drawn, find the probabilities that the sample contains:
(i) exactly one defective bulb,
(ii) exactly two defective bulbs,
(iii)no defective bulbs.

MCQ'S

12. Two balls are drawn from a bag containing 5 white and 7 black balls at random. What is the probability that they would be of different colors?
(a) 35/66 (b) 30/66
(c) 12/66 (d) None of these

13. What is the chance of throwing at least 7 in a single cast with 2 dice?
(a) 5/12 (b) 7/12
(c) 1/4 (d) 17/36

14. If two unbiased dice are rolled together, what is the probability of getting no difference of points?
(a) 1/2 (b) 1/3
(c) 1/5 (d) 1/6

15. There are 10 balls numbered from 1 to 10 in a box. If one of them is selected at random, what is the probability that the number printed on the ball would be an odd number greater that 4?
(a) 0.50 (b) 0.40
(c) 0.60 (d) 0.30

16. Following are the wages of 8 workers in rupees:
50, 62, 40, 70, 45, 56, 32, 45
If one of the workers is selected at random, what is the probability that his wage would be lower than the average wage?
(a) 0.625 (b) 0.500
(c) 0.375 (d) 0.450

17. It is given that a family of 2 children has a girl, what is the probability that the other child is also a girl?
(a) 0.50 (b) 0.75
(c) 1/3 (d) 2/3

18. X and Y stand in a line with 6 other people. What is the probability that there are 3 persons between them?
(a) 1/5 (b) 1/6
(c) 1/7 (d) 1/3

19. Four digits 1, 2, 4 and 6 are selected at random to form a four-digit number. What is the probability that the number so formed, would be divisible by 4?
(a) 1/2 (b) 1/5
(c) 1/4 (d) 1/3

20. Find the probability that a leap year, selected at random, will contain 53 Sundays.
(a) 1/2 (b) 1/5
(c) 1/4 (d) 2/7

21. A bag contains 12 balls which are numbered from 1 to 12. If a ball is selected at random, what is the probability that the number of the ball will be a multiple of 5 or 6 ?
(a) 0.30 (b) 0.25
(c) 0.20 (d) 1/3

22. If two unbiased dice are rolled, what is the probability of getting points neither 6 nor 9?
(a) 0.25 (b) 0.50
(c) .075 (d) 0.80

23. A number is selected at random from the first 1000 natural numbers. What is the probability that the number so selected would be a multiple of 7 or 11?
(a) 0.25 (b) 0.32
(c) 0.22 (d) 0.33

24. Probability that a truck stopped at a roadblock will have faulty brakes or badly worn tires are 0.23 and 0.24 respectively. Also, the probability is .38 that a truck stopped at a roadblock will have faulty brakes and or badly working tires. What is the probability that a truck stopped at the roadblock will have faulty brakes as well as badly worn tires?
(a) 0.45 (b) 0.39
(c) 0.62 (d) None of These

25. One number is chosen from numbers 1 to 200. Find the probability that it is divisible by 4 or 6?
(a) 67/200 (b) 89/200
(c) 56/200 (d) None of These

26. A drawer contains 50 bolts and 150 nuts. Half of the bolts and half of the nuts are rusted. If one item is chosen at random, what is the probability that it is rusted or a bolt?
(a) 5/8 (b) 1/8
(c) 6/8 (d) None of These

27. Two dice are thrown together. What is the probability that the sum of the numbers on the two faces is neither divisible by 3 nor by 4?
(a) 5/10 (b) 4/9
(c) 4/7 (d) None of These

28. Two cards are drawn from a pack of 52 cards. What is the probability that either both are red or both are kings?
(a) 55/120 (b) 55/221
(c) 45/78 (d) None of These

29. The probability that a person will get an electric contract is $\frac{2}{5}$ and the probability that he will not get plumbing contract is $\frac{4}{7}$. If the probability of getting at least one contract is $\frac{2}{3}$ what is the probability that he will get both?
(a) 19/105 (b) 17/105
(c) 21/105 (d) None of These

30. The probability that a person visiting a dentist will have his teeth cleaned is 0.44, the probability that he will have a cavity filled is 0.24. The probability that he will have his teeth cleaned or a cavity filled is 0.60. What is the probability that a person visiting a dentist will have his teeth cleaned and cavity filled?
(a) 0.06 (b) 0.08
(c) 0.8 (d) None of These

31. Probability that Hameed passes in mathematics is $\frac{2}{3}$ and the probability that he passes in English is $\frac{4}{9}$. If the probability of passing both courses is $\frac{1}{4}$ what is the probability that Hameed will pass in at least one of these subjects?
(a) 31/36 (b) 17/36
(c) 6/15 (d) None of These

32. The probability that an Accountant's job applicant has a B. Com. Degree is 0.85, that he is a CA is 0.30 and that he is both B. Com. and CA is 0.25 out of 500 applicants how many would be B. Com. or CA?
(a) 450 (b) 535
(c) 615 (d) None of These

33. A card is drawn from a deck of 52 cards. Find the probability of getting a king or a heart or a red card.
(a) 5/13 (b) 7/13
(c) 6/15 (d) None of These

Where Question Demands At least One Event to Occur for *INDEPENDENT EVENTS*

34. A problem in probability was given to three CA students A, B and C whose chances of solving it are 1/3, 1/5 and 1/2 respectively. What is the probability that the problem would be solved?
(a) 4/15 (b) 7/8
(c) 8/15 (d) 11/15

35. A problem in mathematics is given to 3 students whose chances of solving it are $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$. What is the probability that the problem is solved?
(a) 3/5 (b) 3/4
(c) 5/6 (d) None of These

36. A can solve 90% of the problems given in a book and B can solve 70%. What is the probability that at least one of them will solve the problem, selected at random from the book?
(a) 0.97 (b) 0.89
(c) 0.56 (d) None of These

37. A machine operates if all of its three components function. The probability that the first component fails during the year is 0.14, the second component fails is 0.10 and the third component fails is 0.05. What is the probability that the machine will fail during the year?
(a) 0.2647 (b) 0.8954
(c) 0.5623 (d) None of These

38. A bag contains 5 white, 7 red and 8 black balls. Four balls are drawn one by one with replacement, what is the probability that at least one is white?
(a) $1-(\frac{3}{4})^5$ (b) $1-(\frac{3}{4})^4$
(c) $1-(\frac{5}{4})^4$ (d) none of These

More Than One Event

39. A bag contains 8 red and 5 white balls. Two successive draws of 3 balls are made without replacement. The probability that the first draw will produce 3 white balls and the second 3 red balls is
(a) 5/223 (b) 6/257
(c) 7/429 (d) 3/548

40. A police-man fires four bullets on a dacoit. The probability that the dacoit will be killed by one bullet is 0.6. What is the probability that the dacoit is still alive?
(a) 0.0256 (b) 0.8954
(c) 0.5623 (d) None of These

41. A bag contains 10 white and 15 black balls. Two balls are drawn in succession without replacement. What is the probability that first is white and second is black?
(a) 5/7 (b) 1/4
(c) 7/9 (d) 3/5

42. Find the probability of drawing a diamond card in each of the two consecutive draws from a well shuffled pack of cards, if the card drawn is not replaced after the first draw.
(a) 5/17 (b) 1/16
(c) 1/17 (d) 3/17

43. A bag contains 5 white, 7 red and 8 black balls. If four balls are drawn one by one without replacement, find the probability of getting all white balls.
(a) 5/969 (b) 6/969
(c) 7/969 (d) 1/969

44. A bag contains 19 tickets, numbered from 1 to 19. A ticket is drawn and then another ticket is drawn without replacement. Find the probability that both tickets will show even numbers.
(a) 5/17 (b) 1/16
(c) 4/19 (d) 3/17

45. A box contains 5 white and 7 black balls. Two successive drawn of 3 balls are made

(i) With replacement **(ii)** without replacement.

The probability that the first draw would produce white balls and the second draw would produce black balls are respectively
(a) 6/321 and 3/926 (b) 1/20 and 1/30
(c) 35/144 and 35/108 (d) 7/968 and 5/264

Total Probability

46. There are two urns. The first urn contains 3 red and 5 white balls whereas the second urn contains 4 red and 6 white balls. A ball is taken at random from the first urn and is transferred to the second urn. Now another ball is selected at random from the second arm. The probability that the second ball would be red is
(a) 7/20 (b) 35/88
(c) 17/52 (d) 3/20

47. There are three boxes with the following composition:
Box I: 5 Red + 7 White + 6 Blue balls
Box II: 4 Red + 8 White + 6 Blue balls
Box III: 3 Red + 4 White + 2 Blue balls
If one ball is drawn at random, then what is the probability that they would be of same colour?
(a) 89/729 (b) 97/729
(c) 82/729 (d) 23/32

48. There are two boxes containing 5 white and 6 blue balls and 3 white and 7 blue balls respectively. If one of the the boxes is selected at random and a ball is drawn from it, then the probability that the ball is blue is
(a) 115/227 (b) 83/250
(c) 137/220 (d) 127/250

49. A packet of 10 electronic components is known to include 2 defectives. If a sample of 4 components is selected at random from the packet, what is the probability that the sample does not contain more than 1 defective?
(a) 1/3 (b) 2/3
(c) 13/15 (d) 3/15

50. To test the quality of electric bulbs produced in a factory, two bulbs are randomly selected from a large sample without replacement. If either bulb is defective, the entire lot is rejected. Suppose a sample of 200 bulbs contains 5 defective bulbs. Find the probability that the sample will be rejected.
(a) 197/3980 (b) 125/3980
(c) 189/3980 (d) None of These

51. Tom speaks truth in 30 percent cases and Harry speaks truth in 25 percent cases. What is the probability that they would contradict each other?
(a) 0.325 (b) 0.400
(c) 0.925 (d) 0.075

52. There are three persons aged 60, 65 and 70 years old. The survival probabilities for these three persons for another 5 years are 0.7, 0.4 and 0.2 respectively. What is the probability that at least two of them would survive another five years?
(a) 0.425 (b) 0.456
(c) 0.392 (d) 0.388

Conditional Probability

53. Given that for two events A and B, P (A) = 3/5, P (B) = 2/3 and P (A $\cup$ B) = 3/4, what is P (A/B)?
(a) 0.655 (b) 13/60
(c) 31/60 (d) 0.775

54. Given that P(a) = 1/2, P (B) = 1/3, P (A $\cap$ B) = 1/4, what is P (A'/B')
(a) 1/2 (b) 7/8
(c) 5/8 (d) 2/3

55. If P (a) = p and P (B) = q, then
(a) P(A/B) $\leq$ p/q (b) P(A/B) $\leq$ p/q
(c) P(A/B) $\leq$ q/p (d) None of these

56. If P(A) = 2/3, P (B) = 3/4, P (A/B) = 2/3, then what is P (B /A)?
(a) 1/3 (b) 2/3
(c) 3/4 (d) ½

57. For a group of students, 30 %, 40% and 50% failed in Physics, Chemistry and at least one of the two subjects respectively. If an examinee is selected at random, what is the probability that he passed in Physics if it is known that he failed in Chemistry?
(a) 1/2 (b) 1/3
(c) 1/4 (d) 1/6

58. In a school, there are 1000 students, out of which 430 are girls. It is known that out of 430, 10% of the girls study in class XII. What is the probability that a student chosen randomly studies in class XII given that the chosen student is a girl?
(a) 1/10 (b) 1/13
(c) 1/5 (d) 1/6

59. Ten cards numbered 1 through 10 are placed in a box, mixed up thoroughly and then one card is drawn randomly. If it is known that the number on the drawn card is more than 3, what is the probability that it is an even number?
(a) 3/10 (b) 6/13
(c) 4/7 (d) 1/6

60. Assume that each child born is equally likely to be a boy or a girl. If a family has two children, what is the conditional probability that both are girls given that **(i)** the youngest is a girl, **(ii)** at least one is a girl?
(a) 1/2 and 1/3 (b) 2/5 and 1/3
(c) 1/2 and 2/3 (d) None of These

61. In a class 40 % students read Mathematics, 25 % Biology and 15 % both Mathematics and Biology. One student is select at random. The probability that he reads Mathematics if it is known that he reads Biology is
(a) 2/5 (b) 3/5
(c) 4/5 (d) none

62. In a class 40 % students read Mathematics, 25 % Biology and 15 % both Mathematics and Biology. One student is select at random. The probability that he reads Biology if he reads Mathematics
(a) 7/8 (b) 1/8
(c) 3/8 (d) none

63. Two coins are tossed simultaneously. What is the probability that the second coin would show a tail given that the first coin has shown a head?
(a) 0.50 (b) 0.25
(c) 0.75 (d) 0.125

Expected Value

64. If a random variable x assumes the values 0, 1 and 2 with probabilities 0.30, 0.50 and 0.20, then its expected value is
(a) 1.50 (b) 3
(c) 0.90 (d) 1

65. A packet of 10 electronic components is known to include 3 defectives. If 4 components are selected from the packet at random, what is the expected value of the number of defective?
(a) 1.20 (b) 1.21
(c) 1.69 (d) 1.72

66. The probability that there is at least one error in an account statement prepared by 3 persons A, B and C are 0.2, 0.3 and 0.1 respectively. If A, B and C prepare 60, 70 and 90 such statements, then the expected number of correct statements
(a) 170 (b) 176
(c) 178 (d) 180

67. A bag contains 6 white and 4 red balls. If a person draws 2 balls and receives Rs. 10 and Rs. 20 for a white and red balls respectively, then his expected amount is
(a) Rs. 25 (b) Rs. 26
(c) Rs. 29 (d) Rs. 28

68. The probability of winning of a person is 6/11 and at a result he gets Rs. 77/-. The expectation of this person is
(a) Rs. 35/- (b) ' 42/-
(c) ' 58/- (d) none

69. If two random variables x and y are related as y = -3x + 4 and standard deviation of x is 2, then the standard deviation of y is
(a) – 6 (b) 6
(c) 18 (d) 3.50

70. If 2x + 3y + 4 = 0 and v(x) = 6 then v (y) is
(a) 8/3 (b) 9
(c) – 9 (d) 6

71. The probability distribution of a random variable x is given below:

X:	1	2	4	5	6
P:	0.15	0.25	0.20	0.30	0.10

What is the standard deviation of x?
(a) 1.49 (b) 1.56
(c) 1.69 (d) 1.72

72. The probability distribution of a random variable is as follows:

X:	1	2	4	6	8
P:	k	2k	3k	3k	k

The variance of x is
(a) 2.1 (b) 4.41
(c) 2.32 (d) 2.47

Odds In Favor /Against

73. The odds in favor of one student passing a test are 3:7.The odds against another student passing at are 3:5.The probability that both pass is
(a) $\frac{7}{16}$ (b) $\frac{21}{80}$
(c) $\frac{9}{80}$ (d) $\frac{3}{16}$

74. The odds in favor of one student passing a test are 3:7.The odds against another student passing at are 3:5. The probability that both fail is
(a) $\frac{7}{16}$ (b) $\frac{21}{80}$
(c) $\frac{9}{80}$ (d) $\frac{3}{16}$

Theory Based Questions

75. Initially, probability was a branch of
(a) Physics (b) Statistics
(c) Mathematics (d) Economics.

76. Two broad divisions of probability are
(a) Subjective probability and objective probability
(b) Deductive probability and non-deductive probability
(c) Statistical probability and Mathematical probability
(d) None of these.

77. Subjective probability may be used in
(a) Mathematics (b) Statistics
(c) Management (d) Accountancy.

78. An experiment is known to be random if the results of the experiment
(a) Can not be predicted (b) Can be predicted
(c) Can be split into further experiments (d) Can be selected at random.

79. An event that can be split into further events is known as
(a) Complex event (b) Mixed event
(c) Simple event (d) Composite event.

80. Which of the following pairs of events are mutually exclusive?
(a) A : The student reads in a school. B : He studies Philosophy.
(b) A : Raju was born in India. B : He is a fine Engineer.
(c) A : Ruma is 16 years old. B : She is a good singer.
(d) A : Peter is under 15 years of age. B : Peter is a voter of Kolkata.

81. If P (A) = P(B), then
(a) A and B are the same events (b) A and B must be same events
(c) A and B may be different events (d) A and B are mutually exclusive events.

82. If P(A H B) = 0, then the two events A and B are
(a) Mutually exclusive (b) Exhaustive
(c) Equally likely (d) Independent.

83. If for two events A and B, P(AUB) = 1, then A and B are
(a) Mutually exclusive events (b) Equally likely events
(c) Exhaustive events (d) Dependent events.

84. If an unbiased coin is tossed once, then the two events Head and Tail are
(a) Mutually exclusive (b) Exhaustive
(c) Equally likely (d) All these (a), (b) and (c).

85. If P(A) = P(B), then the two events A and B are
(a) Independent (b) Dependent
(c) Equally likely (d) Both (a) and (c).

86. If for two events A and B, $P(A \cap B) \neq P$ (a) × P(B), then the two events A and B are
(a) Independent (b) Dependent
(c) Not equally likely (d) Not exhaustive.

87. If P(A/B) = P(A), then
(a) A is independent of B (b) B is independent of A
(c) B is dependent of A (d) Both (a) and (b).

88. If two events A and B are independent, then
(a) A and the complement of B are independent
(b) B and the complement of A are independent
(c) Complements of A and B are independent
(d) All of these (a), (b) and (c).

89. If two events A and B are independent, then
(a) They can be mutually exclusive (b) They can not be mutually exclusive
(c) They can not be exhaustive (d) Both (b) and (c).

90. If two events A and B are mutually exclusive, then
(a) They are always independent (b) They may be independent
(c) They can not be independent (d) They can not be equally likely.

91. If a coin is tossed twice, then the events 'occurrence of one head', 'occurrence of 2 heads' and 'occurrence of no head' are
(a) Independent (b) Equally likely
(c) Not equally likely (d) Both (a) and (b).

92. Probability mass function is always
(a) 0 (b) greater than 0
(c) greater than equal to 0 (d) less than 0

93. The sum of probability mass function is equal to
(a) -1 (b) 0
(c) 1 (d) none

94. When X is a continues function f(x)is called
(a) probability mass function (b) probability density function
(c) both (d) none

95. Which of the following set of function define a probability space on S = $\{a_1\ a_2,\ a_3\}$
(a) $P(a_1) = \frac{1}{3}$, $P(a_2) = \frac{1}{2}$, $P(a_3) = \frac{1}{4}$ (b) $P(a_1) = \frac{1}{3}$ $P(a_2) = \frac{1}{6}$, $P(a_3) = \frac{1}{2}$
(c) $P(a_1) = P(a_2) = \frac{2}{3}$, $P(a_3) = \frac{1}{4}$ (d) None

96. If p $(a_1) = 0$, P $(a_2)\frac{1}{3}$, $P(a_3) = \frac{2}{3}$ then S = $\{a_1$ a, a$\}$ is a probability space,
(a) true (b) false
(c) both (d) none

97. If two events are independent then
(a) P(B/A) = P(AB) P(A) (b) P(B/A) = P(AB) P(B)
(c) P(B/A) = P(B) (d) P(B/A) P(A)

98. In formula P(B/A), P (a) is
(a) greater than zero (b) less than zero
(c) equal to zero (d) greater than equal to zero

99. Two events A and B are mutually exclusive means they are
(a) not disjoint (b) disjoint
(c) equally likely (d) none

100. For a event A which is certain, P (a) is equal to
(a) 1 (b) 0
(c) - 1 (d) none

101. When none of the outcomes is favourable to the event then the event is said to be
(a) certain (b) sample
(c) impossible (d) none

102. All possible outcomes of a random experiment forms the
(a) events (b) sample space
(c) both (d) none

103. If one of outcomes cannot be expected to occur in preference to the other in an experiment the events are
(a) simple events (b) compound events
(c) favourable events (d) equally likely events

104. If two events cannot occur simultaneously in the same trial then they are
(a) mutually exclusive events (b) simple events
(c) favourable events (d) none

105. When the number of cases favourable to the event A is none then P(A) is equal to
(a) 1 (b) 0
(c) $\frac{1}{2}$ (d) none

106. If events A and B are independent then
(a) A^C and B^C are dependent (b) A^C and B are dependent
(c) A and B^C are dependent (d) A^C and B^C are also independent

Answer Sheet

1.		2.		3.		4.		5.		6.		7.		8.		9.		10.	
11.		12.	A	13.	B	14.	D	15.	D	16.	B	17.	C	18.	C	19.	D	20.	D
21.	D	22.	C	23.	C	24.	B	25.	A	26.	A	27.	B	28.	B	29.	B	30.	B
31.	A	32.	A	33.	B	34.	D	35.	B	36.	A	37.	A	38.	B	39.	C	40.	A
41.	B	42.	C	43.	D	44.	C	45.	D	46.	B	47.	A	48.	C	49.	C	50.	A
51.	B	52.	D	53.	D	54.	C	55.	A	56.	C	57.	A	58.	A	59.	C	60.	A
61.	B	62.	C	63.	A	64.	C	65.	A	66.	C	67.	D	68.	B	69.	B	70.	A
71.	C	72.	B	73.	D	74.	B	75.	C	76.	A	77.	C	78.	D	79.	D	80.	D
81.	C	82.	A	83.	C	84.	D	85.	C	86.	B	87.	D	88.	D	89.	B	90.	C
91.	C	92.	C	93.	C	94.	B	95.	B	96.	A	97.	C	98.	A	99.	B	100	A
101	C	102	B	103	D	104	A	105	B	106	D								

Theoretical Distributions

Chapter **16**

EXERCISE

PRACTICAL QUESTIONS

BINOMIAL DISTRIBUTION

1. If x is binomial variate with parameter 15 and 1/3, what is the value of mode of the distribution?
(a) 5 and 6 **(c)** 5.50
(b) 5 **(d)** 6

2. What is the standard deviation of the number of recoveries among 48 patients when the probability of recovering is 0.75?
(a) 36 **(c)** 9
(b) 81 **(d)** 3

3. What is the number of trials of a binomial distribution having mean and SD as 3 and 1.5 respectively?
(a) 2 **(c)** 8
(b) 4 **(d)** 12

4. What is the probability of getting 3 heads if 6 unbiased coins are tossed simultaneously?
(a) 0.50 **(c)** 0.3125
(b) 0.25 **(d)** 0.6875

5. What is the probability of making 3 correct guesses in 5 True- False answer type questions?
(a) 0.3125 **(c)** 0.6875
(b) 0.5676 **(d)** 0.4325

6. X is binomial variable with $n = 20$. What is the mean of X if it is known that x is symmetric?
(a) 5 **(c)** 2
(b) 10 **(d)** 8

7. If $X \sim B(n - p)$, what would be greatest value of the variance of x when $n = 16$?
(a) 2 **(c)** 8
(b) 4 **(d)** $\sqrt{5}$

8. If the overall percentage of success in an exam is 60, what is the probability that out of a group of 4 students, at least one has passed?
(a) 0.6525 **(c)** 0.8704
(b) 0.9744 **(d)** 0.0256

9. If a random variable X follows binomial with mean as 5 and satisfying the condition $10\ P(X = 0) = P(X = 1)$, what is the value of $P(x \geq 1/x > 0)$?
(a) 0.67 **(c)** 0.99
(b) 0.56 **(d)** 0.82

10. X is a binomial variable such that $2\ P(X = 2) = P(X = 3)$ and mean of X is known to be 10/3. What would be the probability that X assumes at most the value 2?
(a) 16/81 **(c)** 47/243
(b) 17/81 **(d)** 46/243

POISSON DISTRIBUTION

11. If a mean of a Poisson variable X is 1, what is P(X = takes the value at least 1)?
(a)0.456 **(c)** 0.632
(b)0.821 **(d)** 0.254

12. If 1 percent of an airline's flight suffer a minor equipment failure in an aircraft, what is the probability that there will be exactly two such failures in the next 100 such flights?
(a)0.50 **(c)** 0.265
(b)0.184 **(d)** 0.256

13. If for a Poisson variable X, $f(2) = 3\, f(4)$, what is the variance of X?
(a)2 **(c)** $\sqrt{2}$
(b)4 **(d)** 3

14. If the standard deviation of a Poisson variate X is 2, what is $P(1.5 < X < 2.9)$?
(a)0.231 **(c)** 0.15
(b)0.158 **(d)** 0.144

15. X is a Poisson variate satisfying the following condition $9\, P(X = 4) + 90\, P(X = 6) = P(X = 2)$. What is the value of $P(X \leq 1)$?
(a)0.5655 **(c)** 0.7358
(b)0.6559 **(d)** 0.8201

16. A random variable x follows Poisson distribution and its coefficient of variation is 50. What is the value of $P\ (x > 1/\ x > 0)$?
(a)0.1876 **(c)** 0.9254
(b)0.2341 **(d)** 0.8756

17. If $X \sim P\ (m)$ and its coefficient of variation is 50, what is the probability that X would assume only non-zero values?
(a)0.018 **(c)** 0.989
(b)0.982 **(d)** 0.976

18. If 1.5 per cent of items produced by a manufacturing unit are known to be defective, what is the probability that a sample of 200 items would contain no defective item?
(a)0.05 **(c)** 0.20
(b)0.15 **(d)** 0.22

19. For a Poisson variate X, $P(X = 1) = P\ (X = 2)$. What is the mean of X?
(a)1.00 **(c)** 2.00
(b)1.50 **(d)** 2.50

20. If it is known that the probability of a missile hitting a target is 1/8, what is the probability that out missiles fired, at least 2 will hit the target?
(a) 0.4258 **(c)** 0.5238
(b) 0.3968 **(d)** 0.3611

Normal Distribution

21. What is the coefficient of variation of x, characterized by the following probability density function:
$f(x) = \frac{1}{4\sqrt{2\pi}} e^{-(x-10)^2/32}$ for $-\propto < \ x \ < \propto$
(a)50 **(c)** 40
(b)60 **(d)** 30

22. What is the quartile of X having the following probability density function? $F(x) = \frac{1}{\sqrt{72\pi}} e^{-(x-10)^2/72}$ for $-\propto < x < \propto$

(a) 4 **(c)** 5.95
(b) 5 **(d)** 6.75

23. If the two quartiles of N (μ, σ^2) are 14.6 and 25.4 respectively, what is the standard deviation of the distribution?

(a) 9 **(c)** 10
(b) 6 **(d)** 8

24. If the mean deviation of a normal variable is 16, what is its quartile deviation?

(a) 10.00 **(c)** 15.00
(b) 13.50 **(d)** 12.05

25. If the points of inflexion of a normal curve are 40 and 60 respectively, then its mean deviation is

(a) 40 **(c)** 50
(b) 45 **(d)** 60

26. If the quartile deviation of a normal curve is 4.05, then its mean deviation is

(a) 5.26 **(c)** 4.24
(b) 6.24 **(d)** 4.80

27. If the Ist quartile and mean deviation about median of a normal distribution are 13.25 and 8 respectively, then the mode of the distribution is

(a) 20 **(c)** 15
(b) 10 **(d)** 12

28. If the area of standard normal curve between z = 0 to z = 1 is 0.3413, then the value of φ (1) is

(a) 0.5000 **(c)** -0.5000
(b) 0.8413 **(d)** 1

29. If X and Y are 2 independent normal variables with mean as 10 and 12 and SD as 3 and $, then (X+Y) is normally distributed with

(a) Mean = 22 and SD = 7 **(c)** Mean = 22 and SD = 5
(b) Mean = 22 and SD = 25 **(d)** Mean = 22 and SD = 49

Theory Based Questions

30. A theoretical probability distribution

(a) Does not exist **(b)** Exists only in theory
(c) Exists in real life **(d)** Both (b) and (c)

31. Probability distribution may be

(a) Discrete **(b)** Continuous
(c) Infinite **(d)** (a) or (b)

32. An important discrete probability distribution is

(a) Poisson distribution **(b)** Normal distribution
(c) Cauchy distribution **(d)** log normal distribution

33. An important continuous probability distribution

(a) Binomial distribution **(b)** Poisson distribution
(c) Geometric distribution **(d)** Normal distribution

34. Parameter is a characteristic of
(a) Population **(b)** Sample
(c) Probability distribution **(d)** Both (a) and (b)

35. An example of a parameter is
(a) Sample mean **(b)** Population mean
(c) Binomial distribution **(d)** Sample size

36. A trial is an attempt to
(a) Make something possible
(b) Make something impossible
(c) Prosecute an offender in a court of law
(d) Produce an outcome which is neither certain nor impossible

37. The important characteristic(s) of Bernoulli trials
(a) Each trial is associated with just two possible outcomes
(b) Trials are independent
(c) Trials are infinite
(d) Both (a) and (b)

38. The probability mass function of binomial distribution is given by
(a) $f(x) = p^x q^{n-x}$ **(b)** $f(x) = {}^nc_x p^x q^{n-x}$
(c) $f(x) = {}^nc_x q^x p^{n-x}$ **(d)** $f(x0 = {}^nc_x p^{n-x} q^x$

39. If x is a binomial variable with parameters n and p, then x can assume
(a) Any value between 0 and n
(b) Any value between 0 and n, both inclusive
(c) Any whole number between 0 and n, both inclusive
(d) Any number between 0 and infinity

40. A binomial distribution is
(a) Never symmetrical **(b)** Never positively skewed
(c) never negatively skewed **(d)** Symmetrical when p =0.5

41. The mean of a binomial distribution with parameter n and p is
(a) n(1 – p) **(b)** np(1 – p)
(c) np **(d)** $\sqrt{np(1-p)}$

42. The variance of a binomial distribution with parameters n and p is
(a) np^2 (1 – p) **(b)** $\sqrt{np(1-p)}$
(c) nq(1 – q) **(d)** n^2p^2 $(1 - p)^2$

43. An example of a bi-parametric discrete probability distribution is
(a) Binomial distribution **(b)** Poisson distribution
(c) Normal distribution **(d)** Both (a) and (b)

44. For a binomial distribution, mean and mode
(a) Are never equal **(b)** Are always equal
(c) Are equal when q = 0.50 **(d)** Do not always exist

45. The mean of binomial distribution is
(a) Always more than its variance
(b) Always equal to its variance
(c) Always less than its variance
(d) Always equal to its standard deviation

46. For a binomial distribution, there may be
(a) One mode **(b)** Two modes
(c) **(a)** **(d)** (a) or (b)

47. The maximum value of the variance of a binomial distribution with parameters n and p is
(a) n/2 **(b)** n/4
(c) np(1 – p) **(d)** 2n

48. The method usually applied for fitting a binomial distribution is known as
(a) Method of least square
(b) Method of moments
(c) Method of probability distribution
(d) Method of deviation

49. Which one is uniparametric distribution?
(a) Binomial **(b)** Poisson
(c) Normal **(d)** Hyper geometric

50. For a Poisson distribution
(a) Mean and standard deviation are equal
(b) Mean and variance are equal
(c) Standard deviation and variance are equal
(d) Both (a) and (b)

51. Poisson distribution may be
(a) Unimodal **(b)** Bimodal
(c) Multi-modal **(d)** (a) or (b)

52. Poisson distribution is
(a) Always symmetric **(b)** Always positively skewed
(c) Always negatively skewed **(d)** symmetric only when m = 2

53. A binomial distribution with parameters n and p can be approximated by a Poisson distribution with parameter m = np is
(a) $n \to \infty$ **(b)** $p \to \infty$
(c) $n \to \infty$ *and* $p \to 0$ **(d)** $n \to \infty$ *and* $p \to 0$ so that np remains finite

54. For Poisson fitting to an observed frequency distribution
(a) We equate the Poisson parameter to the mean of the frequency distribution
(b) We equate the Poisson parameter to the median of the frequency distribution
(c) We equate the Poisson parameter to the mode of the frequency distribution
(d) None of these

55. The most important continuous probability distribution is known as
(a) Binomial distribution **(b)** Normal distribution
(c) Chi-square distribution **(d)** Sampling distribution

56. The probability density function of a normal variable x is given by
(a) $f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}(\frac{x-\mu}{\sigma})^2}$ for $-\infty < x < \infty$
(b) $f(x) = f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-(x-\mu)^2}{2\sigma}}$ for $0 < x < \infty$
(c) $f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$ for $-\infty < x < \infty$
(d) None of these

57. The total area of the normal curve is
(a) One **(b)** 50 per cent
(c) 0.50 **(d)** Any value between 0 and 1

58. The normal curve is
(a) Bell-shaped **(b)** U-shaped
(c) J-shaped **(d)** Inverted J-shaped

59. The normal curve is
(a) Positively skewed **(b)** negatively skewed
(c) Symmetrical **(d)** All these

60. Area of the normal curve
(a) Between $-\propto to\ \mu$ is 0.50 **(b)** Between $\mu\ to\ \propto$ is 0.50
(c) Between $-\propto to\ \propto$ is 0.50 **(d)** Both (a) and (b)

61. The cumulative distribution function of a random variable X is given by
(a) $F(x) = P(X \leq x)$ **(b)** $F(X) = P(X \leq x)$
(c) $F(x) = P(X \geq x)$ **(d)** $F(x) = P(X = x)$

62. The mean and mode of a normal distribution
(a) May be equal **(b)** May be different
(c) Are always equal **(d)** (a) or (b)

63. The mean deviation about median of a standard normal variate is
(a) 0.675 σ **(b)** 0.675
(c) 0.80 σ **(d)** 0.80

64. The quartile deviation of a normal distribution with mean 10 and SD 4 is
(a) 0.675 **(b)** 67.50
(c) 2.70 **(d)** 3.20

65. For a standard normal distribution, the points of inflexion are given by
(a) $\mu - \sigma$ and $\mu + \sigma$ **(b)** $-\sigma$ and σ
(c) -1 and 1 **(d)** 0 and 1

66. The symbol φ **(a)** indicates the area of the standard normal curve between
(a) 0 to a **(b)** a to ∞
(c) $-\propto to\ a$ **(d)** $-\propto to\ \propto$

67. The interval $(\mu - 3\sigma, \mu + 3\sigma)$ covers
(a) 95% area of a normal distribution
(b) 96% area of a normal distribution
(c) 99% area of a normal distribution
(d) All but 0.27% area of a normal distribution

68. Number of misprints per page of a hick book follows
(a) Normal distribution **(b)** Poisson distribution
(c) Binomial distribution **(d)** Standard normal distribution

69. The results of ODI matches between India and Pakistan follows
(a) Binomial distribution **(b)** Poisson distribution
(c) Normal distribution **(d)** (b) or (c)

70. The wages of workers of a factory follow
(a) Binomial distribution
(b) Poisson distribution
(c) Normal distribution
(d) (Chi-square distribution

71. If X and Y are two independent normal random variables, then the distribution of (X + Y) is
(a) Normal
(b) Standard normal
(c) T
(d) Chi-square

Answer Sheet

1.	b	2.	d	3.	d	4.	c	5.	a	6.	b	7.	b	8.	a	9.	c	10.	b
11.	c	12.	b	13.	a	14.	d	15.	c	16.	c	17.	b	18.	a	19.	c	20.	d
21.	c	22.	c	23.	d	24.	b	25.	a	26.	d	27.	a	28.	b	29.	c	30.	d
31.	d	32.	a	33.	d	34.	a	35.	b	36.	d	37.	d	38.	b	39.	c	40.	d
41.	c	42.	c	43.	a	44.	c	45.	a	46.	c	47.	b	48.	b	49.	b	50.	b
51.	d	52.	b	53.	d	54.	a	55.	b	56.	a	57.	a	58.	a	59.	c	60.	d
61.	a	62.	c	63.	d	64.	c	65.	c	66.	c	67.	d	68.	b	69.	a	70.	c
71.	a																		

Summary Notes

Index Numbers

Chapter 17

EXERCISE

PRACTICAL QUESTIONS

Basic Problems

1. If the index number of prices at a place in 1994 is 250 with 1984 as base year, then the prices have increased on average by
(a)250% (b) 350%
(c)150% (d) none of these

2. If the prices of all commodities in a place have increased 125 times in comparison to the base period prices, then the index number of prices for the place is now
(a)100 (b) 225
(c)125 (d) none of these

3. If now the prices of all the commodities in a place have been decreased by 85% over the base period prices, then the index number of prices for the place is now (index number of prices of base period = 100)
(a)100 (b) 65
(c)135 (d) none of these

Construct Index No

4. If the prices of all commodities in a place have decreased 35% over the base period prices, then the index number of prices of that place is now
(a)35 (b) 65
(c)135 (d) none of these

5. If the prices of all commodities in a place have increased 1.25 times in comparison to the base period, the index number of prices of that place now is
(a)125 (b) 225
(c)150 (d) none of these

6. If $\sum p_o q_o = 1360, \sum p_n q_o = 1900, \sum p_o q_n = 1344, \sum p_n q_n = 1880$ then the Laspeyre's index number is
(a)0.71 (b) 1.75
(c)1.39 (d) none of these

7. If the ratio between Laspeyre's index number and Paasche's index number is 28: 27. Then the missing figure in the following table P is:

Commodity	Base year		Current year	
	Price	Quantity	Price	Quantity
X	L	10	2	5
Y	L	5	P	2

(a)7 (b) 3
(c)4 (d) 9

8. If $\sum P_n Q_n = 249, \sum P_o Q_o = 150$, Paasche's index number = 150 and Drobiseh and Bowely's index number = 145, then the Fisher's ideal number number is
(a)75 (b) 145.97
(c)60 (d) none of these

Miscellaneous Problems

9. Consumer Price index number for the year 1957 was 313 with 1940 as the base year 96 the Average Monthly wages in 1957 of the workers into factory be Rs 160/- their real wages is
(a)Rs 48.40 (b) Rs 40.30
(c)Rs 51.12 (d) none of these

10. If $\sum p_o q_o = 3500, \sum p_n q_o = 3850$, then the cost of living index (C.L.I) for 1950 w.r. to base 1960 is
(a)110 (b) 100
(c)90 (d) none of these

11. The index number in whole sale prices is 152 for August 1999 compared to August 1998. During the year there is net increase in prices of whole sale commodities to the extent of
(a)45% (b) 52%
(c)35% (d) 48%

12. The wholesale price index number or agricultural commodities in a given region at a given date is 280. The percentage increase in prices of agricultural commodities over the base year is:
(a)380 (b) 180
(c)280 (d) 80

13. If the 1970 index with base 1965 is 200 and 1965 index with base 1960is 150, the index 1970 on base 1960 will be:
(a)700 (b) 500
(c)300 (d) 600

14. Consumer price index number goes up from 110 to 200 and the salary of a worker is also raised from Rs 325 to Rs 500. Therefore, in real terms, to maintain his previous standard of living he should get an additional amount of:
(a)Rs 85 (b) Rs 98.25
(c)Rs 90.91 (d) none of these

15. The prices of a commodity in the year 1975 and 1980 were 25 and 30 respectively taking 1980 as base year the price relative is:
(a)109.78 (b) 113.25
(c)110.25 (d) none of these

16. During a certain period, the cost of living index number goes up from 110 to 200 and the salary of a worker is also raised from Rs 330 to Rs 500. The worker does not get really gain. Then the real wages decreased by:
(a)Rs 45.45 (b) Rs 100
(c)Rs 43.25 (d) none of these

17. If the 2018 index with base 2015 is 250 and 2015 index with base 2012 is 150, the index 2018 on base 2012 will be:
(a) 800 (b) 375
(c)600 (d) None

18. The prices of a commodity in the years 2015 and 2016 were 25 and 30 respectively, taking 2015 as base year the price relative is:
(a) 145 (b) 120
(c) 125 (d) None of these.

19. From the following data

Year	2012	2013	2014	2015	2016
Link Index	100	103	105	112	108

(Base 2012= 100) for the years 2012 -16. The construction of chain index is:
(a) 110,105.25,104,118.72
(b) 108,110.94,117,128.72
(c) 103,108.15,121.3,130.82
(d) None of these.

20. Net monthly salary of an employee was Rs. 30,000 p.m in 2010. The consumer price index number in 2018 is 350 with 2010 as base year. If he has to be rightly compensated then, 7th dearness allowances to be paid to the employee is :
(a) Rs. 48,000 (b) Rs. 47,000
(c) Rs. 75,000 (d) None of these.

21. If the price index for the year, say 2018 be 125 and the price index for the year, say 2010 be 95, then the purchasing power of money (Rupees) of 2010 will in 2018 is
(a) 1.32 (b) Rs. 1.11
(c) Rs.1.57 (d) None of these.

Theory Based Questions

22. The series of numerical figures which shows the relative position is called:
(a)Index number (b) absolute number
(c)Relative number (d) none of these

23. Index number for the base period is always taken as
(a)200 (b) 1
(c)50 (d) 100

24. _____ play a very important part in the construction of index numbers.
(a)Weights (b) estimations
(c)Classes (d) none of these

25. _____ is particularly suitable for the construction of index numbers.
(a)H.M. (b) G.M.
(c)A.M. (d) none of these

26. Index numbers show _____ changes rather than absolute amounts of change.
(a)Relative (b) both
(c)Percentage (d) none of these

27. The _____ makes index numbers time-reversible.
(a)A.M. (b) H.M.
(c)G.M. (d) none of these

28. Price relative is equal to

(a) $\frac{price\ in\ the\ given\ year \times 100}{price\ in\ the\ base\ year}$ (b) price in the given year × 100

(c) $\frac{price\ in\ the\ year\ base\ year \times 100}{price\ in\ the\ given\ year}$ (d) price in the base year × 100

29. Index number is equal to

(a)Sum of price relatives (b) product of price relative

(c)Average of the price relatives (d) none of these

30. The _____ of group indices given the General Index

(a)H.M. (b) A.M.

(c)G.M. (d) none of these

31. Circular Test is one of the tests of

(a)Index numbers (b)both

(c)Hypothesis (d) none of these

32. _____ is an extension of time reversal test

(a)Factor Reversal test (b) both

(c)Circular test (d) none of these

33. Weighted G.M. of relative formula satisfy _____ test

(a)Time Reversal Test (b) factor reversal test

(b)Circular test (d) none of these

34. Factor reversal test is satisfied by

(a)Fisher's ideal index (b) Paasches index

(c)Laspeyres index (d) none of these

35. Laspeyre's formula does not satisfy

(a) Factor reversal test (b) circular test

(c)Time reversal test (d) all the above

36. A ratio or an average of ratios expressed as a percentage is called

(a)A relative number (b) an index number

(c)An absolute number (d) none of these

37. The value at the base time period serves as the standard point of comparison

(a)False (b) both

(c)True (d) none of these

38. An index time series is a list of _____ numbers for two or more periods of times

(a)Index (b) relative

(c)Absolute (d) none of these

39. Index numbers are often constructed from the

(a)Frequency (b) sample

(c)Class (d) none of these

40. _____ is a point of reference in comparing various data describing individual behavior.

(a)Sample (b) estimation

(c)Base period (d) none of these

41. The ratio of price of single commodity in a given period to its price in the preceding year price is called the
(a)Base period (b) relative price
(c)Price ratio (d) none of these

42. $\frac{sum\ of\ all\ commodity\ prices\ in\ the\ current\ year \times 100}{sum\ of\ all\ commodity\ prices\ in\ the\ base\ year\ is}$
(a)Relative Price Index
(b) both
(c)Simple Aggregative Price Index
(d) none of these

43. Chain index is equal to
(a) $\frac{link\ relative\ of\ current\ year \times chain\ index\ of\ the\ current\ year}{100}$
(b) $\frac{link\ relative\ of\ prevoius\ year \times chain\ index\ of\ the\ current\ year}{100}$
(c) $\frac{link\ relative\ of\ current\ year \times chain\ index\ of\ the\ previous\ year}{100}$
(d) $\frac{link\ relative\ of\ previous\ year \times chain\ index\ of\ the\ previous\ year}{100}$

44. P_{01} is the index for time
(a)1 on 0 (b) 1 on 1
(c)0 on 1 (d) 0 on 0

45. P_{10} is the index for time
(a)1 on 0 (b) 1 on 1
(c)0 on 1 (d) 0 on 0

46. When the product of price index and the quantity index to the corresponding value index then the test that holds is
(a)Unit test (b) factor reversal test
(c)Time reversal test (d) none holds

47. The formula should be independent of the unit in which or for which price and quantities are quoted in
(a)Unit test (b) factor reversal test
(c)Time reversal test (d) none

48. Laspeyre's method and Paasche's method do not satisfy
(a)Unit test (b) factor reversal test
(c)Time reversal test (d) b & c

49. The purpose determines the type of index number to use
(a)Yes (b) may be
(c)No (d) may not be

50. The index number is a special type of average
(a)False (b) both
(c)True (d) none

51. The choice of suitable base period is at best temporary solution
(a)True (b) both
(c)False (d) none

52. Fisher's Ideal Formula for calculating index numbers satisfies the ___ tests
(a)Unit test (b) both
(c)Factor reversal test (d) none

53. Fisher's Ideal Formula does not satisfy _____ test
(a)Unit test (b) time reversal test
(c)Circular test (d) none

54. _____ satisfies circular test
(a)G.M of price relatives or the weighted aggregate with fixed weights
(b)A.M of price relatives or the weighted aggregate with fixed weights
(c)G\H.M of price relatives or the weighted aggregate with fixed weights
(d)None

55. Laspeyre's and Paasche's method _____ time reversal test
(a)Satisfy (b) are
(c)Do not satisfy (d) are not

56. There is no such thing as un weighted index numbers
(a)False (c) both
(b)True (d) none

57. Theoretically, G.M is the best average in the construction of index numbers but in practice, mostly the A. M is used
(a)False (b) both
(c)True (d) none

58. Laspeyre's or Paasche's or the Fisher's ideal index do not satisfy
(a)Time reversal test (b) circular test
(c)Unit test (d) none of these

59. _____ is concerned with the measurement of price changes over a period of years, when it is desirable to shift the base
(a)Unit test (b) time reversal test
(c)Circular test (d) none of these

60. The test of shifting the base is called
(a)Unit test (b) circular test
(c)Time reversal test (d) none of these

61. The formula for conversion to current value
(a)Deflated value $= \frac{price\ index\ of\ the\ current\ year}{previous\ value}$
(b)Deflated value $= \frac{price\ index\ of\ the\ current\ year}{current\ value}$
(c)Deflated value $= \frac{price\ index\ of\ the\ previous\ year}{previous\ value}$
(d)Deflated value $= \frac{price\ index\ of\ the\ previous\ year}{previous\ value}$

62. Shifted price index $= \frac{original\ price \times 100}{price\ Index\ of\ the\ year\ on\ which\ it\ has\ to\ be\ shifted}$

(a)True (b) both

(c)False (d) none

63. The number of test of Adequacy is

(a)2 (b) 3

(c)5 (d) 4

64. We use price index numbers

(a)To measure and compare prices

(b)To measure prices

(c)To compare prices

(d)None

65. Simple aggregate of quantities is a type of

(a)Quantity control (b) both

(c)Quantity indices (d) none

Answer Sheet

1.	**c**	**2.**	**b**	**3.**	**b**	**4.**	**b**	**5.**	**b**	**6.**	**c**	**7.**	**c**	**8.**	**d**	**9.**	**c**	**10.**	**a**
11.	**b**	**12.**	**b**	**13.**	**c**	**14.**	**c**	**15.**	**d**	**16.**	**b**	**17.**	**b**	**18.**	**b**	**19.**	**c**	**20.**	**c**
21.	**c**	**22.**	**a**	**23.**	**d**	**24.**	**a**	**25.**	**b**	**26.**	**c**	**27.**	**c**	**28.**	**a**	**29.**	**c**	**30.**	**b**
31.	**a**	**32.**	**c**	**33.**	**a**	**34.**	**d**	**35.**	**b**	**36.**	**b**	**37.**	**c**	**38.**	**a**	**39.**	**b**	**40.**	**c**
41.	**b**	**42.**	**c**	**43.**	**c**	**44.**	**a**	**45.**	**c**	**46.**	**b**	**47.**	**a**	**48.**	**d**	**49.**	**a**	**50.**	**c**
51.	**a**	**52.**	**b**	**53.**	**c**	**54.**	**a**	**55.**	**c**	**56.**	**a**	**57.**	**c**	**58.**	**b**	**59.**	**c**	**60.**	**c**
61.	**b**	**62.**	**a**	**63.**	**d**	**64.**	**a**	**65.**	**c**										

Summary Notes

Number Series, Coding & Decoding & Odd Man Out

Chapter 18

EXERCISE

Number Series

1. 6, 11, 21, 36, 56 ?
(a) 42 **(b)** 51 **(c)** 81 **(d)** 91

2. 10,100,200, 310?
(a) 400 **(b)** 410 **(c)** 420 **(d)** 430

3. 11, 13, 17, 19, 23, 25, 27
(a) 33 **(b)** 27 **(c)** 29 **(d)** 49

4. 6, 12, 21, 33 ?
(a) 33 **(b)** 38 **(c)** 40 **(d)** 48

5. 2, 5, 9, 14, ? , 27
(a) 20 **(b)** 16 **(c)** 18 **(d)** 24

6. 6, 11, 21, ? , 56, 81
(a) 42 **(b)** 36 **(c)** 91 **(d)** 51

7. 10, 18, 28, 40, 54, ?, 88
(a) 70 **(b)** 86 **(c)** 87 **(d)** 98

8. 120, 99, ?, 63, 48, 35
(a) 80 **(b)** 36 **(c)** 45 **(d)** 40

9. 22, 24, 28, 36, ? , 84
(a) 44 **(b)** 52 **(c)** 38 **(d)** 54

10. 4832, 5840, 6848, 7856 ?
(a) 8864 **(b)** 8815 **(c)** 8846 **(d)** 8887

11. 10,100,200, 310, 430?
(a) 560 **(b)** 540 **(c)** 550 **(d)** 590

12. 28, 33, 31, 36, 34 ?
(a) 38 **(b)** 39 **(c)** 40 **(d)** 42

13. 120, 80, 40, 45, ?, 5
(a) 15 **(b)** 20 **(c)** 25 **(d)** 47

14. 2, 15, 41, 80, 132 ?
(a) 184 **(b)** 144 **(c)** 186 **(d)** 196

15. 6, 17, 39, ?, 116
(a) 72 **(b)** 75 **(c)** 85 **(d)** 80

16. 1, 4, 10, 22, ?, 94
(a) 46 **(b)** 48 **(c)** 49 **(d)** 47

17. 4, 9, 25, 48, ? , 169, 289, 361
(a) 120 **(b)** 121 **(c)** 122 **(d)** 164

18. 4, 12, 36, ? , 324
(a) 107 **(b)** 109 **(c)** 108 **(d)** 110

19. 1, 1, 4, 8,9, ? , 16, 64
(a) 27 **(b)** 28 **(c)** 32 **(d)** 40

20. 5760, 960, 192, ? 16, 8
(a) 47 **(b)** 48 **(c)** 52 **(d)** 50

21. 1, 2, 6, 7, 21, 22, 66, ? , 201
(a) 69 **(b)** 68 **(c)** 67 **(d)** 69

22. 48, 24, 96 , ?192
(a) 48 **(b)** 47 **(c)** 44 **(d)** 54

23. 165, 195, 255, 285, ?, 435
(a) 345 **(b)** 390 **(c)** 335 **(d)** 395

24. 2, 3, 3, 5, 10, 13, 39, ?, 172, 177
(a) 42 **(b)** 44 **(c)** 43 **(d)** 40

25. 7, 26, 63, 214, 215, ?, 511
(a) 342 **(b)** 343 **(c)** 441 **(d)** 421

26. 3, 7, 15, 31, ? 127
(a) 62 **(b)** 63 **(c)** 64 **(d)** 65

27. 8, 28, 116, 584, ?
(a) 1752 **(b)** 3502 **(c)** 3504 **(d)** 3508

28. 6, 13, 28, 59, ?
(a) 122 **(b)** 114 **(c)** 113 **(d)** 112

29. 2, 7, 27, 107, 427, ?
(a) 1707 **(b)** 4027 **(c)** 4207 **(d)** 1207

30. 5, 2, 7, 9, 16, 25, 41, ?
(a) 65 **(b)** 66 **(c)** 67 **(d)** 68

31. In a certain language, MADRAS is coded NBESBT, how DELHI is coded in that code?
(a) EMMJI **(b)** EFMIJ **(c)** EMFIJ **(d)** JIFEM

32. If RAMAN is written as 12325 and DINESH as 675489 how HAMAM is written?
(a) 92323 **(b)** 92233 **(c)** 93233 **(d)** 93292

33. If RED is coded as 6720 then GREEN would be coded as
(a) 9207716 **(b)** 167129 **(c)** 1677209 **(d)** 1672091

34. If A = 1, FAT = 27, FAITH = ?
(a) 44 **(b)** 45 **(c)** 46 **(d)** 36

35. If BROTHER is coded 2456784, SISTER coded as 919684, what is coded for BORBERS?
(a) 2542889 **(b)** 2542898 **(c)** 2454889 **(d)** 2524889

36. If DELHI is coded 73541 and CALCUTTA as 82589662, How can CALICUT be coded?
(a) 5279431 **(b)** 5978213 **(c)** 8251896 **(d)** 8543962

37. If CLOCK is coded 34235 and TIME is 8679, what will be code of MOTEL?
(a) 72894 **(b)** 77684 **(c)** 72964 **(d)** 27894

38. If PALE is coded as 2134 and EARTH is coded as 41590, how is PEARL is code?
(a) 29530 **(b)** 24153 **(c)** 25430 **(d)** 254313

39. If LOSE is coded as 1357 and GAIN is coded as 2468, what do figure 82146 stands for?
(a) NGLAI **(b)** NGLIA **(c)** GNLIA **(d)** GNLIA

40. If MEKLF is coded as 91782 and LLLJK as 88867, how can IHJED is coded as?
(a) 97854 **(b)** 64512 **(c)** 54310 **(d)** 75632

41. If in a certain code language NAME is written as 4258 then what is coded as MEAN ?
(a) 2458 **(b)** 5842 **(c)** 8524 **(d)** 5824

42. If GOLD is written as IQNF, how WIND can be written as code?
(a) VHMC **(b)** VHCM **(c)** XJOE **(d)** DNIW

43. If ROSE is written as TQUG, how BISCUIT can be written in that code?
(a) DKUEWKV **(b)** CJTDVJU **(c)** DKVEWKV **(d)** DKUEWKY

LETTER: C Z N V R S W F D
CODE DIGIT: 8 6 4 7 2 9 3 5 1
(Q. No. 44-46) In each of the following questions find out the correctly coded alternative from amongst the given four alternatives **(a)**, **(b)**, **(c)**, **(d)**.

44. ZDRCVF
(a) 612875 **(b)** 619875 **(c)** 612845 **(d)** 612835

45. WNCSZV
(a) 348267 **(b)** 318267 **(c)** 348957 **(d)** 348967

46. RDNFVS
(a) 21679 **(b)** 216549 **(c)** 214579 **(d)** 218579

47. If DELHI is coded as CCIDD, how would you encode BOMBAY?
(a) AJMTVT **(b)** AMJXVS **(c)** MJXVSU **(d)** WXYZAX

48. In a certain code, RIPPLE is written as 613382 and LIFE is written as 8192. How is PILLER written in that code?
(a) 318826 **(b)** 318286 **(c)** 618826 **(d)** 338816

49. If PALAM could be given the code number 43, what code number can be given to SANTACRUZ?
(a) 123 **(b)** 85 **(c)** 120 **(d)** 125

Directions: The number in each question below is to be codified in the following code:

Digit	7	2	1	5	3	9	8	6	4
Letter	W	L	M	S	I	N	D	J	B

50. 184632
(a) MDJBSI **(b)** MDJBIL **(c)** MDJBWL **(d)** MDBJIL

51. In a certain code '256' means 'you are good', '637' means 'we are bad' and '358' means 'good and bad'. Which of the following represents 'and' in that code?
(a) 2 **(b)** 5 **(c)** 8 **(d)** 3

Odd Man Out

Number Based Problems

Find odd man out of the following (52-61)

52. 3, 5, 7, 15, 17, 19
(a) 15 **(b)** 17 **(c)** 19 **(d)** 7

53. 10, 14, 16, 18, 23, 24, 26
(a) 26 **(b)** 23 **(c)** 24 **(d)** 18

54. 1, 4, 9, 16, 24, 25, 36
(a) 9 **(b)** 24 **(c)** 25 **(d)** 36

55. 41, 43, 47, 53, 61, 71, 73, 75
(a) 75 **(b)** 73 **(c)** 71 **(d)** 53

56. 16, 25, 36, 73, 144, 196, 225
(a) 36 **(b)** 73 **(c)** 196 **(d)** 225

57. 1, 4, 9, 16, 19, 36, 49
(a) 19 **(b)** 9 **(c)** 49 **(d)** 16

58. 1, 5, 14, 30, 49, 55, 91
(a) 49 **(b)** 30 **(c)** 55 **(d)** 91

59. 835, 734, 642, 751, 853, 981, 532
(a) 751 **(b)** 853 **(c)** 981 **(d)** 532

60. 4, 5, 7, 10, 14, 18, 25, 32
(a) 7 **(b)** 14 **(c)** 18 **(d)** 33

61. 52, 51, 48, 43, 34, 27, 16
(a) 27 **(b)** 34 **(c)** 43 **(d)** 48

Calendar Based Questions

62. Choose out the odd one of the following:
(a) December **(b)**February **(c)** March **(d)** July

63. Choose out the odd one of the following:
(a) June **(b)** July **(c)** Aug **(d)** Oct

64. Choose out the odd one of the following:
(a) June **(b)** July **(c)** Sept **(d)** Nov

65. Choose out the odd one of the following:
(a) Month **(b)** Week **(c)** Fortnight **(d)** Season

66. Choose out the odd one of the following:
(a) Calendar **(b)** Year **(c)** Date **(d)** Month

Measuring Units Based Questions

67. Choose out the odd one of the following:
(a) Meter **(b)** Yard **(c)** Mile **(d)** Acre

68. Choose out the odd one of the following:
(a) Arc **(b)** Diagonal **(c)** Diameter **(d)** Radius

69. Choose out the odd one of the following:
(a) Inch **(b)** Foot **(c)** Yard **(d)** Quart

70. Choose out the odd one of the following:
(a) Square **(b)** Rectangle **(c)** Triangle **(d)** Cube

71. Choose out the odd one of the following:
(a) Circle **(b)** Ellipse **(c)** Sphere **(d)** Cube

72. Choose out the odd one of the following:
(a) Tonne **(b)** Pint **(c)** Gallon **(d)** Litre

Human Body Based Questions

73. Choose out the odd one of the following:
(a) Ear **(b)** Lung **(c)** Eye **(d)** Heart

74. Choose out the odd one of the following:
(a) Tongue **(b)** Lung **(c)** Lever **(d)** Heart

75. Choose out the odd one of the following:
(a) Shoulder **(b)** Foot **(c)** Elbow **(d)** Arm

76. Choose out the odd one of the following:
(a) Knee **(b)** Foot **(c)** Ankle **(d)** Fingers

77. Choose out the odd one of the following:
(a) Ear **(b)** Nose **(c)** Tongue **(d)** Throat

78. Choose out the odd one of the following:
(a) Fingers **(b)** Palm **(c)** Knee **(d)** Wrist

Food Items Based Questions

79. Choose out the odd one of the following:
(a) Curd **(b)** Butter **(c)** Oil **(d)** Cheese

80. Choose out the odd one of the following:
(a) Wheat **(b)** Mustard **(c)** Rice **(d)** Gram

81. Choose out the odd one of the following:
(a) Biscuits **(b)** Chocolate **(c)** Cake **(d)** Bread

82. Choose out the odd one of the following:
(a) Almond **(b)** Turmeric **(c)** Pepper **(d)** Chillies

Famous Personalities Based Questions

83. Choose out the odd one of the following:
(a) VV Giri **(b)** Dr Rajendra Prasad
(c) Dr S. Radha Krishanan **(d)** Lal Bahadur Shastri

84. Choose out the odd one of the following:
(a) Baber **(b)** Humayu **(c)** Akbar **(d)** Vikramaditya

Colors Based Questions

85. Choose out the odd one of the following:
(a) Green **(b)** Saffron **(c)** White **(d)** Orange

86. Choose out the odd one of the following:
(a) Green **(b)** Orange **(c)** Yellow **(d)** Pink

87. Choose out the odd one of the following:
(a) Green **(b)** Violet **(c)** Red **(d)** Yellow

Answer Sheet

1.	c	2.	d	3.	c	4.	d	5.	a	6.	b	7.	a	8.	a	9.	b	10.	a
11.	c	12.	b	13.	a	14.	d	15.	a	16.	a	17.	b	18.	c	19.	a	20.	b
21.	c	22.	a	23.	a	24.	c	25.	b	26.	b	27.	d	28.	a	29.	a	30.	b
31.	b	32.	a	33.	c	34.	a	35.	a	36.	c	37.	a	38.	b	39.	a	40.	c
41.	d	42.	a	43.	a	44.	a	45.	d	46.	c	47.	a	48.	a	49.	a	50.	d
51.	c	52.	a	53.	b	54.	b	55.	a	56.	b	57.	a	58.	a	59.	a	60.	C
61.	b	62.	B	63.	b	64.	B	65.	D	66.	A	67.	D	68.	B	69.	D	70.	D
71.	D	72.	A	73.	D	74.	B	75.	B	76.	B	77.	D	78.	C	79.	C	80.	C
81.	B	82.	A	83.	D	84.	D	85.	D	86.	D	87.	B						

Direction Sense Test

Chapter **19**

EXERCISE

1. Mohan starts from point A and walks 1 km towards south, turns left and walks 1km. Then he turns left again and walks 1 km. Now he is facing.
(a) East **(b)** West **(c)** North **(d)** South-west

2. Suresh starts from a point, walks 2 miles towards south, turns right and walks 1 ½ miles, turns left and walks V miles and then he turns back. What is the direction he is facing now?
(a) East **(b)** West **(c)** South **(d)** North

3. A man starts from a point, walks 4 miles towards north and turns left and walks 6 miles, turns right and walks for 3 miles and again turns right and walks 4 miles and takes rest for 30 minutes. He gets up and walks straight 2 miles in the same direction and turns right and walks one mile. What is the direction he is facing?
(a) North **(b)** South **(c)** South-east **(d)** West

4. Arun started from point A and walked 10 km East to point B, then turned to North and walked 3 km to point C and then turned West and walked 12 kms to point D, then again turned South and walked 3 kms to point E. In which direction is he from his straight point?
(a) East **(b)** South **(c)** West **(d)** North

5. A start from a point and walks 5 kms north, then turns left and walks 3 kms. Then again turns left and walks 5 km. Point out the direction in which he is going now.
(a) North **(b)** South **(c)** East **(d)** West

6. A rat run 20 towards East and turns to right runs 10 and turns to right runs 9 and again turns to left runs 5 and then turns to left runs 12 and finally turns to left and runs 6. Now what direction is the rat facing?
(a) East **(b)** North **(c)** West **(d)** South

7. A driver left his village and drove North for 20 km, after which he stopped for breakfast. Then he turned left and drove another 30 km, when he stopped for lunch. After some rest, he again turned left and drove 20 kms before stopping for evening tea. Once more he turned left and drove 30 kms to reach the town where he had supper. After evening tea in which direction did, he drive?
(a) West **(b)** East **(c)** North **(d)** South

8. A man is facing East, then he turns left and goes 10 m, then turns right and goes 5 m then goes 5 m to the South and from there 5 m to West. In which direction is be from his original place?
(a) East **(b)** West **(c)** North **(d)** South

9. From her home Prerna wishes to go to school. From home she goes towards North and then turns left and then turns right, and finally she turns left and reaches school. In which direction her school is situated with respect to her home?
(a) North-East **(b)** North-West **(c)** South-East **(d)** South-West

10. A child walks 25 feet towards North, turns right and walks 40 feet, turns right again and walks 45 feet. He then turns left and walks 20 feet. He turns left again walks 20 feet. Finally, he turns to his left to walks another 20 feet. In which direction is the child from his starting point?
(a) North **(b)** South **(c)** West **(d)** East

11. Raju facing North and moves 20 km, then he turned to his right and moves 20 km and then he moves 10 km in North-East, then he turned to his right and moves 20 km and then he turned to his right and moves 20 km and again he turned to his left and moves 20 km. Now in which direction Rahu is facing?
(a) South-East **(b)** North-East **(c)** South-West **(d)** North-West

12. K is a place which is located 2 km away in the north-west direction from the capital P. R is another place that is located 2 km away in the south-west direction from K. M is another place and that is located 2 km away in the north-west direction from R. T is yet another place that is located 2 km away in the south-west direction from M. In which direction is T located in relation to P?
(a) South-west **(b)** North-west **(c)** West **(d)** North

13. Babu is Rahim's neighbor and his house is 200 meters away in the north-west direction. Joseph is Rahim's neighbor and his house is located 200 meters away in the south-west direction. Gopal is Joseph's neighbor and he stays 200 meters away in the south-east direction. Roy is Gopal's neighbor and his house is located 200 meters away in the north-east direction. Then where is the position of Roy's house in relation to Babu's?
(a) South-east **(b)** south-west **(c)** North **(d)** North-east

14. A tourist drives 10 km towards west and turns to left and takes a drive of another 4 km. He then drives towards east another 4 km and then turns to his right and drives 5 km. Afterwards he turns to his left and travels 6 km. In which direction is je from the starting point?
(a) North **(b)** East **(c)** West **(d)** South

15. A man started walking West. He turned right, then right again and finally turned left. Towards which direction was he walking now?
(a) North **(b)** South **(c)** West **(d)** East

16. One evening, Raja started to walk toward the Sun. After walking a while, he turned to his right and again to his right. After walking a while, he again turned right. In which direction is he facing?
(a) South **(b)** East **(c)** West **(d)** North

17. Five boys A, B, C, F, E, are sitting in a park in a circle. A is facing South-West, D is facing South-East, B and E are right opposite A and D respectively and C is equidistant between D and B. Which direction is C facing?
(a) West **(b)** South **(c)** North **(d)** East

18. If a man on a moped start from a point and rides 4 km South then turns left and rides 2 km and turn again to the right to ride to go more towards which direction is, he moving?
(a) North **(b)** West **(c)** East **(d)** South

19. A man starts from a point, walk 8 km towards North, turns right and walks 12 km, turns left and walks 7 km turns and walks 20 km towards South, turns right and walks 12 km. In which direction is he from the starting point?
(a) North **(b)** South **(c)** West **(d)** East

20. Daily in the morning the shadow of Gol Gumbaz falls on Bara Kaman and in the evening the shadow of Bara Kaman falls on Gol Gumbaz exactly. So in which direction is Gol Gumbaz to Bara Kaman?
(a) Easter side **(b)** Western side **(c)** Northern side **(d)** Southern side

21. Ashok went 8 km South and turned West and walked 3 km again he turned North and walked 5 kms. He took a final turn to East and walked 3 kms . In which direction was Ashok from the starting point?
(a) East **(b)** North **(c)** West **(d)** South

22. If X stands on his head with his face towards south, to which direction will his left-hand point?
(a) East **(b)** West **(c)** North **(d)** South

23. I drove East for 5 miles then drove North 3 miles, then turned to my left and drove for 2 miles and again turned to my left. Which direction am I going now?
(a) South **(b)** North **(c)** West **(d)** North-west

24. If A stands on his head with his face towards north. In which direction will his left-hand point?
(a) North-East **(b)** North **(c)** East **(d)** North-West

25. A car travelling from south covers a distance of 8 km, then turns right and runs another 9 kms and again turns to the right and was stopped. Which direction does it face now?
(a) South **(b)** North **(c)** West **(d)** East

26. A taxi driver commenced his journey from a point and drove 10 km toward north and turned to his left and drove another 5 km. After waiting to meet a friend here, he turned to his right and continued to drive another 10 km. He has covered a distance of 25 km so far, but in which direction would he be now?
(a) South **(b)** North **(c)** East **(d)** South-east

27. A walk 3 kms northward and then he turns left and goes 2 km. He again turns left and goes 3 km. He turns right and walks straight. In which direction is he walking now?
(a) East **(b)** West **(c)** North **(d)** South

28. A walk southwards, then turns right, then left and then right. In which direction is he from the starting point?
(a) South **(b)** East **(c)** West **(d)** North

29. A man starts from a point, walks 15 meters towards East, turns left and walks 10 meters, turns right again and walks. Towards which direction is he now waking?
(a) North **(b)** East **(c)** West **(d)** South

30. A boy starts walking towards West, he turns right and again he turns right and then turns left at last. Towards which direction is he walking now?
(a) West **(b)** North **(c)** West **(d)** East

31. I stand with my right-hand extended side-ways towards South. Towards which direction will my back be?
(a) North **(b)** West **(c)** East **(d)** South

32. If a person moves 4 km towards west, then turns right and moves 3 km and then turns right and moves 6 km, which is the directions in which he is now moving?
(a) East **(b)** West **(c)** North **(d)** South

33. If Mohan sees the rising sun behind the temple and the setting sun behind the railway station from his house, what is the direction of the temple from the railway station?
(a) South **(b)** North **(c)** East **(d)** West

34. Laxman went 15 km to North then he turned West and covered 10 kms. Then he turned south and covered 5 kms. Finally turning to East, he covered 10 kms. In which direction he is from his house?
(a) East **(b)** West **(c)** North **(d)** South

35. A man starts from a point, walks 4 miles North, turns to his right and walks 2 miles, again turns to his right and walks 2 miles, again turns to his right and walks 2 miles. In which direction would he be now?
(a) North **(b)** South **(c)** East **(d)** West

36. I started walking down a road in the morning facing the Sun. After walking for some time, I turned to my left. Then I turned to my right. In which direction was I going then?
(a) East **(b)** West **(c)** North **(d)** South

37. Lakshmi walked 2 furlongs north from her house and took a turn to left and continued to walk another one kilometer and finally she turned left and reached the school. Which direction is she facing now?
(a) West **(b)** North **(c)** South **(d)** North

38. You are going straight, first eastwards, then turn to the right, then right again, then left. In which direction would you be going now?
(a) East **(b)** West **(c)** South **(d)** North

39. If Ahmed travels towards North from his house, then to left, then to South covering equal distances in each direction to reach Sohan's house, in which direction is Ahmed's house now?
(a) East **(b)** South **(c)** North **(d)** West

40. You go North, turn right, then right again and then go to the left. In which direction are you now?
(a) South **(b)** East **(c)** West **(d)** North

41. Roopa starts from a point and walks 15 meters towards west, turns left and walks 12 meters, turns right again and walks. What is the direction she is now facing?
(a) South **(b)** West **(c)** East **(d)** North

42. A man starts his journey facing the sun early morning. He then turns right and walks 2 km. He then walks 3 km after turning right again. Which is the direction he is facing now?
(a) North-East **(b)** North **(c)** West **(d)** South

43. Roy walks 2 km to East, then turns North-West and walks 3 km. Then he turns South and walks 5 km. Then again, he turns West and walks 2 km. Finally, he turns North and walks 6 km. In which direction, is he from the starting point?
(a) South-West **(b)** South-East **(c)** North-West **(d)** North-East

44. Seeta starts from a point, walks 2 km towards north, turns towards her right and walks 2 km, turns right again and walks. What is the direction she is facing now?
(a) East **(b)** West **(c)** South **(d)** North

45. Shyam was facing East. He walked 5 km forward and then after turning to his right walked 3 km. Again, he turned to his right and walked 4 km. After this he turned back. Which direction was he facing at that time?
(a) East **(b)** West **(c)** North **(d)** South

46. Raju is standing facing north. He goes 30 meters ahead and turns left and goes for 15 meters. Now he turns right and goes for 50 meters and finally turns to his right and walks. In which direction is he heading?
(a) North **(b)** East **(c)** South **(d)** West

47. Sanmitra starts from his house and walks 3 km towards north. Then he turns right and walks 2 km and then turns right and walks 5 km, then turns right and walks 2 km and then again turns right and walks 2 km. Which direction is he facing now?
(a) North **(b)** South **(c)** West **(d)** East

48. Raju is Ramu's neighbor and he stays 100 meters away towards southeast. Venu is Raju's neighbor and he stays 100 meters away towards southwest. Khader is Venu's neighbor and he stays 100 meters away towards, north-west. Then where is the position of Khader's home in relation to Ramu's?
(a) South-East **(b)** South-West **(c)** North-West **(d)** East

49. Ramesh walked 3 km, towards West and turned to his left and walked 2 km. He, then turned to his right and walked 3 km. Finally, he turned to his right again and walked another 2 km. In which direction is Ramesh from his starting point now?
(a) East **(b)** West **(c)** North **(d)** South

50. Deepa starts walking north towards and after a while she turns to her right. After walking some distance, she turns to his left and walks a distance of 1 km. She then urns to her left again. In which direction she moving now?
(a) North **(b)** West **(c)** East **(d)** South

51. Raman starts walking in the morning facing the Sun. After sometime, he turned to the left later again he turned to his left. At what direction is Raman moving now?
(a) East **(b)** West **(c)** South **(d)** North

52. A start walking towards North turns left, again turns left, turns right, again turns right once again turns left. In which direction is A walking now?
(a) East **(b)** South **(c)** West **(d)** South-East

53. X walks southwards and then turns right, then left and then right, in which direction is he moving now?
(a) South **(b)** North **(c)** West **(d)** South-West

54. A man started to walk East. After moving a distance, he turned to his right. After moving a distance, he turned to his right again. After moving a little he turned in the end to his left. In which direction was he going now.?
(a) North **(b)** South **(c)** East **(d)** West

Answer Sheet

1.	**c**	**2.**	**d**	**3.**	**b**	**4.**	**c**	**5.**	**b**	**6.**	**b**	**7.**	**b**	**8.**	**c**	**9.**	**b**	**10.**	**d**
11.	**a**	**12.**	**c**	**13.**	**a**	**14.**	**d**	**15.**	**a**	**16.**	**a**	**17.**	**d**	**18.**	**d**	**19.**	**b**	**20.**	**a**
21.	**d**	**22.**	**b**	**23.**	**a**	**24.**	**c**	**25.**	**a**	**26.**	**b**	**27.**	**b**	**28.**	**a**	**29.**	**b**	**30.**	**b**
31.	**b**	**32.**	**a**	**33.**	**c**	**34.**	**c**	**35.**	**a**	**36.**	**a**	**37.**	**d**	**38.**	**c**	**39.**	**a**	**40.**	**b**
41.	**b**	**42.**	**c**	**43.**	**c**	**44.**	**c**	**45.**	**a**	**46.**	**b**	**47.**	**a**	**48.**	**c**	**49.**	**b**	**50.**	**b**
51.	**b**	**52.**	**a**	**53.**	**c**	**54.**	**b**												

Summary Notes

Seating Arrangements

Chapter **20**

EXERCISE

Single Row Arrangement

1. Five boys A, B, C, D and E are sitting in a row A is to the right of B and E is to the left of B but to the right of C. A is to the left of D. Who is second from the left end? (U.P.B. Ed 2013)
(a) D **(b)** A **(c)** E **(d)** B

2. There are five different houses, A to E, in a row. A is to the right of B and E is to the left of C and right of A, B is to the right of D. Which of the houses is in the middle? IB CA (IO) 2013)
(a) A **(b)** B **(c)** C **(d)** D

3. Five friends P, Q, R, S and T are sitting in a row facing North. Here, S is between T and Q and Q is to the immediate left of R. P is to the immediate left of T. Who is in the middle? (SSC (Multi Task)2014)
(a) S **(b)** T **(c)** Q **(d)** R

4. Six children A, B, C, D, E and F are standing in a row. B is between F and D. E is between A and C. A does not stand next to eight F or D. C does not stand next to D. F is between which of the following pairs of children? (SSC (FCI) 2012)
(a) B and E **(b)** B and C **(c)** B and D **(d)** B and A

5. There are eight books kept one over the other. Two books are on Organization Behavior, two books on TQM, three books on Industrial Relations and one book is on Economics. Counting from the top, the second, fifth and sixth books are on Industrial Relations. Two books on Industrial Relations are between two books on TQM. One book of Industrial Relations is between two books on Organizational Behavior while the book above the book of Economics is a book of TQM. Which book is the last book from the top? (MAT 2011)
(a) Economics **(b)** TQM
(c) Industrial Relations **(d)** Organizational Behavior

6. Five boys are standing in a row facing East. Pavan is left of Tavan, Vipin and Chavan to the left of Nakul. Chavan is between Tavan and Vipin. Vipin is fourth from the left, then how far is Tavan to the right? (CLAT 2014)
(a) First **(b)** Second **(c)** Third **(d)** Fourth

7. Six persons M, N, O, P, Q and R are sitting in two rows with three persons in each row. Both the row are in front of each other. Q is not at the end of any row. P is second the left of R. O is the neighbor of Q and diagonally opposite to P. N is the neighbor of R. Who is in front N? (UPSC (CSAT) 2011)
(a) R **(b)** Q **(c)** P **(d)** M

8. Six persons A, B, C, D, E and F are sitting in two rows, three in each row. (MAT 2011)
(I) E is not at the end of any row
(II) D is second to the left of F

(III) C, the neighbor of E, is sitting diagonally opposite
(IV) B is the neighbor of F.
Which of the following are in one of the two rows?
(a) D, B and F **(b)** C, E and B **(c)** A, E and F **(d)** F, B

9. Five boys A_1, A_2, A_3, A_4 and A_5 are sitting in a stair in the following way. (RRB (TC/CC) 2010)
I. A_5 is above A_1.
II. A_4 is under A_2
III. A_2 is under A_1
IV. A_4 is between A_2 and A_3.
Who is at the lowest position of the stair?
(a) A_1 **(b)** A_3 **(c)** A_5 **(d)** A_2

10. Five children are sitting in a row. S is sitting next to P but not T. K is sitting next to R, who is sitting on the extreme left and T is not sitting next to K. Who is/are adjacent to S? (NIFT (UG) 2014)
(a) K and P **(b)** R and P **(c)** Only P **(d)** P and T

11. Five senior citizens are living in a multistoried building. Mr. Muan lives in a flat above Mr. Ashokan, Mr. Lokesh in a flat below Mr. Gaurav, Mr. Ashokan lives in a flat below Mr. Gaurav and Mr. Rakesh lives in a flat below Mr. Lokesh. Who lives in the topmost flat? (MAT 2013).
(a) Mr. Lokesh **(b)** Mr. Gaurav **(c)** Mr. Muan **(d)** Mr. Rakesh

12. In a gathering seven members are sitting in a row. 'C' is sitting left to 'B' but on the right to 'D'. 'A' is sitting right to 'B', 'F; is sitting right to 'E' but left to 'D'. 'H' is sitting left to 'E'. Find the person sitting in the middle (SSC (10+2) 2013)
(a) C **(b)** D **(c)** E **(d)** F

Directions (No: 13-17): Study the following information carefully to answer the given questions.
A to H are seated in straight line facing North. C sits fourth left of G. D sits second to right of G. Only two people sit between D and A. B and F are immediate neighbors of each other. B is not an immediate neighbor of A. H is not neighbor of D. (GIC 2012)

13. Who amongst the following sits exactly in the middle of the persons who sit fifth from the left and the person who sit sixth from the right?
(a) C **(b)** H **(c)** E **(d)** F

14. Who amongst the following sits third to the right of C?
(a) B **(b)** F **(c)** A **(d)** E

15. Which of the following represents persons seated at the two extreme ends of the line?
(a) C, D **(b)** A, B **(c)** B, G **(d)** D, H

16. What is the position of H with respect to F?
(a) Third to the left **(b)** Immediate right **(c)** Second to right **(d)** Fourth to left

17. How many persons are seated between A and E?
(a) One **(b)** Two **(c)** Three **(d)** Four

Directions (Q. No. 18-22)
Study the following information carefully to answer the given questions.
Ten students are A to J are sitting in a row facing west.
I. B and F are not sitting on either of the edges.
II. G is sitting left of D and H is sitting to the right of J.
III. There are four persons between E and A.
IV. I is the north of B and F is the south of D.
V. J is between A and D and G is in E and F.
VI. There are two persons between H and C.

18. Who is sitting at the seventh place counting from left?
(a) H **(b)** C **(c)** J **(d)** Either H or C

19. Who among the following is definitely sitting at one of the ends?
(a) C **(b)** H **(c)** E **(d)** Cannot be determined

20. Who are immediate neighbors of I?
(a) BC **(b)** BH **(c)** AH **(d)** Cannot determined

21. Who is sitting second left of D?
(a) G **(b)** F **(c)** E **(d)** J

22. If G and A interchange their positions, then who become the immediate neighbors of E?
(a) G and F **(b)** Only F **(c)** Only A **(d)** J and H

Directions (Q. Nos. 23-24) Read the following information carefully and then answer the questions that follow.
A group of singers, facing the audience, are standing in line on the stage as follows.
I. D is not right to C
II. F is not standing beside G.
III. B is not left of F
IV. E is not left of A
V. C and B have one person between E and F
VI. There are two persons H and C.

23. Who is on the Second extreme right?
(a) D **(b)** F **(c)** G **(d)** E

24. If we start counting from the left, on which number is B?
(a) 1st **(b)** 2nd **(c)** 3rd **(d)** 5th

Double Row Arrangement

Directions (Q. No. 25- 27): Study the following information carefully to answer the given questions.
Eight persons P to W are sitting in front of one another in two rows. Each row has four persons. P is between U and V and facing North. Q, who is to the immediate left of M is facing W. R is between T and M and W is to the immediate right of V. **(UCO Bank 2011)**

25. Who is sitting in front of R?
(a) U **(b)** Q **(c)** V **(d)** P

26. Who is to the immediate right of R?
(a) M **(b)** U **(c)** M or W **(d)** None of these

27. In which of the following pairs, persons are sitting in front of each other?
(a) MV **(b)** RV **(c)** TV **(d)** UR

28. Four girls A, B, C, D are sitting around a circle facing the centre. B and C infront of each other, which of the following is definitely true? (MAT 2009)
(a) A and D Infront of each other **(b)** A is not between B and C
(c) D is left of C **(d)** A is left of C

Rectangular & Circular Arrangement

29. Siva, Satish, Amar and Praveen are playing cards. Amar is to the right of Satish who is to the right of Siva. Who is to the right of Amar?
(a) Satish **(b)**Amar **(c)** Praveen **(d)** Shiva

Directions (Q. No. 30- 33): Study the following information carefully to answer the given questions.
(a) P, Q, R, S, T, U, V and w are sitting round the circle and are facing the centre.
(b) P is second to the right of T who is the neighbor of R and V
(c) S is not the neighbor of P
(d) V is the neighbor of U
(e) Q is not between S and W. W is not between U and S

30. Which two of the following are not neighbor?
(a) RV **(b)**UV **(c)** RP **(d)** QW

31. Who is immediate right to the V?
(a)P **(b)**U **(c)** R **(d)** T

32. Which of the following is correct?
(a) P is not the immediate right of Q.
(b) R is between U and V
(c) Q is to the immediate left of W
(d) U is between W and S

33. What is the position of S?
(a) Between U and V
(b) Second to right of P
(c) To the immediate right of W
(d) Data inadequate

Directions (Q. No. 34- 37): Study the following information carefully to answer the given questions.
Six friends are sitting in a circle and are facing the centre of the circle. Deepa is between Prakash and Pankaj. Priya is between Mukesh and Lalit. Prakash and Mukesh are opposite to each other.

34. Who is sitting right to Prakash?
(a) Mukesh **(b)**Deepa **(c)** Pankaj **(d)** Lalit

35. Who is just right to Pankaj?
(a) Deepa **(b)** Lalit **(c)** Prakash **(d)** Priya

36. Who are the neighbors of Mukesh?
(a) Prakash and Deepa **(c)** Priya and Pankaj
(b) Deepa and Priya **(d)** Lalit and Priya

37. Who is sitting opposite to Priya?
(a) Prakash **(c)** Pankaj
(b) Deepa **(d)** Lalit

Answer Sheet

1.	**c**	**2.**	**a**	**3.**	**a**	**4.**	**b**	**5.**	**a**	**6.**	**d**	**7.**	**b**	**8.**	**a**	**9.**	**b**	**10.**	**d**
11.	**c**	**12.**	**b**	**13.**	**d**	**14.**	**c**	**15.**	**d**	**16.**	**a**	**17.**	**a**	**18.**	**d**	**19.**	**c**	**20.**	**d**
21.	**a**	**22.**	**c**	**23.**	**b**	**24.**	**d**	**25.**	**d**	**26.**	**b**	**27.**	**a**	**28.**	**a**	**29.**	**c**	**30.**	**a**
31.	**d**	**32.**	**c**	**33.**	**c**	**34.**	**d**	**35.**	**a**	**36.**	**c**	**37.**	**b**						

Summary Notes

Blood Relations

Chapter **21**

EXERCISE

1. A is B's brother. C is A's mother. D is C's father; E is B's son. How is D related to A?
(a) Son (b) Grandson (c) Grandfather (d) Great Grandfather

2. As is B's brother. C is A's father. D is C's sister and E is D's mother. How is B related to E?
(a) Grand-daughter
(b) Great grands daughter
(c) Grandaunt
(d) Daughter

3. A is B's Sister. C is B's Mother. D is C's Father. E is D's Mother. Then how is A related to D?
(a) Grandmother (b) Grandfather (c) Daughter (d) Grands-daughter

4. A is the father of B. C is the daughter of B. D is the brother of B. E is the son of A. What is the relationship between C and E?
(a) Brother and sister (b) Cousins (c) Niece and uncle (d) Uncle and aunt

5. If P is the husband of Q and R is the mother of S and Q. What is R to P?
(a) Mother (b) Sister (c) Aunt (d) Mother-in-law

6. P and Q are brothers. R and S are sister. P's son is S's brother. How is Q related to R?
(a) Uncle (b) Brother (c) Father (d) Grandfather

7. X is the husband of Y. W is the daughter of X. Z is husband of W. N is the daughter of Z. What is the relationship of N to Y?
(a) Cousin (b) Niece (c) Daughter (d) Grand-daughter

8. A reads a book and find the name of the author familiar. The author 'B' is the paternal uncle of C. C is the daughter of A. How is B related to A?
(a) Brother (b) Sister (c) Father (d) Uncle

9. A's mother is sister of B and she has a daughter C who is 21 years old. How is B related to D?
(a) Uncle (b) Maternal Uncle (c) Niece (d) Daughter

10. A is B's brother. C is A's mother. D is C's father. F is A's son. How is F related to D?
(a) Son
(b) Grandson
(c) Grand-grandson
(d) Grand-daughter

11. A is B's brother. C is A's mother. D is C's father. E is B's son. How is B related to D?
(a) Son (b) Grand-daughter (c) Grandfather (d) Great grandfather

12. A is B's brother. C is A's mother. D is C's father. F a is A's son. How is B related to F's child?
(a) Aunt (b) Cousin (c) Nephew (d) Grandfather

13. A is B's daughter. B is C's mother. D is C's brother. How is D related to A?
(a) Father (b) Grandfather (c) Brother (d) Son

14. A is D's brother. D is B's father. B and C are sisters. How is C related to A?
(a) Cousin (b) Niece (c) Aunt (d) Nephew

15. A is B's brother. C is A's mother; D is C's father. E is B's son. How is D related to E?
(a) Grandson
(b) Great Grandson
(c) Great Grandfather
(d) Grandfather

16. X and Y are the children of A. A is the father of X but Y is not his son. How is Y related to A?
(a) Sister (b) Brother (c) Son (d) Daughter

17. A is B's brother. C is A's mother. D is C's father. E is B's son. How is E related to A?
(a) Cousin (b) Nephew (c) Uncle (d) Grandson

18. Based on the statements given below, find out who is the uncle of P?
(i) K is the bother of J
(ii) M is the sister of K
(iii) P is the brother of N
(iv) N is the daughter of J
(a) K (b) J (c) N (d) M

19. A and B are sisters. A is mother of D. D has a daughter C who is married to F. G is the husband of A. How is C related to D?
(a) Cousin (b) Niece (c) Aunt (d) Sister-in-law

20. R and S are brothers. X is the sister of Y and X is mother of R. What is Y to S?
(a) Uncle (b) brother (c) Father (d) Mother

21. A is B's brother. C is A's mother. D is C's father. B and D's grand-daughter. How is B related to D.? Who is A's son?
(a) Aunt (b) Cousin (c) Niece (d) Grandaunt

22. A is the son of B while B and C are sisters to one another. E is the mother of C. If D is the son of E. which of the following statements is correct?
(a) D is the maternal uncle of A
(b) E is the brother of B
(c) D is the cousin of A
(d) B and D are brothers

23. P is the father of T. T is the daughter of M. M is the daughter of K. What is P to K?
(a) Father (b) Father-in-law (c) Brother (d) Son-in-law

24. A and B are brothers. E is the daughter of F. F is the wife of B. What is the relation of E to A?
(a) Sister (b) Daughter (c) Niece (d) Daughter

25. M and F are a married couple. A and B are sisters. A is the sister of F. Who is B to M?
(a) Sister (b) Sister-in-law (c) Niece (d) Daughter

26. If A is the mother of D. B is not the son of C. C is the father of D, D is the sister of B, then how is A related to B?
(a) Mother (b) Brother (c) Step son (d) Sister

27. A and B are brother and sister respectively. C is A's father. D is C's sister and E is D's mother. How is B related to E?
(a) Grand-daughter (b) Great grand-daughter
(c) Aunt (d) Daughter

28. Q is the son of P. X is the daughter of Q. R is the aunty (Bua) of X and L is the son of R, then what is L to P?
(a) Grandson (b) Grand-daughter (c) Daughter (d) Nephew

29. P and Q are brothers. R and S are sisters. P's son is S's brother. How is Q related to R?
(a) Uncle (b) Brother (c) Father (d) Grandfather

30. A and B are the young ones of C. If C is the mother of B but A is not the daughter of C, then what is the relationship between C and A?
(a) Nephew and Aunty (b) Brother and Sister
(c) Mother and son (d) Niece and Aunty

31. A is the mother of D and sister of B. B has a daughter C who is married to F. G is the husband of A. How is G related to D?
(a) Uncle (b) Husband (c) Son (d) Father

32. Pointing towards A, B said "your mother is the younger sister of my mother". How is A related to B?
(a) Uncle (b) Cousin (c) Nephew (d) Father

33. A is B's wife's husband's brother. C and D are sisters of B. How is A related to C?
(a) Brother (b) Sister-in-law (c) Wife (d) Sister

34. A and B are brothers. C and D are sisters. A's son is D's brother. How is B related to C?
(a) Father (b) Brother (c) Uncle (d) Son

35. A is B's sister. C is B's mother. D is C's father. E is D's mother. Then how is A related to D?
(a) Grandmother (b) Grandfather (c) Daughter (d) Grand-daughter

36. P, Q, R, S, T, U are 6 members of a family in which there are two married couples. T, a teacher is married to a doctor who is mother of R and U. Q the lawyer is married to P. P has one son and one grandson. Of the two married ladies one is a housewife. There is also one student and one male engineer in the family. Which of the following is true about the grand-daughter of the family?
(a) She is a lawyer (b) She is an engineer
(c) She is a student (d) She is a doctor

37. Six members of a family namely A, B, C, D, E and F are travelling together. 'B' is the son of C but C is not the mother of B. A and C are married couple. E is the brother of C. D is the daughter of A. F is the brother of B. How many male members are there in the family?
(a) 3 (b) 2 (c) 4 (d) 1

38. A's mother is sister of B and has a daughter C. How can A be related to B from among the following?
(a) Niece (b) Uncle (c) Daughter (d) Father

39. Rajiv is the brother of Atul. Sonia is the sister of Sunil. Atul is the son of Sonia. How is Rajiv related to Sonia?
(a) Nephew (b) Son (c) Brother (d) Father

40. Sita is the niece of Ashok. Ashok's mother is Lakshmi. Kalyani is Lakshmi's mother. Kalyani's husband is Gopal. Parvathi is the mother-in-law of Gopal. How is Sita related to Gopal?
(a) Great grandson's daughter (b) Gopal's Sita's father
(c) Sita is Gopal's great grand-daughter (d) Grand niece

41. Seema is the daughter-in-law of Sudhir and sister-in-law of Ramesh. Mohan is the son of Sudhir and only brother of Ramesh. Find the relation between Seema and Mohan.
(a) Sister-in-law (b) Aunt
(c) Cousin (d) Wife

42. Suresh introduces a man as "He is the son of the woman who is the mother of the husband of my mother". How is Suresh related to the man?
(a) Uncle (b) Son (c) Cousin (d) Grandson

43. Pointing to a lady in a photograph. Meera said. "Her father's only son's wife is my mother-in-law "How is Meera's husband related to that lady in the photo?
(a) Nephew (b) Uncle (c) Son (d) Father

44. Pointing to a photograph Vikas said "She is the daughter of my grandfather's only son". How is the related to Vikas in the photograph?
(a) Father (b) Brother (c) Sister (d) Mother

45. Suresh's sister is the wife of Ram. Ram is Rani's brother. Ram's father is Madhur. Sheetal is Ram's grandmother. Rema is Sheetal is daughter-in-law. Rohit is Rani's brother's son. Who is Rohit to Suresh?
(a) Brother-in-law (b) Son
(c) Brother (d) Nephew

46. Vinod introduces Vishal as the son of the only brother of his father's wife. How is Vinod related to Vishal?
(a) Cousin (b) Brother (c) Son (d) Uncle

47. Among her children, Ganga's favourites are Ram and Rekha. Rekha is the mother of Sharat, who is loved most by his uncle Mithun. The head of the family is Ram Lal, who is succeeded by his sons Gopal and Mohan. Gopal and Ganga have been married for 35 years and have 3 children. What is the relation between Mithun and Mohan?
(a) Uncle (b) Son (c) Brother (d) No relation

48. Rahul and Robin are brothers. Pramod is Rohin's father. Sheela is Pramod's sister. Prema is Pramod's niece. Shubha is Sheela's grand-daughter. How is Rahul related to Shubha?
(a) Brother (b) Cousin (c) Uncle (d) Nephew

49. Preeti has a son, named Arun. Ram is Preeti's brother. Neeta too has a daughter named Reema. Neeta is Ram's sister. What is Arun's relationship to Reema?
(a) Brother (b) Nephew (c) Cousin (d) Uncle

50. There are 2 film stars. One is the father of the other's son. What is the relationship of the two with each other?
(a) Grandfather and Grandson (b) Grandfather and son
(c) Husband and wife (d) Father and Son

51. Ramu's mother said to Ramu,"My mother has a son whose son is Achyut". How is Achyut relation to Ramu?
(a) Uncle (b) Cousin (c) Brother (d) Nephew

52. Ravi's father has a son Rohit who has an aunt Laxmi who has a husband Rao whose father-in-law is Mohan. What is the relation of Mohan to Ravi?
(a) Nephew (b) Grandfather (c) Son (d) Uncle

53. Vijay says, Ananda's mother is the only daughter of my mother". How is Ananda relation to Vijay?
(a) Brother (b) Father (c) Nephew (d) Grandfather

54. Introducing a man, a woman said, "His wife is the only daughter of my mother." How is the woman related with the man?
(a) Sister-in-law (b) Wife (c) Aunt (d) Mother-in-law

55. A prisoner introduced a boy who came to visit him to the jailor as "Brothers and sisters I have none, he is my father's son's son". Who is the boy?
(a) Nephew (b) Son (c) Cousin (d) Uncle

Answer Sheet

1.	**c**	**2.**	**a**	**3.**	**d**	**4.**	**c**	**5.**	**d**	**6.**	**a**	**7.**	**d**	**8.**	**a**	**9.**	**b**	**10.**	**c**
11.	**b**	**12.**	**d**	**13.**	**c**	**14.**	**b**	**15.**	**c**	**16.**	**d**	**17.**	**b**	**18.**	**a**	**19.**	**a**	**20.**	**a**
21.	**a**	**22.**	**a**	**23.**	**d**	**24.**	**c**	**25.**	**b**	**26.**	**a**	**27.**	**a**	**28.**	**a**	**29.**	**a**	**30.**	**c**
31.	**d**	**32.**	**b**	**33.**	**a**	**34.**	**c**	**35.**	**d**	**36.**	**c**	**37.**	**c**	**38.**	**a**	**39.**	**b**	**40.**	**c**
41.	**d**	**42.**	**b**	**43.**	**a**	**44.**	**c**	**45.**	**d**	**46.**	**a**	**47.**	**d**	**48.**	**c**	**49.**	**c**	**50.**	**d**
51.	**b**	**52.**	**b**	**53.**	**c**	**54.**	**b**	**55.**	**b**										

Summary Notes