MATHS PREVIOUS YEARS QUESTION BY CMA ALI SIR

INDEX NUMBER

CH: 1 RATIO , PRPORTION , INDICES AND LOG

2006 - NOVEMBER

1. Two numbers are in the ratio 2 : 3 and the difference of their squares is 320. The numbers are:

   (a)12, 18 **(b) 16, 24** (c) 14,21 (d) None.

2. 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.**

3. An alloy is to contain copper and zinc in the ratio 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) 9kg

4.

5. $7\log\left(\frac{16}{15}\right) + 5\log\left(\frac{25}{24}\right) + 3\log\left(\frac{81}{80}\right)$ is equal to:

   (a) 0 (b) 1 **(c) log2** (d) log 3

2007 - FEBRUARY

6. Two numbers are in the ratio 7 : 8. if 3 is added to each of them, their ratio becomes 8 : 9. The numbers are :

   (a) 14,16 (b) 24,27 **(c) 21, 24** (d) 16,18

7. 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) 1

8. 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) $a^2 - \frac{1}{a^2}$

9. 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 +1) (d) None.

10. If $\log_{10000} X = \frac{1}{4}$, then x is given by:

(a) $\frac{1}{100}$ **(b)** $\mathbf{\frac{1}{10}}$ (c) $\frac{1}{20}$ (d) None of these.

2007 - MAY

11. 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

12. 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

13. Simplification of $\frac{x^{m+3n}.x^{4m-9n}}{x^{6m-6n}}$ is :

(a) x^m **(b)** $\mathbf{x^{-m}}$ (c) x^n (d) x^{-n}

14. If log (2a - 3b) = log a - log b, then a = :

(a) $\mathbf{\frac{3b^2}{2b-1}}$ (b) $\frac{3b}{2b-1}$ (c) $\frac{b^2}{2b+1}$ (d) $\frac{3b^2}{2b+1}$

2007 - AUGUST

15. 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

16. Ratio of earnings of A and B is 4 : 7. If the earnings 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.**

17. 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

18. $\frac{1}{\log_{ab}(abc)} + \frac{1}{\log_{bc}(abc)} + \frac{1}{\log_{ca}(abc)}$ is equal to :

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

19. 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.

2007 - NOVEMBER

20. Rs. 407 are to be divided among A, B and C so that their shares are inthe ratio $\frac{1}{4}:\frac{1}{5}:\frac{1}{6}$. The respective shares of A, B, C are :

(a) Rs. 165, Rs. 132, Rs. 110 (b) Rs. 165, Rs. 110, Rs. 132

(c) Rs. 132, Rs. 110, Rs. 165 (d) Rs. 110, Rs. 132, Rs. 165

21. The incomes of A and B are in the ratio 3 : 2 and their expenditures in the ratio 5 : 3. If each saves Rs. 1,500, then B's income is :

(a) Rs. 6,000 (b) Rs. 4,500 (c) Rs. 3,000 (d) Rs. 7,500

22. If $4^x = 5^y = 20^z$ then z is equal to :

(a) xy (b) $\frac{x+y}{xy}$ (c) $\frac{1}{xy}$ **(d)** $\frac{xy}{x+y}$

23. $\left(\frac{\sqrt{3}}{9}\right)^{\frac{5}{2}}\left(\frac{9}{3\sqrt{3}}\right)^{\frac{7}{2}} \times 9$ is equal to :

(a) 1 (b) $\sqrt{3}$ (c) $3\sqrt{3}$ (d) $\frac{3}{9\sqrt{3}}$

24. The value $\frac{\log_3 8}{\log_9 16 \cdot \log_4 10}$ is :

(a) 3 $\log_{10}2$ (b) 7 $\log_{10}3$ (c) 3 $\log_e z$ (d) None.

2008 - FEBRUARY

25. In 40 litres mixture of glycerine and water, the ratio of glycerine and water is 3:1. The quantity of water added in the mixture in order to make this ratio 2:1 is:

(a) 15 litres (b) 10 litres (c) 8 litres **(d) 5 litres**

26. 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)** $\frac{(a+b)^3}{a-b}$

27. If $2^x - 2^{x-1} = 4$ then x^x is equal to :

(a) 7 (b) 3 **(c) 27** (d) 9

28. If $x = \frac{e^n - e^{-n}}{e^n + e^{-n}}$, then the value of n 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) $\log_e \frac{1-x}{1+x}$

29. 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

2008 - JUNE

30. In what ratio should tea worth Rs. 10 per kg be mixed with tea worth Rs. 14 per kg, so that the average price of the mixture may be Rs. 11 per kg?

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

31. The ages of two persons are in the ratio 5:7. Eighteen years ago their ages were in the ratio of 8:13. their present ages (in years) are :

(a) 50,70 (b) 70, 50 (c) 40, 56 (d) None.

32. If $x = y^a$, $y = z^b$ and $z = x^c$ then abc is:

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

33. If $\log_2 [\log_3 (\log_2 x)] = 1$, then x equals :

(a) 128 (b) 256 **(c)512** (d) None.

2009 - DECEMBER

34. If $\log\left(\frac{a+b}{4}\right) = \frac{1}{2}(\log a + \log b)$ then: $\frac{a}{b} + \frac{b}{a}$

(a) 12 **(b) 14** (c) 16 (d) none

35. If A, B and C started a business by investing Rs. 1,26,000, Rs. 84,000 and Rs. 2,10,000. If at the end of the year profit is Rs. 2,42,000 then the share of each is:

(a)72,600, 48,400, 1,21,000 (b) 48,400, 1,21,000, 72,600

c)72,000, 49,000, 1,21,000 (d) 48,000,1,21,400,72,600

2009 – JUNE

36. If $\frac{p}{q} = -\frac{2}{3}$ then the value of $\frac{2p+q}{2p-q}$ is :

(a) 1 (b) -1/7 **(c) 1/7 -** (d) 7

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

(a) (x + 2) (b) (x - 2) **(c) (2x + 2)** (d) (2x – 2)

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

(a) 3 (b) 9 (c)12 **(d) 10**

39. Find the value of: $[1- \{1- (1-x^2)^{-1}\}^{-1}]^{-1/2}$

(a)1/x **(b) x** (c) 1 (d) None of these.

40. log (m + n) = log m + log n, m can be expressed as :

(a) m = $\frac{n}{n-1}$ (b) m = $\frac{n}{n+1}$ (c) m = $\frac{n+1}{n}$ (d) m = $\frac{n+1}{n-1}$

41. $\log_4 (x^2 + x) - \log_4(x+1) = 2$. Find x

(a) 16 (b) 0 (c) -1 (d) None of these.

2009 - DECEMBER

42. $\frac{2^n + 2^{n-1}}{2^{n+1} - 2^n}$

(a) ½ **(b) -3** (c) 2/3 (d) 1/3

43. If $2^x \times 3^y \times 5^z = 360$ Then what is the value of x, y, z,?

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

44. Find the value of $[\log_{10} \sqrt{25} - \log_{10} (2)^3 + \log_{10} (4)^2]^x$

(a)x (b)10 **(c)1** (d)None.

2010 - JUNE

45. If $\log_a b + \log_a c = 0$ then

(a) b = c (b) b = - c (c) b = c = 1 **(d) b and c are reciprocals.**

46. 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

47. class, the remaining students are in the ratio of 4 : 6 then the number of students in each class is:

(a) 30, 40 (b) 25, 24 (c)40, 60 **(d) 50, 70**

2010 - DECEMBER

48. The value of $2 \log x + 2 \log x^2 + 2 \log x^3 + \text{----------} + 2 \log x^n$ will be :

(a) $\frac{n(n+1)\log x}{2}$ **(b) n(n + 1) log x** (c) n^2 log x (d) None of these.

49. The recurring decimal 2.7777 ……. can be expressed as:

(a)24/9 (b)22/9 (c)26/9 **(d)25/9**

50. Solve : $\left(\frac{\log x_{10}-3}{2}\right)+\left(\frac{11-\log x_{10}}{3}\right)=2$

(a) 10^{-1} (b) 10^2 (c) 10 (d) 10^3

51. If A:8 = 2:5, then (10A + 3B):(5A + 2B) is equal io:

(a) 7 : 4 (b) 7 : 3 (c) 6 : 5 (d) 7 : 9

2011 - JUNE

52. If n = m! where ('m' is a positive integer > 2) then the value of:

$$\frac{1}{\log_2^n}+\frac{1}{\log_3^n}+\frac{1}{\log_4^n}+\ \ldots\ldots\ldots+\frac{1}{\log_m^n}$$

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

Answer:

(a) Given : n = M ! for M ≥ 2

$$\frac{1}{\log_2^n}+\frac{1}{\log_3^n}+\frac{1}{\log_4^n}+\ \ldots\ldots\ldots+\frac{1}{\log_m^n}$$

or, $=\log_n^2+\log_n^3+\log_n^4+\ \ldots\ldots\ldots\ldots+\log_n^m\left(\because \log_b^a=\frac{1}{\log_a^b}\right)$

$= \log_n(2 \times 3 \times 4 \times \ldots\ldots\ldots \times m)\ (\because \log^{(mn)} = \log^m + \log^n)$

$= \log_n (m!)$

$= \log_n^n$

$= 1$

53. 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

2011 - DECEMBER

54. The ratio Compounded of 4:5 and sub-duplicate of "a":9 is 8:15. Then Value of "a" is:

(a) 2 (b) 3 **(c) 4** (d) 5

55. If $\log_2 x + \log_4 x = 6$, then the Value of x is :

(a) 16 (b) 32 (c) 64 (d) 128

56. If X Varies inversely as square of Y and given that Y = 2 for X = 1, then the Value of X for Y = 6 will be:

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

2012 - JUNE

57. The value of $\frac{(3^{n+1}+3^n)}{(3^{n+3}-3^{n+1})}$ is equal to:

(a) 1/5 **(b) 1/6** (c) ¼ (d) 1/9

58. If $\log_x y = 100$ and $\log_2 x = 10$, then the value of 'y' is :

(a) 2^{10} (b) 2^{100} **(c) $2^{1,000}$** (d) $2^{10,000}$

59. Which of the numbers are not in proportion ?

(a) 6, 8, 5, 7 (b) 7, 3, 14, 6 [c)18,27,12,18 (d) 8, 6, 12, 9

2012 - DECEMBER

60. Find the value of x. if $x\,(x)^{1/3} = (x^{1/3})^x$

(a) 3 **(b) 4** (c) 2 (d). 6

61. Which of the following is true.

If $\frac{1}{ab}+\frac{1}{bc}+\frac{1}{ca}=\frac{1}{abc}$

(a) log (ab + bc + ca) = abc (b) log $\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$ = abc

(c)log (abc) = 0 **(d) log (a + b + c) = 0**

62. 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

2013 - JUNE

63. For what value of x, the equation $(\log_{\sqrt{x}} 2)^2 = \log_x^2$ is true?

(a) 16 (b) 32 (c) 8 (d) 4 (

64. The mean proportional between 24 and 54 is :

(a) 33 (b) 34 (c) 35 **(d) 36**

65. The triplicate ratio of 4 : 5 is:

(a) 125 : 64 (b) 16 : 25 **(c) 64: 125** (d) 120:46

2013 - DECEMBER

66. If $\sqrt[3]{a} + 3\sqrt{b} + 3\sqrt{c}$ then the value of $\left(\frac{a+b+c}{3}\right)^3 = 0$

(a) abc (b) 9abc (c) $\frac{1}{abc}$ (d) $\frac{1}{9abc}$

67. Find three numbers in the ratio 1 : 2 : 3, so that the sum of their squares is equal to 504

(a) 6, 12, 18 (b) 3, 6, 9 (c) 4, 8, 12(d) 5, 10, 15

68. The value of $\log_4 9 \cdot \log_3 2$ is:

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

69. The value of $(\log x \cdot \log_z y \cdot \log_x z)^3$ is

(a)0 (b) -1 **(c)1** (d) 3(

70. Divide 80 into two parts so that their product is maximum, then the numbers are:

(a) 25, 55 (b) 35, 45 **(c) 40,40** (d) 15,65 (

2014 - JUNE

71. If x : y = 2:3, then (5x+2y):(3x-y)= _____

(a)19:3 (**b) 16 : 3** (c) 7 : 2 (d) 7 : 3

72. If $(25)^{150} = (25x)^{50}$; then the value of x will be :

(a) 5^3 **(b) 5^4** (c) 5^2 (d) 5

73. The value of $\left(\frac{y^a}{y^b}\right)^{a^2+ab+b^2} \times \left(\frac{y^b}{y^c}\right)^{b^2+bc+c^2} \times \left(\frac{y^c}{y^a}\right)^{c^2+ac+a^2}$ is equal to _____.

(a)y (b)-1 **(c)1** (d)Noneof these

74. If the salary of P is 25% lower than that of Q and the salary of R is 20% higher than that of Q, the ratio of the salary of R and P will be:

(a)5: 8 (**b)8 :5** (c)5:3 (d)3 :5

75. If $x^2 + y^2 = 7xy$, then $\log \frac{1}{3}(x+y)$ = _____.

(a) (log x+log y) **(b) $\frac{1}{2}$ (log x + log y)**

(c) $\frac{1}{3}$ (log x / log y) (d) $\frac{1}{3}$ (log x + log y) (1 mark)

76. A person has assets worth Rs. 1,48,200. He wish to divide it amongst his wife, son and daughter in the ratio 3:2:1 respectively. From this assets, the share of his son will be:

(a)Rs. 24,700 **(b) Rs. 49,400** (c) Rs. 74,100 (d) Rs. 37,050

77. If $x = \log_{24}12$, $y = \log_{36}24$ and $z = \log_{48}36$, then xyz + 1 =

(a) 2xy (b) 2xz **(c) 2yz** (d) 2

2014 - DECEMBER

78. If log x = a + b, log y = a - b then the value of $\log \frac{10x}{y^2}$ = _____.

(a) 1 - a + 3b (b) a - 1 + 3b (c) a + 3b + 1 (d) 1 - b + 3a

79. If $x = 1 + \log_p qr$, $y = 1 + \log_0 rp$ and $z = 1 + \log_r pq$ then the value of

$\frac{1}{x} + \frac{1}{y} + \frac{2}{z}$ = _____

(a)0 **(b) 1.** (c)-1 (d) 3

80. For three months, the salary of a person are in the ratio 2 : 4 : 5. If the difference between the product of salaries of the first two months and last two months is Rs. 4,80,00,000; then the salary of the person for the second month will be:

(a) Rs. 4,000 (b) Rs. 6,000 **(c) Rs. 8,000** (d) Rs. 12,000

2015 - JUNE

81. A dealer mixes rice costing Rs. 13.84 per Kg. with rice costing Rs. 15.54 and sells the mixture at Rs. 17.60 per Kg. So, he earns a profit of 14.6% on his sale price. The proportion in which he mixes the two qualities of rice is:

(a) 3 : 7 (b) 5 : 7 (c) 7:9 (d) 9: 11

82. If $p^x = q$, $q^y = r$ and $r^z = p^6$, then the value of xyz will be:

(a) 0 (b) 1 (c) 3 **(d) 6**

83. If log x = m + n and log y = m - n, then log $(10x/y^2)$ =

(a) 3n - m + 1 (b) 3m - n + 1 (c) 3n + n + 1 (d) 3m + n + 1

84. If $15(2p^2 - q^2) = 7pq$, where p and q are positive, then p : q will be:

(a) 5 : 6 (b) 5 : 7 (c) 3 : 5 (d) 8 : 3

2015 - DECEMBER

85. The ratio of third proportion of 12, 30 to the mean proportion of 9, 25is:

(a)2:1 **(b) 5:1** (c) 7:15 (d) 3:5

86. The value of $\log_5 3 \times \log_3 4 \times \log_2 5$.

(a) 0 (b) 1 (c) **2 (d)** $\frac{1}{2}$

87. What number must be added to each of the numbers 10,18,22, 38 to make the numbers is proportion?

(a)2 (b) 4 (c) 8 (d) None of these.

88. The value of $\frac{2^n+2^{n-1}}{2^{n+1}-2^n}$is :

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

2016 - JUNE

89. The integral part of a logarithm is called _____ and the decimalpart of a logarithm is called _____.

(a)Mantissa, Characteristic **(b) Characteristic, Mantissa**
(c) Whole, Decimal (d) None of these.

90. The value of $\left[\frac{x^2-(y-z)^2}{(x+z)^2-y^2}+\frac{y^2-(x-z)^2}{(x+y)^2-z^2}+\frac{z^2-(x-y)^2}{(y+z)^2-x^2}\right]$ is

(a) 0 **b) 1** (c) – 1 (d)∞

91. X, Y, Z together starts a business. If X invests 3 times as much as Y invests and Y invests two third of what Z invests, then the ratio of capitals of X, Y, Z is:

(a) 3:9:2 (b) 6:3:2 (c) 3:6:2 **(d) 6:2:3**

92. If $\log_4(x^2 + x) - \log_4(x+1) = 2$, then the value of X is:

(a) 2 (b) **3(c)** (d) 8

93. Value of $\frac{1}{\log_3^{60}} + \frac{1}{\log_4^{80}} + \frac{1}{\log_5^{60}}$ is:

(a) 0 **(b) 1** (c) 5 (d) 60

2016 - DECEMBER

94. If $3^x = 5^y = 75^z$, then

(a) x+y- z=0 (b) $\frac{2}{x} + \frac{1}{y} - \frac{1}{z}$ **(c)** $\mathbf{\frac{1}{x} + \frac{2}{y} = \frac{1}{z}}$ (d) $\frac{2}{x} + \frac{1}{z} = \frac{1}{y}$

95. If log 2 = 0.3010 and log 3 = 0.4771, then the value of log 24 is:

(a) 1.0791 (b) 1.7323 **(c) 1.3801** (d) 1.8301

96. If abc = 2, then the value of $\frac{1}{1+a+2b^{-1}} + \frac{1}{1+\frac{1}{2}b+c^{-1}} + \frac{1}{1+c+a^{-1}}$ is:

(a) 1 (b) 2 (c) 3 (d) $\frac{1}{2}$

97. There are total 23 coins ofRs. 1,Rs. 2 and Rs. 5in abag.If theirvalueisRs. 43 and the ratio of coinsof Rs.1and Rs. 2 is3:2.Thenthenumberofcoins of Rs. 1 is:

(a) 12 (b) 5 (c) 10 (d) 14

2017-JUNE

98. If a : b = 2 : 3, b:c = 4:5 and c : d = 6 : 7, then a : d is:

(a) 24 : 35 (b) 8 : 15 **(c) 16:35** (d) 7:15

99. The value of log ($1^3 + 2^3 + 3^3 + \ldots\ldots n^3$) is equal to:

(a) 3 log 1 + 3 log 2 + ….. + 3 log n

(b) 2 log n + 2 log (n+1) - 2 log 2

(c)log n + log (n+1) + log (2n+1) - log 6(1 mark)

(d)1

100. If a = $\frac{\sqrt{6}+\sqrt{5}}{\sqrt{6}-\sqrt{5}}$ and b = $\frac{\sqrt{6}-\sqrt{5}}{\sqrt{6}+\sqrt{5}}$ then the value of $\frac{1}{a^2} + \frac{1}{b^2}$ is equal to:

(a) 480 **(b) 482** (c) 484 (d) 486

2017 - DECEMBER

101. The ratio of the number of Rs. 5 coins and Rs. 10 coins is 8 : 15. If the

value of Rs. 5 coins is Rs. 360, then the number of Rs. 10 coins will be:

(a) 72 (b) 120 **(c)135** (d) 185

102. If $\log_3 [\log_4 (\log_2 x)] = 0$, then the value of 'x' will be:

(a) 4 (b) 8 **(c) 16** (d) 32

103. If $\log \left(\frac{x-y}{2}\right) = \frac{1}{2} (\log x + \log y)$, then the value of $x^2 + y^2$ =

(a) $2xy$ (b) $4xy$ (c) $2x^2y^2$ **(d) 6xy**

104. If $\frac{1}{2}, \frac{1}{3}, \frac{1}{5}$ and $\frac{1}{x}$ are in proportion, then the value of 'x' will be:

(a) $\frac{15}{2}$ (b) $\frac{6}{5}$ (c) $\frac{10}{3}$ (d) $\frac{5}{6}$

2018-MAY

105. 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.**

106. The value of the expression :

$a^{\log_a b \cdot \log_b^c \cdot \log_c^d \cdot \log_d t}$

a) t (b) abcdt (c) (a + b + c + d + t) (d) None

107. The mean proportional between 24 and 54 is:

(a) 33 (b) 34 (c)35 **(d) 36**

108. The value of $\log_4 9 . \log_3 2$ is:

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

109. $\frac{2^n + 2^{n-1}}{2^{n-1} - 2^n}$

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

2018 - NOVEMBER

110. $\frac{3x-2}{5x+6}$ is the duplicate ratio of $\frac{2}{3}$ then find the value of x:

(a) 2 **(b)** **6** (c) 5 (d) 9

111. $\frac{2^{m+1}\times 3^{2m+n+3}\times 5^{n-m+4}\times 6^{2n+m}}{6^{2m+n}\times 10^{n+1}\times 15^{m+3}}$

(a) 3^{2m+2n} (b) 3^{2n-2m} **(c) 1** (d) None of the above

112. Ifx:y:z = 7:4:11 then $\frac{x+y+z}{z}$ is:

(a) 2 (b) 3 (c) 4 (d) 5

113. $\log_2 \log_2 \log_2 16$ =?

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

2019 - JUNE

114. If the ratio of two numbers is 7 :11. If 7 is added to each number then the new ratio will be 2 : 3 then the numbers are.

(a)49, 77 (b)42,45 (c)43,42 (d)39, 40

115. If $2^{x^2} = 3^{y^2} = 12^{z^2}$then

(a) $\frac{1}{x^2}+\frac{1}{y^2}=\frac{1}{z^2}$ (b) $\frac{1}{x^2}+\frac{2}{y^2}=\frac{1}{z^2}$ **(c)** $\frac{2}{x^2}+\frac{1}{y^2}=\frac{1}{z^2}$ (d)None

116. The value of

$$\log_5,\left(1+\frac{1}{5}\right)+\log_5\left(1+\frac{1}{6}\right)+------+\log_5,\left(1+\frac{1}{624}\right)$$

(a)2 **(b)3** (c)5 (d) 0

117. $\log_{2\sqrt{2}}(512):\log_{3\sqrt{2}}324 =$

(a)128:81 (b)2 : 3 **(c)3:2** (d) None

118. If $P = x^{1/3} + x^{-1/3}$then $P^3 - 3P$ =

(a)3 (b) $\frac{1}{2}\left(x+\frac{1}{x}\right)$ **(c)** $\left(x+\frac{1}{x}\right)$ (d) $2\left(x+\frac{1}{x}\right)$

2019 - NOVEMBER

119. The ratio of two numbers are 3 : 4. The difference of their squares is 28 Greater no is:

(a)8 (b)12 (c)24 (d)64.

120. The price of scooter and moped are in the ratio 7 : 9. The price of moped is Rs. 1,600 more than that of scooter. Then the price of mopedis:

(a)Rs. 7,2000 (b)Rs. 5.600 (c)Rs. 800 (d)Rs. 700

121. $\log_{0.01} 10{,}000$ = ?

(a)2 **(b)-2** (c)4 (d) -4

122. Value of $\left[9^{n+\frac{1}{4}} \cdot \frac{\sqrt{3.3^n}}{3\cdot\sqrt{3^{-n}}}\right]^{\frac{1}{n}}$

(a) 9 **(b)27** (c) 81 (d)3

123. If $x = \sqrt{3} + \frac{1}{\sqrt{3}}$ then $\left(x - \frac{\sqrt{126}}{\sqrt{42}}\right)\left(x - \frac{1}{x - \frac{2\sqrt{3}}{3}}\right)$ =?

(a)5/6 (b)6/5 (c)2/3 (d)- 3/5

2020 - NOVEMBER

124. If a : b = 3 : 7, then 3a + 2b : 4a + 5b = ?

(a)23:47 (b)27:43 (c)24 : 51 (d)29 : 53

125. If $\log_a\sqrt{3} = \frac{1}{6}$, find the value of Q:

(a)9 (b) 81 **(c)27** (d) 3

126. log 9 + log 5 is expressed as:

(a)log 4 (b)log 9/5 (c)log 5/9 **(d)log 45**

127. If a : b = 9 : 4, then $\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}}$ =?

(a) 3/2 (b) 2/3 (c)6/13 **(d)13/6**

128. The ratio of number of boys and the number of girls in a school is found to be 15 : 32. How many boys and equal number of girls should be added to bring the ratio to 2/3?

(a)19 (b)20 (c)23 (d)27

129. Find the value of a from the following:

$\sqrt{(9)}^{-5} \times \sqrt{(3)}^{-7} - \sqrt{(3)}^{-a}$

(a)11 (b)13 (c)15 **(d)17**

2021 - JANUARY

130. Find the value of $\frac{3t^{-1}}{t^{-1/3}}$

(a) $\frac{3}{t^{2/3}}$ (b) $\frac{3}{t^{3/2}}$ (c) $\frac{3}{t^{1/3}}$ (d) $\frac{3}{t^2}$

131. If $\log_a (ab) = x$, then $\log_b (ab)$ is

(a) 1/x (b) $\frac{x}{1+x}$ **(c)** $\frac{x}{x-1}$ (d) None of these

132. In a certain business A and B received profit in a certain ratio B and C received profits in the same ratio. If A gets Rs. 1600 and C gets Rs. 2500 then how much does B get?

(a)Rs. 2,000 (b)Rs. 2,500 (c)Rs. 1,000 (d)Rs. 1,500

133. The ratio of two quantities is 15 :17. If the consequent of its inverse ratio is 15, then the antecedent is;

(a)15 (b)$\sqrt{15}$ **(c)17** (d) 14

134. The salaries of A, B and C are in the ratio 2 : 3 : 5. If increments of 15%, 10% and 20% are allowed respectively to their salary, then what will be the new ratio of their salaries?

(a)3:3:10 (b)10:11: 20 **(c)23:33: 60** (d)Cannot be determined

2021 - JULY

135. The salaries of A, B, and C are in the ratio 2 : 3 : 5. if increments of 15%, 10% and 20% are allowed respectively to their salary, then what will be the new ratio of their salaries?

(a)23 : 33 : 60 (b)33:23:60 (c) 23:60:33 (d) 33:60: 23

136. if A : B = 5 : 3, B : C = 6 : 7 and C : D = 14 : 9 then the value of A : B : C : D is:

(a)20 : 14 : 12 : 9 (b)20 : 9 : 12 : 14 (c)20 : 9 : 14 : 12 **(d)20:12:14:9**

137. A vessel contained a solution of acid and water in which water was 64%. Four litres of the solution were taken out of the vessel and the same quantity of water was added. If the resulting solution contains 30% acid, the quantity (in litres) of the solution, in the beginning in the vessel, was

(a)12 (b)36 **(c)24** (d)2

138. If xy + yz + zx = -1 then the value of $\left(\frac{x+y}{1+xy} + \frac{z+y}{1+2y} + \frac{x+z}{1+zx}\right)$ is:

(a) xyz (b) $\frac{-1}{yz}$ **(c)** $\frac{1}{xyz}$ (d) $\frac{1}{x+y+z}$

(a)64 (b)4 **(c)16** (d) 2

2021 - DECEMBER

139. Let a= $(\sqrt{5}+\sqrt{3})/(\sqrt{5}-\sqrt{3})$andb= $(\sqrt{5}-\sqrt{3})/(\sqrt{5}+(\sqrt{3})$. What is the value of $a^2 + b^2$?

(a)64` **(b)62** (c)60 (d) 254

140. Incomes of R and S are in the ratio 7 : 9 and their expenditures are in the ratio 4:5. Their total expenditure is equal to income of R. What is the ratio of their savings?

(a)23 : 36 (b) 28:41 (c) 31 : 43 **(d) 35 : 46**

Answer:

141. A bag contains 105 coins containing some 50 paise, and 25 paise coins. The ratio of the number of these coins is 4:3 . The total value (in Rs.) in the bag is

(a)43.25 **(b)41.25** (c)39.25 (d)35.25)

142. If $\log_{10} 3 = x$ and $\log_{10} 4 = y$, then the value of $\log_{10} 120$ can be expressed as

(a)x - y + 1 **(b)x + y + 1** (c)x + y -1 (d)2x + y -1

143. Find the value of $\log(x^6)$, if $\log(x) + 2\log(x^2) + 3\log(x^3) = 14$,

(a)3 (b)4 (c)5 **(d)6**

144. The value of $\frac{6^{n+4}3^{n+3}\times 2^{n+3}}{5\times 6^n+6^n}$is:

(a)232 (b)242 **(c)252** (d)262

145. In a department, the number of males and females are in the ratio 3 : 2. if 2 males and 5 females join the department, then the ratio becomes 1:1. Initially, the number of females in the department is

(a)9 **(b)6** (c) 3 (d) 8

146. If, $\left(\frac{3a}{2b}\right)^{2x-4} = \left(\frac{2b}{3a}\right)^{2x-4}$,for some a and b, then the value of x is

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

147. The value of $\left(1 - \sqrt[3]{0.027}\left(\frac{5}{6}\right)\left(\frac{1}{2}\right)^2\right)$ is:

(a)11/16 (b)13/16 **(c)15/16** (d)1

JUNE 2022

148. Log $\sqrt{3} = 6$ base a ,the a will be

A.27 B.36 C.15 D.1

149. Log $\frac{p^2}{qr}$ + Log $\frac{q^2}{pr}$ + Log $\frac{r^2}{qr}$ is

A.pqr B.0 C.1 D.none

150. A Box contain 25 paise coins and 10 paise coins and 5 paise coins in the Ratio 3:2:1 and total money is Rs 40 .how many 5 paise conis are there

A. 65 **B.55** C.40 D.50

151. If X: Y = 4: 6 and Z: X- 4: 16 find Y ?

B. 4 B.6 C.16 D.1

152. If ($\sqrt{3^{18}}$)= $\sqrt{9^x}$ find X

A.18 B.8 **C9** D.19

DEC 2022

153. If the cost of 3 bags and 4 pens is Rs. 257 whereas the cost of 4 bags and 3 Rs. 324, then the cost of one beg is:

A. 8 B. 24 C. 32 D. 75

154. If $\log_{10} 2 = y$ and $\log_{10} 3=x$, then the value of $\log_{10} 15$ is:

A. x – y+ 1 B. x + y + 1 C. x – y- 1 D. y – x+ 1

155. $\log_7 4.\log_4 5.\log_5 6.\log_6 7 \cdot \log_7 8.\log_8 9$ equals to:

A. 3 B. 2 C. 1 D. 0

156. A sum of money is to be distributed among A, B, C, D in the proportion of 5:2:4:3. If C gets Rs. 1000 more than D, what is B's share?

A. 2000 B. 1500 C. 2300 D. 1000

157. By simplifying $(2a^3b^4)^4/((4a^3b)^2\times (a^3b^3))$, the answer will be

A. $4a^3b^3$ B. $4a^3b^{23}$ C. $4a^{23}b^{23}$ D. $4a^{18}b^{13}$

158. A group of 400 soldiers posted at border area had a provision for 31 days.

After 28 days 280 soldiers from this group were called back. Find the number of days for which the remaining ration will be sufficient?

A. 3 B. 6 C. 8 D. 10

JUNE 2023

159. If $\sqrt[3]{a} + 3\sqrt{b} + 3\sqrt{c}$ then the value of $\left(\frac{a+b+c}{3}\right)^3 = 0$

(a) abc (b) 9abc (c) $\frac{1}{abc}$ (d) $\frac{1}{9abc}$

160. The value of $[\log_{10}(5 \log_{10} 100)]^2$ =?

(a)1 (b)2 (c) 10 (d) 2 5

161. If log x = m + n and log y = m - n, then log $(100x/y^2)$ =

(a) 3n - m + 1 (b) 3n + m -1 (c) m^2-n^2 (d) 3m + n + 1

CHAPTER 2 EQUATIONS

MULTIPLE CHOICE QUESTIONS AND ANSWERS

2006 - NOVEMBER

162. On solving $\sqrt{\frac{x}{1-x}} + \sqrt{\frac{1-x}{x}} = 2\frac{1}{6}$, we get one value of x as :

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

163. Find the positive value of k for which the equations : $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will have real roots :

(a)12 **(b) 16** (c) 18 (d) 22

2007 - FEBRUARY

164. A man sells 6 radios and 4 televisions for Rs. 18,480, If 14 radios and 2 televisions are sold for the same amount, what is the price of a television?

(a) Rs. 1,848 (b) Rs. 840 (c) Rs. 1,680 **(d) Rs. 3,360**

165. If one root of a equation is $2 + \sqrt{5}$, then the quadratic equation is :

(a) $x^2 + 4x - 1 = 0$ **(b) $x^2 - 4x - 1 = 0$**

(c) $x^2 + 4x + 1 = 0$(d) $x^2 - 4x + 1 = 0$

2007 - MAY

166. A man starts his job with a certain monthly salary and earns a fixed increment every year. If his salary was Rs. 1,500 after 4 years of service and Rs. 1,800 after 10 years of service, what was his starting salary and what is the annual increment in rupees?

(a) Rs. 1,300, Rs. 50(b) Rs. 1,100, Rs. 50

(c) Rs. 1,500, Rs. 30(d) None.

2007 - AUGUST

167. The sides of an equilateral triangle are shortened by 12 units, 13 units and

14 units respectively and a right angled triangle is formed. The side of the equilateral triangle is :

(a) 17 units (b) 16 units

(c)15 units(d) 18 units.

168. The value of $\sqrt{6 + \sqrt{6 + \sqrt{6 + \ldots\ldots\infty}}}$ is :

(a) -3 (b) 2

(c) 3 (d) 4

2007 - NOVEMBER

169. Area of a rectangular garden is 8000 square metres. Ratio in length and breadth is 5:4. A path of uniform width, runs all round the inside of the garden. If the path occupies 3200 m^2, what is its width?

(a) 12m (b) 6m

(c) 10m (d) 4m.

2008 - FEBRUARY

170. A man went to the Reserve Bank of India with Rs. 1,000. He asked the cashier to give him Rs. 5 and Rs. 10 notes only in return. The man got 175 notes in all. Find how many notes of Rs. 5 and Rs. 10 did he receive?

(a) (25, 150) (b) (40, 110)

(c) (150,25) (d) None.

2008 - JUNE

171. A man rowing at the rate of 5 km in an hour in still water takes thrice as much time in going 40 km up the river as in going 40 km down. Find the rate at which the river flows :

(a)9 km/hr **(b) 2.5 km/hr**

(c) 12 km/hr (d) None.

172. The value of

$2 + \frac{1}{2+\frac{1}{2+\ldots\ldots\ldots\infty}}$)is:

(a) 1 + $\sqrt{2}$ (b) $2 \pm \sqrt{5}$

(c) $2 \pm \sqrt{3}$(d) None.

2008 - DECEMBER

173. If $x^3 - 6x^a + 11x - 6 = 0$ then find the value of (3x - 4).

(a)(1,2,3) **(b) (-1,2,5)**

(c) (-1,3, 5) (d) (2, 3, 5)

174. If $(2 - \sqrt{3})$ is a root of a quadratic equation $x^2 + p_x + q = 0$ then find the value of p and q.

(a) (4.-1) (b) (4,1)

(c) (-4,1) (d) (2,3)

175. If area and perimeter of a rectangle is 6000 cm^2 and 340 err respectively, then the length of rectangle is :

(a)140 **(b) 120**

(c) 170 (d) 200

2009 - June

176. One root of the equation :

$x^2 - 2(5 + m)x + 3(7 + m) = 0$ is

reciprocal of the other.

Find the value of M.

(a) – 7 (b) 7

(c) 1/7 (d) -1/7

2009 - December

177. If the length of a rectangle is 5 cm more than the breadth and if the perimeter of the rectangle is 40 cm, then the length & breadth of the rectangle will be :

(a) 7.5 cm, 2.5 cm (b) 10 cm, 5 cm

(c) 12.5 cm, 7.5 cm (d) 15.5 cm, 10.5 cm.(1 mark)

2010 - June

178. Roots of the equation $3x^2 - 14x + k = 0$ will be reciprocal of each other if:

(a) k = - 3 (b) k = 0

(c) k = 3 (d) k = 14.

2010 - December

179. Positive value of 'k' for which the roots of equation $12x^2 + kx + 5 = 0$ are in ratio 3:2, is:

(a) 5/12 (b) 12/5 (c) $\frac{5\sqrt{10}}{2}$ **(d) $5\sqrt{10}$**

180. If one root of the equation $x^2 - 3x + k = 0$ is 2, then value of k will be:

(a) -10 (b) 0 **(c) 2** (d) 10

2011 - June

181. If the ratio of (5x - 3y) and (5y - 3x) is 3 : 4, then the value of x : y is :

(a) 27 : 29 (b) 29 : 27 (c) 3:4 (d) 4:3

182. If roots of equation $x^2+x + r = 0$ are '$\propto$' and 'β' and$\propto^3+\beta^3 = - 6$. Find the value 'r' ?

(a) $\frac{-5}{3}$ (b) $\frac{7}{3}$ (c) $\frac{-4}{3}$ (d) 1

2011 - December

183. If one root of the Equation $px^2+qx +r = 0$ is r then other root of the Equation will be:

(a) 1/q (b) 1/r **(c) 1/p** (d) $\frac{1}{p + q}$

184. value of p is:

(a) 1 **(b) 2** (c) – 2 (d) - 1

185. Equation whose roots are (pq + p + q) and (pq - p - q)?

(a) $x^2-2cx + C^2-b^2 = 0$ (b) $x^2 - 2bx + C^2 + b^2 = 0$

(c) $8cx^2 - 2(b + c)x + C^2 = 0$ (d) $x^2 + 2bx - (C^2 - b^2) = 0$

2012 - June

186. If one of the roots of the equation $x^2 + px + a$ is $\sqrt{3}+2$, then the value of 'p' and 'a' is:

(a)- 4, -1 (b) 4, -1 **(c) – 4, 1** (d) 4,1

2012 - December

187. If $1\log_{10} 5 + \log_{10}(5x+1) = \log_{10}(x+5) + 1$ then, the value of x = _____.

(a) 7 **(b) 3** (c) 5 (d) 10

(a) 6 (b) -1 **(c) 6 and – 1** (d) None of the above.

188. Roots of equation $2x^2 + 3x + 7 = 0$ are α and β. The value of $\alpha\beta^{-1} + \beta\alpha^{-1}$ is

(a) 2 (b) 3/7 (c) 5 **(d) -19/14**

189. value of 'k' is _____.

(a) ±1 (b) ± 2 (c) ±3 **(d) ± 4**

2013 - June

190. If α and β are the roots of the equation $x^2 + 7x + 12 = 0$, then the equation whose roots $(\alpha + \beta)^2$ and $(\alpha - \beta)^2$ will be:

(a) $x^2 - 14x + 49 = 0$ (b) $x^2 - 24x + 144 = 0$

(c) $x^2 - 50x + 49 = 0$ (d) $x^2 - 19x + 144 = 0$

2013 - December

191. If $b^2 - 4ac$ is a perfect square but not equal to zero than the roots are:

(a)real and equal (b)real, irrational and equal
(c)real, rational and unequal (d)Imaginary.

192. A seller makes an offer of selling certain articles that can be described by the equation x = 25 - 2y where 'x' is the price per unit and 'y' denotes the number of unit. The cost price of the article is Rs. 10 per unit. The maximum quantity that can be offered in a single deal to avoid lossis _____.

(a) 6 **(b) 7** (c) 8 (d) 9

193.]If kx - 4 = (k -1)x, then which of the following is true?

(a) x = - 5 (b) x = - 4 (c) x = - 3 **(d) x = + 4**

194. The value of 'K' for which the system of equations kx + 2y = 5 and 3x + y = 1 has no solution is:

(a) 5 (b) $\frac{2}{3}$ **(c) 6** (d) $\frac{3}{2}$

2014 - June

195. The roots of the equation $y^3 + y^2 - y - 1 = 0$ are:

(a)(1, 1, -1) **(b) (-1,-1, 1)** (c) (1,1, 1) (d) None of these

2014 - December

196. The equation $x + 5y = 33$; $\frac{x+y}{x-y} = \frac{13}{3}$ has the solution (x, y) as;

(a) (4, 8) **(b) (8, 5)** (c)(4, 16) (d) (16, 4)

2015 - June

197. The number of students in each section of a school is 36. After admitting 12 new students, four new sections were started. If total number of students in each section now is 30, than the number of sections initially were.

(a) 6 (b) 10 (c) 14 **(d) 18**

198. If α and β be the roots of the quadratic equation $2x^2 - 4x = 1$, the valueof $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$ is _____.

(a) -11 (b) 22 **(c) -22** (d) 11

199. A person on a tour has Rs. 9,600 for his expenses. If his tour is extended by 16 days, he has to cut down his daily expenses by Rs. 20, his original duration of tour had been.

(a) 48 days (b) 64 days **(c) 80 days** (d) 96 days

200. 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**(b) 73 years**(c) 68 years(d) 63 years

201. The roots ofthe cubic equation $x^3 - 7x + 6 = 0$ are:

(a) 1,2 and3(b)1 -2and3**(c)1,2 and- 3(**d)1, -2 and - 3

2015 - December

202. If the roots of the equation $4x^2 - 12x + k = 0$ are equal, then the value of k

is:

(a)-3 (b) 3 (c) -9 **(d) 9**

203. If$\alpha + \beta = -2$ and $\alpha\beta = -3$. then α,β are the roots of the equation, which is:

(a) $x^2 - 2x - 3 = 0$ **(b) $x^2 + 2x-3 = 0$**

(c) $x^2 + 2x + 3 = 0$ (d) $x^2-2x + 3 = 0$

2016 - June

204. Let E_1 and E_2 are two linear equations in two variables x and y. (0,1) is a solution of both equations E_1 and E_2. (2, -1) is a solution of equationE_1 only and (-2, -1) is solution of E_2 only then $E_1$and E_2 are _____.

(a) X = 0, y = 1(b)2x - y = - 1, 4x + y = 1

(c) x + y = 1, x - y = - 1 (d)x + 2y = 2, x + y = 1

205. If difference between the roots of the equation x^2– kx+8=0 is 4, then the value of K is:

(a) 0 (b) ±4 (c) $\pm 8\sqrt{3}$ **(d) $\pm 4\sqrt{3}$**

206. If, $2^{x+y} = 2^{2x-y} = \sqrt{8}$ then the respective values of X and Y are —.

(a) 1, $\frac{1}{2}$ (b) $\frac{1}{2}$,1 (c) $\frac{1}{2},\frac{1}{2}$ (d) None of these.

2016 - December

207. A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of each article (in Rs.) was 2 more than thrice the number of articles produced on that day. if the total cost of production on that day was Rs. 800, the number of articles produced was

(a) 14 **(b) 16** (c) 12 (d) 18

2017-June

208. 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 (b) 7 units **(c) 8 units** (d) 10 units.

209. If α, β are the roots of the equation $x^2 + x + 5 = 0$ then $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$ is equalto

(a) $\frac{16}{5}$ (b) 2 (c) 3 **(d) $\frac{14}{5}$**

210. 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) **(b) (1,2)** (c) (-1,2) (d) (-2,1)

2017 - December

211. The roots of the cubic equation $x^3 + 7x^2 - 21x - 27 = 0$ are

(a)-1,3,9 (b)1,-3, 9 **(c) - 1,3, - 9** (d)- 1, -- 3,9

212. The difference between the roots of the equation $x^2–7x - 9 = 0$ is :

(a)7 **(b)$\sqrt{85}$** (c) 9 (d)$2\sqrt{85}$

213. If the sum of two numbers is 13 and the sum of their squares is 85, then the numbers will be;

(a) 3, 10 (b) 5, 8 (c)4, 9 **(d) 6, 7**

214. If $u^{5x} = v^{5y} = w^{5z}$ and $u^2 = vw$, then the value of xy + xz - 2yz will be:

(a) 5 (b) 2 (c)1 **(d)0**

2018 - May

215. If α + β = - 2 and αβ = - 3, then α, β are the roots of the equation, which is;

(a) $x^2 - 2x - 3 = 0$ **(b) $x^2 + 2x - 3 = 0$**

(c) $x^2 + 2x + 3 = 0$ (d) $x^2 - 2x + 3 = 0$

216. If $2^{x+y} = 2^{2x-y} = \sqrt{8}$, then the respective values of x and y are _____

(a) 1, $\frac{1}{2}$ (b) $\frac{1}{2}$, 1 (c) $\frac{1}{2},\frac{1}{2}$ (d) None of these

217. 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) **(b) (1,2)**

(c)(-1,2) (d) (-2,1)

218. 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 sides of an equilateral triangle is:

(a)6 units (b) 7 units **(c) 8 units** (d) 10 units

219. 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) $\frac{16}{5}$ (b) 2 (c) 3 **(d) $\frac{14}{5}$**

2018 - November

220. Let α and β be the roots of $x^2 + 7x + 12 = 0$. Then the value of $\left(\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}\right)$will be:

(a) $\frac{7}{12} + \frac{12}{7}$ (b) $\frac{49}{144} + \frac{144}{49}$ **(c) $-\frac{91}{12}$** (d) None of the above,

221. When two roots of quadratic equation are α, $\frac{1}{\alpha}$ then what will be thequadratic equation:

(a) $\alpha x^2 - (\alpha^2 + 1)x + \alpha = 0$

(b) $\alpha x^2 - a^2 x + 1 = 0$

(c) $\alpha x^2 - (\alpha^2 + 1)x + 1 = 0$

(d) None of these

2019 - June

222. A number consists of two digits such that the digit in one's place in thrice the digit in ten's place. If 36 be added then the digits are reversed. Find the number _____.

(a)62

(b)26

(c)39

(d)None of these

223. Find the condition that one roots is double the other of $ax^2+bx+c = 0$

(a)$2b^2 = 3ac$

(b)$b^2 = 3ac$

(c)$2b^2 = 9ac$

(d)$2b^2 > 9ac$

2019 - November

224. Roots of the equation $x^3 + 9x^2 - x - 9 = 0$.

(a) 1, 2,3

(b)1,-1,-9

(c)2, 3, - 9

(d)1, -3, 9

225. $\frac{2x + 5}{10} + \frac{3x + 10}{15} = 5$

(a)10.58

(b)9.58

(c)9.5

(d)None

226. Find value of $x^2 - 10x + 1$ if $x = \frac{1}{5-2\sqrt{6}}$

(a)25

(b)1

(c)0

(d)49

227. Find the value, of K in $3x^2 - 2kx + 5 = 0$

if $-x = 2$

(a) 17/4

(b) - 7/14

(c) 4/17

(d) -4/17

2020 - November

228. The rational root of the equation

$0 = 2p^3 - p^2 - 4n + 2$ is;

(a)2

(b)-2

(c)1/2

(d)-1/2

229. If $2x^2$ - (a + 6) 2x + 12a - 0, then the roots are:

(a)6 and a

(b)4 and a^2

(c)3 and 2a

(d)6 and 3a

230. Solving equation m + $\sqrt{m}$= 6/25, the value of m works out to:

(a)1/25

(b)2/25

(c)3/25

(d)1

2021 - January

231. The value of P/or which the difference between the root of equation x^2 + px + 8 = 0 1 <2 is

(a)±2

(b)±4

(c) ±6

(d) ±8(1 mark)

232. If the quadratic equation x^2 + px + q = 0 and x^2 + qx + p = 0 have a common root then p + q = ?

(a)0

(b)1

(c)-1

(d)2

233. The harmonic mean of the roots of the equation

(5 + $\sqrt{2}$) x 2 - (4 + $\sqrt{5}$)x + 8 + 2$\sqrt{5}$ = 0 is

(a)2

(b)4

(c)6

(d)8

2021 - July

234. If α and β are the roots of the equation $2x^2 + 5x + k - 0$, and $4(\alpha^2 + \beta^2 + \alpha\beta) = 23$, then which of the following is true?

(a)$k^2 + 3k - 2 = 0$

(b)$k^2-2k+ 3 = 0$

(c)$k^2-2k-3 = 0$

(**d)$k^2 - 3k + 2 = 0$**

235. The value of 'k' is _____, if 2 is the root of the following cubic equation:

$x^3 - (k+1) x + k = 0$.

(a)2

(b)6

(c)1

(d)4

Answer:

(b)$x^3 - (k + 1) x + k = 0$

$\Rightarrow 2^3-(k+ 1)2 + k = 0$

$\Rightarrow 8-2k-2 + k = 0$

$\Rightarrow 6 - k = 0$

$\Rightarrow k = 6$

236. The cost of 2 oranges and 3 apples is Rs. 28. If the cost of an apple is doubled then the cost of 3 oranges and 5 apples is Rs. 75. The original cost of 7 oranges and 4 apples (in (Rs.)) is:

(a) 59

(b)47

(c)71

(d)63

237. The sum of square of any real positive quantity and its reciprocal is never less than:

(a)1

(b)2

(c)3

(d)4

2021 - DECEMBER

238. If one root is half of the other of a quadratic equation and the difference in roots is a, then the equation is

(a)$x^2 + ax + 2a^2 = 0$

(b)$x^2 - 3ax - 2a^2 = 0$

(c)$x^2 - 3ax + 2a^2 = 0$

(d)$x^2 + 3ax - 2a^2 = 0$

239. In a multiple choice question paper consisting of 100 questions of 1 mark each, a candidate gets 60% marks. If the candidate attempted all questions and there was a penalty of 0.25 marks for wrong answer, the difference between number of right answers and wrong answers is:

(a)32

(b) 36

(c)40

(d)38

240. If the square of a number exceeds twice of the number by 15, then number that satisfies the condition is

(a)-5

(b)3

(c)5

(d)15

241. Solve $x^3-7x + 6 = 0$

(a)x = 6, 7, - 4

(b)x = -1,-2,-3

(c)x = 1,2,-3

(d)x = 2, 4, 6

JUNE 2022

242. If the second Root of the given equation is reciprocal of first Root then the value of K in the Equation

$5x^2-13x + k = 0$

(a)3 (b)2 **(c)5** (d)1

243. A plumber can be paid either Rs 600 and Rs 50 per hour or Rs 170 per hour .if the job takes n hour ,for what values of n the method earns wages for the plumber

(a) **5** (b) 6 (c) 4 (d) 7

244. If a person has cloth of total 91 cm .if he divides into 3 parts then the longest parts is twice the shortest one and another part is 3 cm more than shortest ,what is the shortest one ?

(a) 25 (b)44 (c) **22** (d) 46

DEC 2022

245. If the roots of the equation $x^2 – px + q = 0$ are in the ratio 2:3, then

A. $p^2 = 25q$ B. $p^2 = 6q$ C. $6p^2 = 5q$ D. $6p^2 = 25q$

246. The solutions of the following system of linear equations: $2x - 5y + 4 = 0$ and $2x + y – 8 = 0$ will be

A. (2, -3) B. (1, -3) C. (3, 2) D. (-2, 2)

247. What will be the value of k, if the roots of the equation $(k - 4)x^2 - 2kx + (k + 5) = 0$ are equal?

A. 18 B. 20 C. 19 D. 21

JUNE 2023

248. The largest side of a triangle is 3 times the shortest sides and third sides is 4 cm shorter than the longest sides. If the perimeters of triangle is 59. What is the length of shortest side

(a) Less than 7 cm
(b) Greater than or equal to 7 cm
(c) Less than 9 cm
(d) Greater than or equal to 9 cm

249. **If** α and β are roots of equation of $x^2-(n^2 +1)x +1/2(n^2+n+1)=0$ find value of $\alpha^2+ \beta^2$

A. 2n B.n C.$2n^2$ D. n^3

250. The age of a man is four times the sum of the of his two sons and after 10 years his age will be double the sume of their ages .find the present age of men

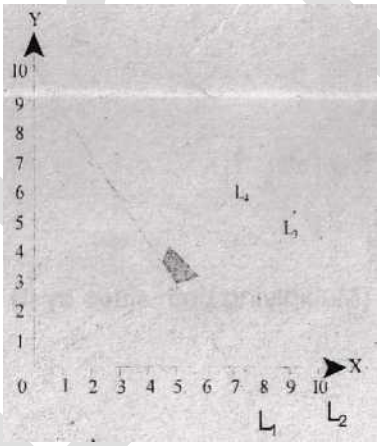
(a) 56
(b) 45
(c) 60
(d) 64

CHAPTER 3 LINEAR INEQUALITIES

MULTIPLE CHOICE QUESTIONS AND ANSWERS

2006 - NOVEMBER

251. Graphs of Inequations are drawn below :



L_2: $5x + 3y = 30$ L_1 : $x + y = 9$

L_3 : $y = \frac{x}{3}$ L_4: $y = \frac{x}{2}$

The common region (shaded part) shown in the diagram refers to the inequalities:

(a) $5x + 3y \leq 30$

$x + y \leq 9$

$y \leq \frac{1}{2}x$

$y \leq x/2$

$x \geq 0, y \geq 0$

(b)$5x + 3y \geq 30$

$x + y \leq 9$

$y \geq x/3$

$y \leq x/2$

$x \geq 0, y \geq 0.$

(c)$5x + 3y \geq 30$

$x + y \geq 9$

$y \leq x/3$

$y \geq x/2$

$x \geq 0, y \geq 0.$

(d)$5x + 3y > 30$

$x + y < 9$

$y \geq 9$

$y \leq x/2$

$x \geq 0, y \geq 0.$

252. 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.

2007 - FEBRUARY

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

(a) $\left\{x: \frac{19}{18} \leq x \leq \frac{29}{18}\right\}$ (b) $\left\{\mathbf{x}: \frac{7}{9} \leq \mathbf{x} \leq \frac{17}{9}\right\}$

(c) $\left\{x: \frac{-29}{18} \leq x \leq \frac{-19}{18}\right\}$(d) None of these.

255. On solving the inequalities $6x + y \geq 18$, $x + 4y \geq 12$, $2x + y \geq 10$, weget the following situation:

(a)(0, 18), (12, 0), (4, 2) & (2, 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)

2007 - MAY

256. A car manufacturing company manufactures cars of two types A and B. Model A requires 150 man-hours for assembling, 50 manhours for painting and 10 man-hours for checking and testing. Model B requires 60 man-hours for assembling, 40 man-hours for painting and 20 man-hours for checking and testing. There are available 30 thousand man-hours for assembling, 13 thousand man-hours for painting and 5 thousand man-hours for checking and testing. Express the above situation using linear inequalities. Let the company manufacture x units of type A model of car and y units of type B model of car. Then, the inequalities are:

(a)5x + 2y ≥ 1000; 5x + 4y ≥ 1300,

x + 2y ≤ 500; x ≥ 0, y ≥ 0,

(b)5x + 2y ≤ 1000, 5x + 4y ≤ 1300,

x + 2y ≥ 500; x ≥ 0, y ≥ 0.

(c)5x + 2y ≤ 1,000, 5x + 4y ≤ 1300,

x + 2y ≤ 500; x ≥ 0, y ≥ 0.

(d)5x + 2y = 1000, 5x + 4y ≥ 1300,

x + 2y = 500 ; x ≥ 0, y ≥ 0.(1 mark)

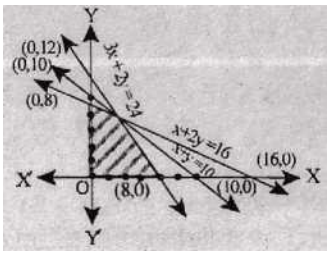
2007 - AUGUST

256. 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 asy)

(a) y ≥ $\frac{x}{5}$ (b) 5y ≤ x

(c) 5y ≥ x (d) None.

257. The shaded region represents :



(a)3x + 2y ≤ 24, x + 2y ≥ 16, x + y ≤ 10x, x ≥ 0, y ≥ 0

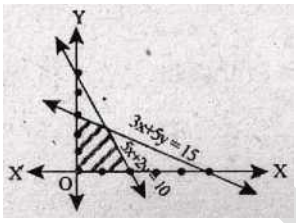
(b)3x + 2y ≤ 24, x + 2y ≤16, x + y ≥10, x ≥ 0, y ≥ 0

(c)3x + 2y ≤ 24, x + 2y ≤16, x + y ≤10, x ≥ 0, y ≥ 0

(d)None of these.

2007 - NOVEMBER

258. The shaded region represents :



(a) 3x + 5y ≤ 15, 5x + 2y ≥10, x, y ≥ 0

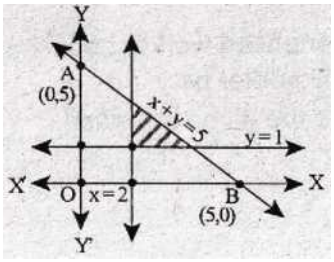
(b) 3x + 5y ≤ 15, 5x + 2y ≤ 10, x, y ≥ 0

(c)3x + 5y ≥15, 5x + 2y ≥10, x, y, ≥ 0

(d)None of these.

2008 - FEBRUARY

259. The shaded region represents :

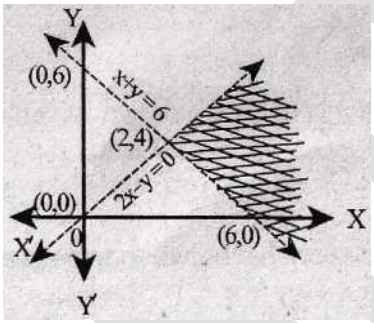


(a) $x + y \leq 5, x \geq 2, y \leq 1$**(b) $x + y \leq 5, x \geq 2, y \geq 1$**

(c) $x + y \geq 5, x \geq 2 , y \geq 1$(d) None of these. (1 mark)

2008 - JUNE

260. 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 (1 mark)

261. If a >0 and b <0, it follows 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. (1 mark)

2008 - DECEMBER

261. the Linear relationship between two variables in an inequality :

(a)$ax + by \leq c$(b) $ax\ by \leq c$

(c)$axy + by \leq c$(d) $ax + bxy \leq c$

2010-JUNE

262. The solution of the inequality $\frac{(5-2x)}{3} \leq \frac{x}{6} - 5$ is

(a) $x \geq 8$ (b) $x \leq 8$

(c) $x = 8$ (d) None of these.

2010 - DECEMBER

263. On the average an experienced person does 7 units of work while a fresh one work 5 units of work daily but the employer has to maintain an output of atleast 35 units of work per day. The situation can be expressed as :

(a) $7x + 5y < 35$ (b) $7x + 5y \leq 35$

(c) $7x + 5y > 35$ **(d) $7x + 5y \geq 35$**

2011 - JUNE

264. Solution space of the inequalities $2x + y \leq 10$ and $x - y \leq 5$:

(i)includes the origin.

(ii)includes the point (4, 3) which one is correct ?

(a)Only (i)(b) Only (ii)

(c) Both (i) and (ii)(d) None of the above.

2011 - DECEMBER

265. On an average, experienced person does 5 units of work while a fresh person does 3 units of work daily but the employer has to maintain the output of atleast 30 units of work per day. The situation can be expressed as.

(a) $5x + 3y \leq 30$ **(b) $5x + 3y \geq 30$**

(c) $5x + 3y > 30$ (d) $5x + 3y = 30$

2012 - JUNE

266. Find the range of real values of x satisfying the inequalities $3x - 2 > 7$ and $4x - 13 > 15$

(a)$x > 3$ **(b) $x > 7$**

(cj $x < 7$(d) $x < 3$

2012 - DECEMBER

267. On the average, experienced person does 5 units of work while a fresh one 3 units work daily but the employer have to maintain the output of at least 30 units of work per day. The situation can be expressed as.

(a) $5x + 3y \leq 30$ **(b) $5x + 3y \geq 30$**

(c) $5x + 3y = 30$(d) None of these.

2013 - JUNE

268. The union forbids employer to employ less than two experienced person (x) to each fresh person (y), This situation can be expressed as:

(a)$x \leq y/2$ **(b) $y \leq x/2$**

(c)$y \geq x/2$ (d) None of these.

2013 - DECEMBER

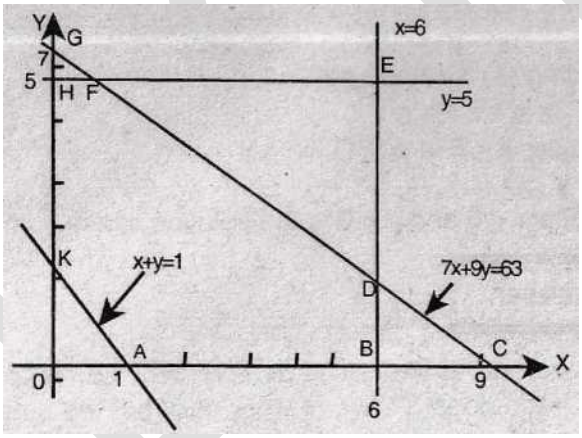
269. The solution of the inequality $8x + 6 < 12x + 14$ is:

(a)(-2,2) (b) (0,-2)

(c)$(2, \infty)$ **(d) $(-2, \infty)$**

2014 - JUNE

270. The graph of linear inequalities $7x + 9y \leq 63$, $x + y \geq 1$,$0 \leq x \leq 6$ and



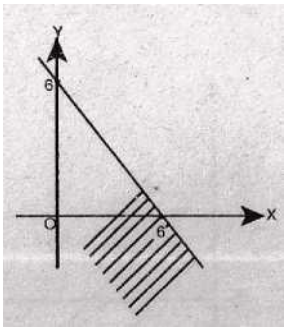
Common region of the inequalities is:

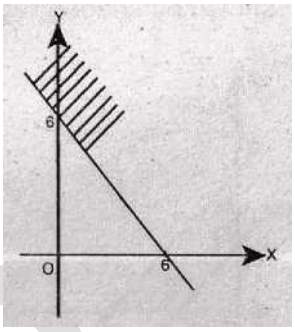
(a)BCDB and DEFD(b) Unbounded

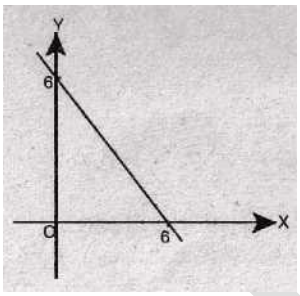
(c) HFGH**(d) ABDFHKA**

2014 - DECEMBER

271. The graph to express the inequality $x + y \leq 6$ is:

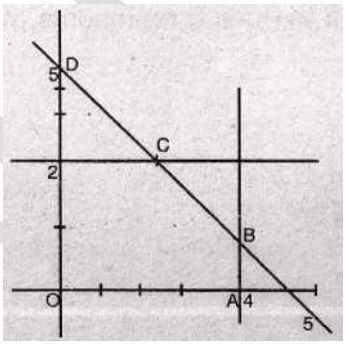
(a) 

(b) 

(c) 

(d) None of these.

272. The graph of linear inequalities $x + y \geq 5; x + y \leq 5; 0 \leq x \leq 4$ and $0 \leq y \geq 2$ is given below:



The common region of the inequalities will be:

(a)OABCEO (b) ECDE

(c) Line Segment DC(d) Line Segment BC

2015 - JUNE

273. The common region in the graph of linear inequalities $2x + y \geq 18$, $x + y \geq$

12 and $3x + 2y \leq 34$ is:

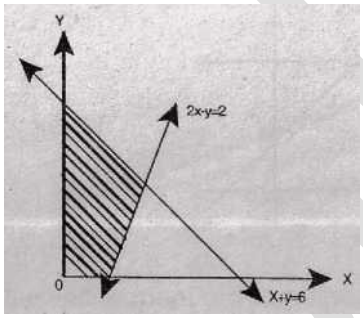
(a)unbounded(b) infeasible

(c) feasible and bounded (d) feasible and unbounded

Answer:

2015 - DECEMBER

274. The common shaded region in the graph represents the linear inequalities as:



(a)$x + y \geq 6$

$2x - y - 2 \geq 0$

$x, y \geq 0$

(b)$x + y \geq 6$

$2x - y - 2 \leq 0$

$x, y \geq 0$

(c)$x + y \leq 6$

$2x - y - 2 \leq 0$

$x, y \geq 0$

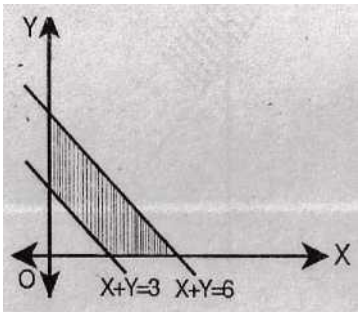
(d)$x + y \leq 6$

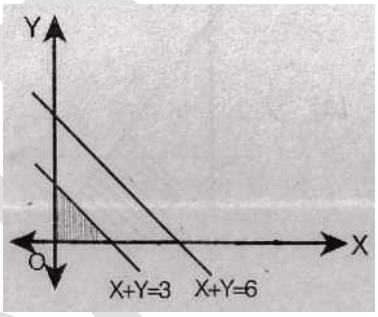
$2x - y - 2 \geq 0$

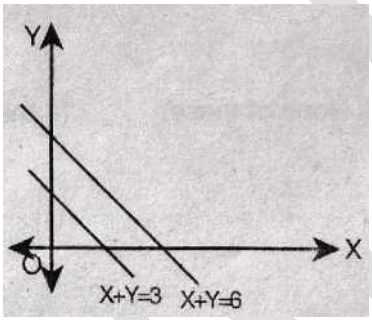
x, y ≥ 0

2016 - JUNE

275. The common region of $x + y \leq 6$; $x + y \geq 3$; $x \geq 0$; $y \geq 0$, is (as shown by shaded region):

(a) 

(b) 

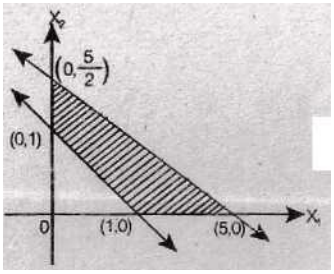
(c) 

(d) None the these. (1 mark)

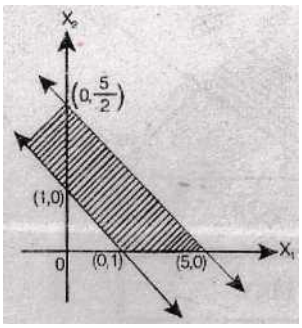
2016 - DECEMBER

276. The common region by the inequalities $x_1 + 2x_2 \leq 5$, $x_1 + x_2 \geq 1$ $x_1 \geq 0$, $x_2 \geq 0$ is given as shaded portion in:

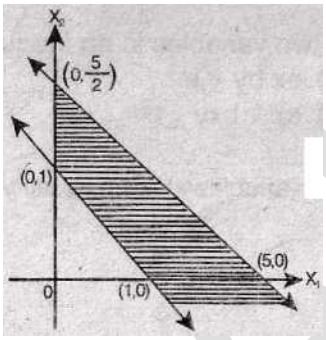
(a)


X_2
$(0,\frac{5}{2})$
(0,1)
0
(1,0)
(5,0)
X_1

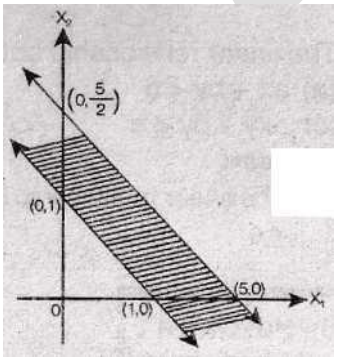
(b)


X_2
$(0,\frac{5}{2})$
(1,0)
0
(0,1)
(5,0)
X_1

(o)


X_2
$(0,\frac{5}{2})$
(0,1)
(5,0)
0
(1,0)
X_1

(d)


X_2
$(0,\frac{5}{2})$
(0,1)
(5,0)
0
(1,0)
X_1

2017-JUNE

277. A dietician wishes to mix together two kinds of food so that the vitamins content of the mixture is atleast 9 units of vitamin A, 7units of vitamin B, 10 units of vitamin C, 12 units of vitamin D. The vitamin content per kg. of each food is shown in table. Assuming 'x' units of food I is to be mixed with 'y' units of food II the situation can be expressed as:

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

(a)$2x + y < 9$

$x + y \leq 7$

$x + 2y \leq 10$

$2x + 3y \leq 12$

$x \geq 0, y \geq 0$

(b)$2x + y \geq 30$

$x + y \leq 7$

$x + 2y \geq 10$

$2x + 3y \geq 12$

$x \geq 0, y \geq 0$

(c)$2x + y \geq 9$

$x + y \geq 7$

$x + 2y \leq 10$

$x + 3y \leq 12$

$x \geq 0, y \geq 0$

(d)2x + y ≥ 9

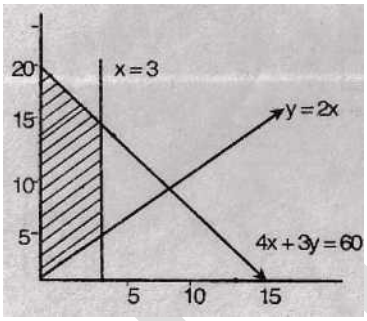
x + y ≥ 7

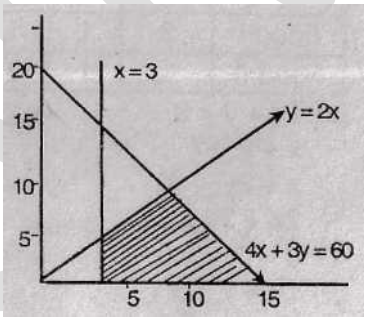
x + 2y ≥ 10

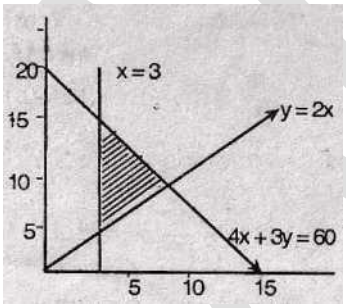
2x + 3y≥ 12

x ≥ 0, y≥0

278. The common regions by the inequalities 4x + 3y ≤ 60; y ≥ 2x; x ≥ 3, x≥ 0 and y ≥ 0 is

(a) 

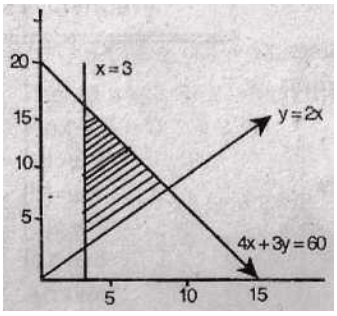
(b) 

(c) 

(d) None of these. (1 mark)

Answer:

(c)



2018 - MAY

279. The linear relationship between two variables in an inequality:

(a) ax + by ≤ c(b) ax.by ≤ c

(c) axy + by≤c(d) ax + bxy≤c

2018- NOVEMBER

280. On Solving the Inequalities $5x + y \leq 100$, $x + y \leq 60$, $x \geq 0$, $y \geq 0$, we get the following solution:

(a)(0, 0), (20,0), (10, 50) & (0,60)

(b)(0, 0), (60, 0), (10, 50) & (0,60)

(c)(0,0), (20,0), (0, 100) & (10,50)

(d)None of these

2019 - JUNE

281. An employer recruits experienced (x) and fresh workmen (y) for his under the condition that he cannot employ more than 11 people, x and y can related by the inequality.

(a)$x + y \neq 11$

(b) $x + y \leq 11$, $x \geq 0$, $y \geq 0$

(c) $x + y \geq 11$, $x \geq 0$, $y \geq 0$

(d)None of these(1 mark)

282. The solution set of the in equations $x + 2 > 0$ and $2x - 6 > 0$ is

(a)$(-2,\infty)$

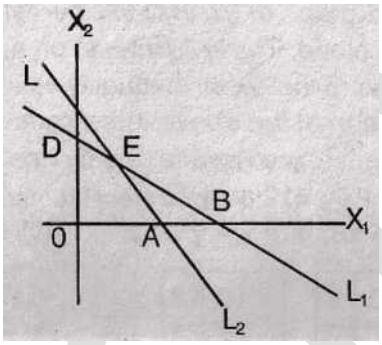
(b)$(3,\infty)$

(c)(-∞,-2)

(d)(-∞, - 3)

283. The common region represented by the following in equalities

$L_1 = X_1 + X_2 < 4$; $L_2 = 2X_1 - X_2 > 6$



(a)OABC

(b)Outside of OAB

(c)Δ BCE

(d)Δ ABE

2019 - NOVEMBER

284. $6x + y \geq 18$, $x + 4y \geq 12$, $2x + y \geq 10$

On solving the inequalities; we get

(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)

2020 - NOVEMBER

285. Solve for x of the Inequalities

$2 \leq \frac{3x-2}{5} \leq 4$ where $x \leftarrow N$

(a){5,6,7}

(b) {3, 4, 5, 6}

(c){4,5,6}

(d)None

2021 - JANUARY

286. The common region in the graph of the inequalities $x + y \leq 4$, $x - y \leq 4$, $x \geq 2$ is

(a)Equilateral triangle

(b)Isosceles triangle

(c)Quadrilateral

(d)Square

2021 - DECEMBER

287. XVZ Company has a policy for its recruitment as: it should not recruit more than eight men (x) to three women (y). How can this fact be expressed in inequality?

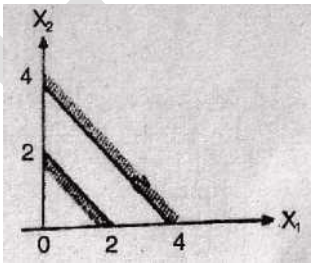
(a)$3y \geq 8x$

(b)$3y \leq x/8$

(c)$8y \geq 3x$

(d)$8y \leq 3x$

288. The region indicated by the shading in the graph is expressed by the inequalities



(a)$x_1 + x_2 \leq 2$;

$x_1 + x_2 \geq 4$;

$x_1 \geq 0$, $x_2 \geq 0$

(b)$x_1 + x_2 \leq 2$;

$x_2x_1 + x_2 \leq 4$;

$x_1 \geq 0, x_2 \geq 0$

(c)$x_1 + x_2 \geq 2$;

$x_1 + x_2 \geq 4$;

$x_1 \geq 0, x_2 \geq 0$

(d)$x_1 + x_2 \leq 2$;

$x_1 + x_2 \geq 4$;

$x_1 \geq 0, x_2 \geq 0$

DEC2022

289. If 2x + 5 > 3x + 2 and 2x – 3 < = 4x - 5, the 'x' can take which of the following values?

A. 4 B. -4 C. 2 D. -2

June 2023

290. A Fertlizers company produce to fertilizers called Grade I and Grade II Each of these is processed through a critical chemical plant unit .tha plant has maximum 180 hours available in a week . manufacture one bag of grade I fertilizers required 4 hours in the plant . Manufacture one bag of grade II fertilizers required 10 hours in a plant .Express this in linear equation.

(a) $2x_1 + 5x_2 \leq 180$ B. $4x_1 + 10x_2 > 180$ C.. $2x_1 + 5x_2 > 180$ D. $4x_1 + 10x_2 \geq 180$

CHAPTRER : 4 TIME VALUE OF MONEY

S.I & C.I , EFFECTIVE RATE AND DEP RELATED WORK SHEET

1. 1 Rs. 8,000 becomes Rs. 10,000 in two years at simple interest. The amount that will become Rs. 6,875 in 3 years at the same rate of interest is :

   (a) Rs. 4,850 **(b) Rs. 5,000** (c)Rs. 5,500 (d) Rs. 5,275

2. The difference between the simple and compound interest on a certain sum for 3 year at 5% p.a. is Rs. 228.75. The compound interest on the sum for 2 years at 5% p.a. is :

   (a)Rs. 3,175 **(b) Rs. 3,075** (c) Rs. 3,275 (d) Rs. 2,975.

3. The rate of simple interest on a sum of money is 6% p.a. for first 3 years, 8% p.a. for the next five years and 10% p.a. for the period beyond 8 years. If the simple interest accrued by the sum for a period for 10 years is Rs. 1,560. The sum is :

   (a)Rs. 1,500 **(b) Rs. 2,000** (c) Rs. 3,000 (d) Rs. 5,000

4. 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.

5. In what time will Rs. 3,90,625 amount to Rs. 4,56,976 at 8% per annum, when the interest is compounded semi-annually? [Given : $(1.04)^4 = 1.16986$]

   (a) 2 years (b) 4 years (c) 5 years (d) 7 years

6. A certain sum of money amounts to Rs. 6,300 in two years and Rs. 7,875 in three years nine months at simple interest. Find the rate of interest per annum :

   (a) 20% (b) 18% (c) 15% (d) 10%

7. How long will Rs. 12,000 take to amount to Rs. 14,000 at 5% p.a. converted quarterly ? [Given : $(1.0125)^{12.4} = 1.1666$]

   (a)3 years **(b) 3.1 years** (c) 13.5 years (d) 12.4 years.

8. If Rs. 1,000 be invested at interest rate of 5% and the interest be added to the principal every 10 years, then the number of years in which it wilt amount to Rs. 2,000 is :

   (a) $16\frac{2}{3}$ years (b) $6\frac{1}{4}$ years (c) 16 years (d) $6\frac{2}{3}$ years.

9. 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 years (b) 30 years (c) 25 years (d) None of these

10. The effective rate equivalent to nominal rate of 6% compounded monthly is :

(a) 6.05 **(b) 6.16** (c) 6.26 (d) 6.07

11. A person borrows Rs. 5,000 for 2 years at 4% p.a. simple interest. He immediately lends to another person 6 $\frac{1}{4}$ % p.a. simple interest for 2years. Find his gain in the transaction per year:

(a) Rs. 112.50 (b) Rs. 125 (c) Rs. 225 (d) Rs. 167.50

12. A person deposited Rs. 5,000 in a bank. The deposit was left to accumulate at 6% compounded quarterly for the first five years and at 8% compounded semi-annually for the next eight years. The compound amount at the end of 13 years is :

(a) Rs. 12621.50 **(b) Rs. 12613.10** (c) Rs. 13613.10 (d) None.

13. Two equal sums of money were lent at simple interest at 11 % p.a. for3 $\frac{1}{2}$ years and 4 $\frac{1}{2}$ years respectively.If the difference in interests for two periods was Rs. 412.50, then each sum is:

(a) Rs. 3,250 (b) Rs. 3,500 **(c) Rs. 3,750** (d) Rs. 4,350

14. Anshul's father wishes to have Rs. 75,000 in a bank account when his first college expenses begin. How much amount his father should deposit now at 6.5% compounded annually if Anshul is to start college in 8 years hence from now ?

(a) Rs. 45,360 (b) Rs. 46,360 (c) Rs. 55,360 (d) Rs. 48,360.

15. In how much time would the simple interest on a certain sum be 0.125 times the principal at 10% per annum?

(a) $1\frac{1}{4}$ years (b) $1\frac{3}{4}$ years (c) $2\frac{1}{4}$ years (d) $2\frac{3}{4}$ years

16. The difference between compound interest and simple interest on a certain sum for 2 years @ 10% p.a. is Rs. 10. Find the sum :

(a) Rs. 1,010 (b) Rs. 1,095 **(c) Rs. 1,000** (d) Rs. 990

17. 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

18. If the difference between simple interest and compound interest is Rs. 11 at the rate of 10% for two years, then find the sum.

(a) Rs. 1,200 **(b) Rs. 1,100** (c) Rs. 1,000 (d) None of these

19. Find the numbers of years in which a sum doubles itself at the rate of 8% per annum.

(a) $11\frac{1}{2}$ **(b) $12\frac{1}{2}$** (c) $9\frac{1}{2}$ (d) $13\frac{1}{2}$

20. In how many years, a sum will become double at 5% p.a. compound interest.

(a) 14.0 years (b) 15 years (c)16 years **(d) 14.3 years**

21. The time by which a sum of money is 8 times of itself if it doubles itself in 15 years interest compounded annually.

(a) 42 years (b) 43 years **(c) 45 years** (d) 46 years

22. What is the rate of simple interest if a sum of money amounts to Rs. 2,784 in 4 years and Rs. 2,688 in 3 years ?

(a) 1% p.a. **(b) 4% p.a** .(c) 5% p.a .(d) 8% p.a.(1 mark)

23. A sum amount to Rs. 1,331 at a principal of Rs. 1,000 at 10 % compounded annually. Find the time.

(a) 3.31 years (b) 4 years **(c) 3 years** (d) 2 years

24. In how many years, a sum of Rs. 1,000 compounded annually @ 10%, will amount toRs. 1,331?

(a) 6 years (b) 5 years (c) 4 years **(d) 3 years**

25. The compound interest for a certain sum @ 5% p.a. for first year is Rs. 25. The SI for the same money @ 5% p.a. for 2 years will be.

(a)Rs. 40 **(b)Rs.50** (c) Rs. 60 (d) Rs. 70

26. At what % rate of compound interest (C.I) will a sum of money become 16 times in four years, if interest is being calculated compounding annually:

(a) r = 100% (b) r = 10% (c)r = 200% (d) r = 20%

27. Find the present value of an annuity of Rs. 1,000 payable at the end of each year for 10 years. If rate of interest is 6% compounding per annum (given $(1,06)^{-10}$ = 0.5584):

(a) Rs. 7,360 (b) Rs. 8,360 (c) Rs. 12,000 (d) None of these.

28. if the simple Interest on a sum of money at 12% p.a. for two years is Rs. 3,600. The compound interest on the same sum for two years at the same rate is :

(a) Rs. 3,816 (b) Rs. 3,806 (c) Rs. 3,861 (d) Rs. 3,860

29. The effective annual rate of interest corresponding to nominal rate 6% p.a. payable half yearly is

(a)6.06% (b) 6.07% (c) 6.08% **(d) 6.09%**

30. The cost of Machinery is Rs.1,25,000/- If its useful life is estimated to be 20 years

and the rate of depreciation of its cost is 10% p.a., then the scrap value of the Machinery is [given that $(0.9)^{20} = 0.1215$]

(a) Rs. 15,187 (b) Rs. 15,400 (c) Rs. 15,300 (d) Rs. 15,250

31. Mr. X invests 'P' amount at Simple Interest rate 10% and Mr. Y invests 'Q' amount at Compound Interest rate 5% compounded annually. At the end of two years both get the same amount of interest, then the relation between two amounts P and Q is given by :

(a) P = $\frac{41Q}{80}$ (b) P = $\frac{41Q}{40}$ (c) P = $\frac{41Q}{100}$ (d) P = $\frac{41Q}{200}$

32. If the difference of S.I and C.I is Rs. 72 at 12% for 2 years. Calculate the amount.

(a) Rs. 8,000 (B) Rs. 6,000 **(c) Rs. 5,000** (d) Rs. 7,750

33. If a simple interest on a sum of money at 6% 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 (b) 7 : 15 **(c) 15:7** (d) 1:7

34. 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 oriainal sum of principal was ____.

(a)Rs. 60,690 **(b) Rs. 60,960** (c) Rs. 90,660 (d) Rs. 90,690

35. 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% **(b) 6.67%** (c) 7.20% (d) 5.00%

36. 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% (b) 9.36% (c) 11.36% (d) 9.9%

37. The S.I. on a sum of money is $\frac{4}{9}$ of the principal and the no. of yearsis equal to the

rate of interest per annum. Find the rate of interest per annum ?

(a)5% **(b) 20/3%** (c) 22/7% (d) 6%

38. Simple interest on Rs. 2,000 for 5 months at 16% p.a. is _____.

(a) Rs. 133.33 (b) Rs. 133.26 (c) Rs. 134.00 (d) Rs. 132.09

39. How much investment is required to yield an Annua! income of Rs. 420 at 7% p.a. Simple interest.

(a)Rs. 6,000 (b) Rs. 6,420 (c) Rs. 5,580 (d) Rs. 5,000

40. 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 (b) 5.8 years **(c) 6 years** (d) 8 years

41. 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 (b) 630 (c) 640 (d) 635

42. 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% (b) 40% **(c) 50%** (d) 60%

43. 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 (b) Rs. 5,500 (c) Rs. 6,000 (d) Rs. 6,500

44. In what time will a sum of money double itself at 6.25% p.a. simple interest?

(a) 5 years (b) 8 years (c) 12 years **(d) 16 years**

45. What principal will amount to Rs. 370 in 6 years at 8% p.a. at simple interest?

(a)Rs. 210 **(b) Rs. 250** (c) Rs. 310 (d) Rs. 350

46. 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 (b) Rs. 2,280 **(c) Rs. 2,028** (d) Rs. 2,820

47. If a sum triples in 15 years at simple rate of interest, the rate of interest per annum will be:

(a) 13.0% **(b) 13.3%** (c) 13.5% (d) 18.0%

48. A sum of money invested of compound interest doubles itseif in four years, it becomes 32 times of itself at the same rate of compound -interest in

(a) 12 years (b) 16 years **(c) 20 years** (d) 24 years

49. 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. 382 more. The amount of sum invested is:

(a) Rs. 12,600 (b) Rs. 6,800 **(c) Rs. 4,200** (d) Rs. 2,800

50. A sum of money doubles itself in 8 years at simple interest. The numberof years it would triple itself is _____.

(a)20 years (b) 12 years **(c) 16 years** (d) None of these.

51. 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 rates 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 **(b) Rs. 8,000** (c) Rs. 10,000 (d) Rs. 12,000

52. 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 16 years. When you receive and get 8.5% per annum interest rate compounded annually. What is the present value of this annuity? (Give answer in Rs. without any fraction.)(Given P (15,0.085) = 8.304236576)

(a)83,042 (b)1,66,084 **(c)93,042** (d)8,30,423

53. In how many years will a sum of money become four times at 12% p.a. simple interest?

(a) 18years (b) 21 years **(c) 25 years** (d) 28 years

54. The simple interest for a certain sum for 2 years at 10% per annum is Rs. 90. The corresponding compound interest is (In Rs.):

(a) 99 (b) 95.60 **(c) 94.50** (d) 108

55. 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 **(b) Rs. 1,518.07** (c) Rs. 2,008.07 (d) Rs. 2,200.00

56. 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 (b) 10%, Rs. 1,200 **(c) 20%, Rs. 1,500(**d) 10%, Rs. 1,500

57. 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 **(b) Rs. 7,500** (c) Rs. 7,225 (d) Rs. 8,000

58. 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 (b) Rs. 13,000 **(c)Rs. 12,000** (d) Rs. 15,000

59. 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% (b) 4% (c) 6% (d) 7%

60. The difference between the Compound interest and Simple interest at 10% per annum for 4 years on Rs. 10,000 is Rs. _____.

(a) 650 (b) 640 **(c) 641** (d) 600

61. If compound interest on any sum at the rate of 5% for two years is Rs. 512.50 then the sum would be:

(a) Rs. 3,000 (b) Rs. 4,000 **(c) Rs. 5,000** (d) Rs. 6,000

62. The effective rate of interest equivalent to the nominal rate of 7% converted monthly:

(a) 7.26% **(b) 7.22%** (c) 7.02% (d) 7.20%

63. 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 (b) Rs. 18 (c) Rs. 18,828,85(d) Rs. 18,882.65

64. 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 (b) 6 $\frac{1}{4}$ years (c) 16 years (d) 6 $\frac{2}{3}$ years

65. 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 2years find his gain in the transaction for year:

(a) Rs. 112.50 **(b) Rs. 225** (c) Rs. 125 (d)Rs. 107.50

66. If an amount is kept at S.I. it earns an interest of Rs. 600 in first two years but whbn 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**(b) 20%, Rs. 1,500**(c) 10%, Rs. 1,200(d) 10%., Rs. 1,500

67. If Rs. 10,000 is invested at 8% per year compounded quarterly, then the value of the investment after 2 years is:[given $(1 + 0.02)^8 = 1.171659$]

(a)Rs. 11,716.59 .(b) Rs. 10,716.59(c) Rs. 117.1659(d) None of the above

68. A bank pays 10% rate of interest compounded annually. A sum of Rs. 400 is deposited in the bank. The amount at the end of 1 year will be

(a)Rs. 440 (b)Rs. 439 (c) Rs. 441 (d)Rs. 442

69. A certain money doubles itself in 10 years when deposited on simple interest. It would triple itself in

(a) 20 years (b) 15 years (c) 25 years (d) 30 years

70. A man deposited Rs. 8,000 in a bankfor 3 years at 5% per annum compound interest, after 3 years he will get

(a) Rs. 8,800 **(b) Rs. 9,261** (c) Rs. 9,200 (d) Rs. 9,000

71. If in two years time a principal of Rs. 100 amounts to Rs. 121 when the interest at the rate of r % is compounded annually, then the value of r will be

(a)10.5 **(b) 10%** **(**c)15 (d) 14

72. A certain sum of money Q was deposited for 5 year and 4 months at 4.5% simple interest and amounted to Rs. 248, then the value of Q is

(a) Rs. 200 (b) Rs. 210 (c) Rs. 220 (d) Rs. 240

73. If compound interest on a sum for 2 years at 4% per annum is Rs. 102, then the simple interest on the same sum for the same period at the same rate will be

(a)Rs. 99 (b) Rs. 101 **(c) Rs. 100** (d) Rs. 95

74. 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 interest after 2, 3 and 4 years respectively. !f 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

75. 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

76. The effective rate of interest for one year deposit corresponding to a nominal 7% rate of interest per annum convertible quarterly is

(a) 7% (b) 7.5% (c) 7.4% **(d) 7.18%**

77. How much will Rs. 25,000 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

78. Rs. 8,000/- at 10% per annum interest compounded half yearly will become at the end of one year

(a) Rs. 8,800 (b) Rs. 8,820 (c) Rs. 8,900 (d) Rs. 9,600

79. The value of furniture depreciates by 10% a year, it the present value of the furniture in an office is Rs. 21,870, calculate the value of furniture 3 years ago

(a) Rs. 30,000 (b) Rs. 35,000 (c) Rs. 40,000(d) Rs. 50,000

80. The certain sum of money became Rs. 692/- in 2 yrs and Rs. 800/- in 5 yrs then the principle amount is _____

(a)Rs. 520 **(b)Rs. 620** (c)Rs. 720 (d)Rs. 820

81. A sum of money amount to Rs. 6,200 in 2 years and Rs. 7,400 in 3 years as per S.I. then the principal is

(a)Rs. 3,000 (b)Rs. 3,500 **(c)Rs. 3,800** (d)None

82. A sum was invested for 3 years as per C.I. and the rate of interest for first year is 9%, 2nd year is 6% and 3rd year is 3% p.a. respectively. Find the sum if the amount in three years is Rs. 550?

(a)Rs. 250 (b)Rs. 300 **(c)Rs. 462.16** (d)Rs. 350

83. P = Rs. 5,000 R = 15% T = $4^{1/2}$ using I = $\frac{PTR}{100}$ then I will be

(a)Rs. 3,375 (b)Rs. 3,300 (c)Rs. 3,735 (d)None

84. The effective rate of interest does not depend upon

(a)Amount of Principal (b)Amount of Interest
(c)Number of Conversion Periods (d)None of these

85. If P i^2 = Rs. 96, and R = 8% compounded annually then P =

(a)Rs. 14,000 **(b)Rs. 15,000** (c)Rs. 16,000 (d)Rs. 17,000

86. Determine the present value of perpetuity of Rs. 50,000 per month @ rate of

interest 12% p.a. is _____

(a)Rs. 45,00,000 **(b)Rs. 50,00,000** (c)Rs. 55,00,000(d)Rs. 60,00,000

87. In simple interest if the principal is Rs. 2,000 and the rate and time arethe roots of the equation x^2 -11x + 30 = 0 then simple interest is

(a)Rs. 500 **(b)Rs. 600** (c)Rs. 700 (d)Rs. 800

88. A man invests Rs. 12,000 at 10% p.a. and another sum of money at 20% p.a. for one year. The total investment earns at 14% p.a. simple interest the total investment is:

(a)Rs. 8,000 **(b)Rs. 20,000** (c)Rs. 14,000 (d)Rs. 16,000

89. The difference in simple interest of a sum invested of Rs. 1,500 for 3 years is Rs. 18. The difference in their rates is:

(a)0.4 (b)0.6 (c)0.8 (d)0.10

90. Find the effective rate of interest on Rs. 10,000 on which interest is payable half yearly at 5% p.a.

(a)5,06% (b)4% (c) 0.4% (d)3%

91. Find the effective rate of interest at 10% p.a. when interest is payable quarterly.

(a)10.38% (b)5% (c)5.04% (d)4%

92. What will be the population after 3 years when present population is Rs. 25,000 and population increases at the rate of 3% in I year, at 4% in II year and at 5% in III year?

(a)Rs. 28,119 (b)Rs. 29,118(c)Rs. 27,000 (d)Rs. 30,000

93. The value of scooter is Rs. 10,000 find its value after 7 years if rate of depreciation

is 10% p.a.

(a)Rs. 4,782.96 (b)Rs. 4,278.69 (c) Rs. 42,079(d)Rs. 42,000

94. SI = 0.125P at 10% p.a. Find time.

(**a)1.25 years** (b)25 years (c)0.25 years (d)None

95. Scrap value of a machine valued at Rs. 10,00,000, after 10 years within depreciation at 10% p.a.:

(a)Rs. 3,48,678.44 (b)Rs. 3,84,679.45 (c)Rs. 4,00,000 (d)Rs. 3,00,000

96. The difference between CI and SI for 2 years, is 21. If rate of interest is 5% find principal

(a)Rs. 8,400 (b)Rs. 4,800 (c)Rs. 8,000 (d)Rs. 8,200

97. Present value of a scooter is Rs. 7,290 if its value decreases every year by 10% then its value before 3 years is equal to:

(a)10,000 (b)10,500 (c)20,000 (d)20,500

98. On what sum will the compound interest at 5% per annum for 2 year compounded annually be Rs. 3,280.

(a)Rs. 32,000 (b)Rs. 16,000 (c)Rs. 48,000 (d)Rs. 64,000

99. An amount P becomes Rs. 5,100.5 and Rs. 5,203 after second and fourth years respectively at 1 % of interest per annum compounded annually Thus values of P and R are:

(a)Rs. 4,000 and 1.5 **(b)Rs. 5,000 and 1**
(c)Rs. 6,000 and 2 (d)Rs. 5,500 and 3

100. A certain sum invested at 4% per annum compounded semi- annually amounts to Rs. 1,20,000 at the end of one year. Find the sum:

(a)1,15,340 (b)1,10,120 (c)1,12,812 (d)1,13,113

101. Find the compound interest if an amount of Rs. 50,000 is deposited in a bank for one year at the rate of 8% per annum compounded semiannually.

(a)Rs. 3,080 **(b)Rs. 4,080** (c)Rs. 5,456 (d)Rs. 7,856

102. Rs. 2,500 is paid every year for 10 years to pay off a loan. What is the loan amount if interest rate be 14% per annum compounded annually?

(a)Rs15,847.90 (b)Rs. 13,040.27(c)Rs. 14,674.21 (d)Rs. 16,345.11

103. An amount is lent at a nominal rate of 4.5% per annum compounded quarterly. What would be the gain in rupees over when compounded annually?

(a)0.56 (b)0.45 (c)0.07 (d)0.85

104. What sum of money will produce Rs. 42,800 as an interest in 3 years and 3 months at 2.5% p.a. simple interest?

(a)Rs. 3,78,000 (b)Rs. 5,26,769 (c)Rs. 4,22,000 (d)Rs. 2,24,000

105. The ratio of principal and the compound interest value for three years (compounded annually) is 216 : 127. The rate of interest is:

(a)0.1777 (b)0.1567 (c)0.1666 (d)0.1587

106. A certain sum amounted to Rs. 575 at 5% in a time in which Rs. 750 amounted to Rs. 840 at 4%. If the rate of interest is simple, find the sum-of

(a) 525 (b)550 (c)515 **(d)500**

107. Find the amount of compound interest, if an amount of Rs. 50,000 is deposited in a bank for one year at the rate of 8% per annum compounded semiannually

(a)3,080 **(b)4,080** (c)5,456 (d)7,856

108. The population of a town increase by 2% of the population at the beginning of the year. The number of year by which the total increases in population would be 40% is :

(a)7 years (b)10 years **(c)17 years** (d)19 years (approx)

109. Two equal amounts of money an deposited in two banks each at 15% p.a. fix 3.5 year in the bank and fix 5 years in the either. The difference between the interest amount from the bank in Rs. 144. Find the sum

(a)Rs. 620 **(b)Rs. 640** (c)Rs. 820 (d)Rs. 840

110. The simple on sum at 4% p.a. for 2 years is Rs. 80. Find the CI on the same sum for the same period.

(a)Rs. 81.60 (b)Rs. 80.80 (c) Rs. 83.20 (d) Rs. 82.30

111. Which is a better investment 9% p.a. compounded quarterly or 9.1 % p.a. simple interest?

(a)9% compounded (b)9.1% S.T.(c)Both are same(d)Cannot be said

112. The effective rate of interest corresponding to a nominal rate of 7% p.a. compounded quarterly is

(a)7.5% (b)7.6% (c)7.7% **(d)7.18%**

113. Assuming that the discount rate is 7% p.a. how much would pay to. receive Rs. 200 growing at 5% annually for ever?

(a)Rs. 2,500 (b)Rs. 5,000 (c)Rs. 7,500 **(d)Rs. 10,000**

114. A man invested one -third of his capital at 7% one fourth at 8% and the remainder at 10%. If the annual income is Rs. 561. The capital is -

(a)Rs. 4,400 (b)Rs. 5,500 **(c)Rs. 6,600** (d)Rs. 5,800

115. A sum of money is lent at C.I. Rate 20% p.a. 2 years. It would fetch Rs. 482 more if the interest is compounded half yearly. The sumis:

(a)Rs. 19,800 (b)Rs. 19,900 **(c)Rs.20,000** (d)Rs.20,100

116. What T denote the actual rate of interest in decimal, and n denote the number of conversion periods, the formula for computing the effective rate of interest E is given by,

(a)$(1 + i)^n$ **(b) $(1 + i)^n - 1$** (c)$1 – (1 + i)^n$ (d)$(1 + i)^{-n}$

117. The effective rate of return for 24% per annum convertible monthly is given as:

(a)24% **(b)26.82%** (c)18% (d)24.24%

118. What is the compound interest (in Rs.) on a sum of Rs. 12,600 for $1^{1/2}$ years at 20% per annum if the interest is compounded half yearly? (Nearest to a rupee).

(a)4,271 **(b)4,171** (c)4,711 (d)4,117

119. If discount rate is 14% per annum, then hour much a company has to pay to receive Rs. 280 growing at 9% annually forever?

(a)Rs. 5,600 (b)Rs. 2,800 (c)Rs. 1,400(d)Rs. 4,200

120. If the nominal rate of growth is 17% and inflation is 9% for the five years. Let P be the Gross Domestic Product (GDP) amount at the present year then the projected real GDP after 6 years is:

(a)1.587 P (b)1.921 P (c)1.403 P (d) 2.51 P

121. A sum of Rs. 7,500 amounts to Rs. 9,075 at 10% p.a., interest being compounded yearly in a certain time. The simple interest (in Rs.) on the same sum for the same time and the same rate is:

(a)1,000 (b)1,250 (c)1,800 **(d)1,500**

122. if a person bought a house by paying Rs. 45,00,000 down payment and Rs. 80,000 at the end of each year till the perpetuity. Assuming the rate of interest as 16% the present value of house (in Rs.) is given as:

(a)47,00,000 (b)45,00,000 (c)57,80,000 **(d)50,00,000**

123. Let the operating profit of a manufacturer for five years is given as:

Years	1	2	3	4	5	6
Operating profit (in lakh Rs.)	90	100	106.4	107.14	120.24	157.34

Then the operating profit of Compound Annual Growth Rate (CAGR) for year 6 with respect to year 2 is given that:

(a)9% **(b)12%** (c)11% (d)13%

124. A certain sum amounts to Rs. 15,748 in 3 years at simple interest at r% p.a. The same sum amounts to Rs. 16,510 at (r + 2) % p.a. simnie interest in the same time. What is the value of r?

(a) 10% (b)3% (c)12% (d)6%

125. What is the difference (in Rs.) between the simple interest and thecompound interest on a sum of Rs. 8,000 for $2\frac{2}{5}$ years at the rate of10% p.a. when the interest is compounded yearly?

(a)136.12 (b)129.50 (c)151.75 (d)147.20

126. A sum of Rs.x amounts to Rs.27,900 in 3 years and to Rs.41,850 in 6 years at

a certain rate percent per annum, when the interest is compounded yearly. The value of x is;

(a)16,080 **(b)18,600** (c)18,060 (d)16,800

127. Mr. X wants to accumulate Rs. 50,00,000 at the end of 10 years. Then how much amount is required to be invested every year if interest is compounded annually at 10%? (Given that P(10,0.10) = 15.9374298)

(a)Rs. 3,13,726.87 (b)Rs. 4,13,726.87 (c)Rs. 3,53,726.87 (d)Rs. 4,53,726.87

128. Rahul invested Rs. 70,000 in a bank at the rate of 6.5% p.a. simple interest rate. He received Rs. 85,925 after the end of term. Find out the period for which sum was invested by Rahul.

(a)2 years (b)3 years **(c)3.5 years** (d)2.5 years

129. A company needs Rs. 10,000 in five years to replace as equipment. How much (in Rs.) should be invested now at an interest rate of 8% p.a. is order to provide for this equipment?

(a)6,000 **(b)6,805** (c)10,000 (d) 11,000

130. An amount is lent at R% simple interest for R years and the simple interest amount was one-fourth of the principal amount. Then R is _____

(a)5 (b)6 (c)$5^{1/2}$ (d) $6^{1/2}$

131. A sum of money is put at 20% compound interest rate p.a. At which year the aggregated amount just exceeds the double of the original sum?

(a) 6 (b)5 **(c)4** (d)3

132. In how much time a sum of amount doubles at simple interest at 12.5%

rate .

(a) 7 year **(b) 8 year** (c) 9 year (d) 10 year

133. The effective rate of return for 7% per annum convertible Quarterly is given as:

(a)7% **(b)7.18%** (c)5% (d)7.5%

134. The CAGR of Initial Value of a investment of Rs 15000 and Final Value of Rs 25000 in a 3 years is Is

(a)19% **(b)18.56%** (c) 17.56% (d)17%

135. A machine worth Rs. 4,90,740 in depreciated at 15% on its opening value each year. When its value would reduce to Rs. 2,00,750

A. 5 years 5 months **B. 5 years 6 month**s

C. 5 years 7 months D. 5 years 8 months

136. If Rs. 64 Amount to Rs. 83.20 in 2 years, what will Rs. 86 Amount to in 4 years at the same Rate percent per annum?

A. Rs. 127.60 B. Rs. 147,60 **C. Rs. 145.3** D. 117.6

137. The effective annual rate of interest corresponding to a normal rate of 6% per annum payable half yearly is:

A. 6.06 % B. 6.07 % C. 6.08 % D. 6.09 %

138. 10 years ago the earning per share (EPS) of ABC.Ltd. was Rs. 5 share. Its EPS for this year isRs. 22. Compute at what rate, EPS of the company grow annually?

A. 15.97 % B. 16.77 % C. 18.64 % D. 14.79 %

139. A sum of money invested of compound interest doubles itself in four years. In how many years it becomes 32 times of itself at the same rate of compound interest.

A 12 years B. 16 years **C. 20 years** D. 24 years

2023 – JUNE

140. Mr Paul invested Rs 1,00,000 in a mutual fund scheme in January 2018 .after one year in January 2019,she got a dividend amounting to Rs 10,000 for first year Rs 12000 for second year ,Rs 16000 for third year ,Rs 18000 for fourth year and Rs 21000 for fifth year in January 2023 .what is compounded annual growth rate (CAGR) for dividend Return ? given $1.2038^4 = 2.1$

A. 20.38% B. 18.59% C. 16.36% D. 15.89%

141. Mr Ram invested a total of Rs 1,00,000 in two different banks for a fixed period .the first bank yield interest 9% per annuam and second bank 11% per annuam ,if the total interest at the end of one year is 9.75% per annuam . then the amount invested in these banks are respectively :

A. Rs. 52,500 ,Rs 47500 **B. Rs. 62500 , Rs 37500**
C.Rs. 57500 ,Rs 42500 D. Rs 67500,32500

142. The Nominal Rate of interest is 10% per annum .the interest is

compounded quarterly .the effective rate of interest per annum wil be-

A. 10% B.10.10% C.10.25% **D 10.38%**

143. The difference between compound interest and simple interest on a certain sum of Money for 3 years at 6% per annum is Rs 110.16 the principle is

A. Rs. 3000 B. Rs. 3700 C.Rs. 12000 **D Rs 10,000**

144. 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 23240 and Rs 9000 respectively approximately ,for how years the machine is put to use ?

A. 7 B. 8 **C.9** D 10

145. The population of a town increases every year by 2% of the population at the beginning of that year .the approximate number of year ,by which the total increase of population will be 40% .is --------(Given 1.02^N=1.17166)

A. 15 **B. 17** C.19 D 20

146. The compound interest on Rs 15625 for 9 months at 16% per annum compounded quarterly is

A. Rs. 1851 B. Rs. 1941 **C.Rs. 1951** D Rs 1961

147. If the discount rate is 10% per annum ,how much amount would you pay to receive Rs 2500 growing at 8% annually forever?

A. Rs. 1,25,000 B. Rs.2,50,000 C.Rs. 1,50,000 D Rs 2,00,000

CHAPTER -4
TIME VALUE OF MONEY

ANNUITY RELATED PROBLEM

2006 - NOVEMBER

148. Mr. X Invests Rs. 10,000 every year starting from today for next 10 years suppose interest rate is 8% per annum compounded annually. Calculate future value of the annuity: (Given that $(1 + 0.08)^{10} = 2.15892500$]

(a) Rs. 1,56,454.88 (b) Rs. 1,44,865.625 (c) Rs. 1,56,554.88 (d) None of these

149. The present value of an annuity of Rs. 3,000 for 15 years at 4.5% p.a. C.I. is [Given that $(1.045)^{15} = 1.935282$]

(a) Rs. 23,809.67 **(b) Rs. 32,218.67** (c) Rs. 32,908.67(d) None of these

2007 - FEBRUARY

150. A machine can be purchased for Rs. 50,000. Machine will contribute Rs. 12,000 per year for the next five years. Assume borrowing cost is 10% per annum. Determine whether machine should be purchased or not:

(a)Should be purchased **(b) Should not be purchased**
(c)Can't say about purchase (d)None of the above

151. 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%?

[Give $(1.1)^{10} = 2.5937$]

(a) Rs. 18,823.65 (b) Rs. 18,828.65 (c) Rs. 18,832,65 (d) Rs. 18,882.65

2007 - MAY

152. A company is considering proposal of purchasing a machine either by making full payment of Rs. 4,000 or by leasing it for four years at an annual rate of Rs. 1,250. Which course of action is preferable, if the company can borrow money at 14% compounded annually? [Given : (1.14)* = 1.68896]

(a) Leasing is preferable (b) Should be purchased
(c) No difference (d) None of these

153. Vipul purchases a car for Rs. 5,50,000. He gets a loan of Rs. 5,00,000 at 15% p.a. from a Bank and balance Rs. 50,000 he pays at the time of purchase. He has to pay the whole amount of loan in 12 equal monthly instalments with interest starting from the end of the first month. The money he has to pay at the end of every month is : [Given $(1.0125)^{12} = 1.16075452$]

(a) Rs. 45,130.43 (b) Rs. 45,230.43 (c) Rs. 45,330.43(d) None of these

2007 - AUGUST

154. A company establishes a sinking fund to provide for the payment of Rs.

2,00,000 debt maturing in 20 years. Contributions to the fund are to be made at the end of every year. Find the amount of each annual deposit if interest is 5% per annum :

(a)Rs. 6,142 **(b) Rs. 6,049** (c) Rs. 6,052 (d) Rs. 6,159

2007 - NOVEMBER

155. 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) Rs. 84,077 **(b) Rs. 81,628** (c)Rs. 84,449 (d) Rs. 84,247

2008 - FEBRUARY

156. Anshul's father wishes to have Rs. 75,000 in a bank account when his first college expenses begin. How much amount his father should deposit now at 6.5% compounded annually if Anshul is to start college in 8 years hence from now ?

(a) Rs. 45,360 (b) Rs. 46,360 (c) Rs. 55,360 (d) Rs. 48,360.

157. A company may obtain a machine either by leasing it 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 18% per annum, which alternative is preferable ?

(a) Leasing (b) Purchasing (c) Can't say (d) None of these

2008 - JUNE

158. A sinking fund is created for redeeming debentures worth Rs. 5 lacs 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) Rs. 12,006 (b) Rs. 12,040 (c) Rs. 12,039 (d) Rs. 12,035

2008 - DECEMBER

159. Future value of an ordinary annuity:

(a) A (n, i) = A A $\left[\frac{(1+i)^n-1}{i}\right]$ (b) A (n, i) = A A $\left[\frac{(1+i)^n+1}{i}\right]$

(c) A (n, i) - A A $\left[\frac{1-(1+i)^n}{i}\right]$ (d) A (n, i) = A A $\left[\frac{(1+i)^n-1}{i(1+i)^n}\right]$

2009 - JUNE

160. Paul borrows Rs. 20,000 on condition to repay it with compound interest at 5% p.a. in annual instalment of Rs. 2,000 each. Find the number of years in which the debt would be paid off.

(a) 10 years (b) 12 years (c) 14 years **(d) 15 years**

2009 - DECEMBER

NO QUESTION ASKED

2010 - JUNE

161. Find the present value of an annuity of Rs. 1,000 payable at the end of each year for 10 years. If rate of interest is 6% compounding per annum (given $(1,06)^{-10}$ = 0.5584):

(a) Rs. 7,360 (b) Rs. 8,360 (c) Rs. 12,000 (d) None of these.

2010- DECEMBER

162. The future value of an annuity of Rs. 5,000 is made annually for 8 years at interest rate of 9% compounded annually [Given that $(1.09)^8$ =1.99256] is _____

(a)Rs. 55,142.22 (b) Rs. 65,142.22 (c) Rs. 65,532.22(d) Rs. 57,425.22

2011 - JUNE

No question asked

2011 -DECEMBER

No asked question

2012-JUNE

No asked question

2012 - DECEMBER

No asked question

2013 - JUNE

No asked question

2013 - DECEMBER

No asked question

2014-JUNE

163. 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 (b) Rs. 2,280 **(c) Rs. 2,028** (d) Rs. 2,820

164. 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: $(1.1)^{10}$= 2.59374],

(a)Rs. 37,467 (b) Rs. 37,476 **(c)Rs. 37,647** **(**d) Rs. 37,674

2014 - DECEMBER

165. 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 **(b) Rs. 6,610** (c) Rs. 6,160 (d) Rs. 5,160

2015 - JUNE

No asked question

2015 - DECEMBER

166. 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 16 years. When you receive and get 8.5% per annum interest rate compounded annually. What is the present value of this annuity? (Give answer in Rs. without any fraction.)(Given P (15,0.085) = 8.304236576)

(a)83,042 (b)1,66,084 **(c)93,042** (d)8,30,423

2016 - JUNE

No asked question

2016 - DECEMBER

No asked question

2017 - JUNE

167. 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 **(b) Rs. 9,157.65** (c) Rs. 9,715.56(d) Rs. 9,175.65

2017 - DECEMBER

No asked question

2018 - MAY

168. Mr. X invests 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 (b) Rs. 1,56,554.88 (c) Rs. 1,44,865.625 (d) None of these

169. 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 (b) Rs. 18 (c) Rs. 18,828,85(d) Rs. 18,882.65

170. 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 **(b) Rs. 6,610** (c) Rs. 6,160 (d) Rs. 5,160

2018 - NOVEMBER

171. What is the net present value of piece of property which would be valued at Rs. 2 lakh at the end of 2 years? (Annual rate of increase = 5%)

(a) Rs. 1.81 lakh (b) Rs. 2.01 lakh (c) Rs. 2.00 lakh (d) None of the above

2019-JUNE

172. A person wants to lease out a machine costing Rs. 5,00,000 for a 10 year period. It has fixed a rental of Rs. 51,272 per annum payable annually starting from the end of first year. Suppose rate of interest is 10% per annum compounded annually on which money can be invested. To whom this agreement is favourable?

(a)Favour of Lessee (b)Favour of Lessor(c)Not for both(d)Can't be determined

173. Let a person invest a fixed sum at the end of each month in an account paying interest 12% per year compounded monthly. If the future value of this annuity after the 12^{th} payment is Rs. 55,000 then the amount invested every month is?

(a)Rs. 4,837 (b)Rs. 4,637 **(c)Rs. 4,337** (d)Rs. 3,337

174. Determine the present value of perpetuity of Rs. 50,000 per month @ rate

of interest 12% p.a. is _____

(a)Rs. 45,00,000 **(b)Rs. 50,00,000** (c)Rs. 55,00,000(d)Rs. 60,00,000

2019 - NOVEMBER

175. The value of scooter is Rs. 10,000 find its value after 7 years if rate of depreciation is 10% p.a.

(a)Rs. 4,782.96 (b)Rs. 4,278.69 (c) Rs. 42,079(d)Rs. 42,000

176. Scrap value of a machine valued at Rs. 10,00,000, after 10 years within depreciation at 10% p.a.:

(a)Rs. 3,48,678.44 (b)Rs. 3,84,679.45 (c)Rs. 4,00,000 (d)Rs. 3,00,000

177. Present value of a scooter is Rs. 7,290 if its value decreases every year by 10% then its value before 3 years is equal to:

(a)10,000 (b)10,500 (c)20,000 (d)20,500

2020 - NOVEMBER

178. Find the future value of annuity of Rs. 1,000 made annually for 7 years at interest rate of 14% compounded annually. Given that 1.14^7 . = 2.5023

(a)10,730.7 (b)5,365.35 (c)8,756 (d)9,892.34

179. Find the present value of Rs. 1,00,000 to be required after 5 years if the interest rate be 9%. Given that $1,09^5$ =1.5386.

`(a)78,995.98 (**b)64,994.15** (c)88,992.43 (d)93,902.12

180. A five year annuity due has periodic cash flow of Rs. 100 each year. If the interest rate is 8% the future value of this annuity is given by:

(a)(Rs.100) × (future value at rate8%for5 years) × (0 08)

(b)(Rs.100) × (future value at rate8%for5 years) × (1 - .08)

(c)(Rs.100) × (future value at rate8%for5 years) × (1 + 0.08)

(d)(Rs.100) × (future value at rate8%for5 years) × (1/0.08)

181. A person decides to invest Rs. 1,25,000 per year for the next five years in an annuity which gives 5% per annum compounded annually. What is the approx future value? (use $1.05^5 = 1.2762$, if needed)

(a)1,59,535 **(b)6,90,500** (c)5,90,704 (d)3,59,535

182. Which of the following statements is True? (assume that the yearlycash flow? Are identical for both annuities)

(a)The present value of an annuity due is greater than the present value of an ordinary annuity

(b)The present value of an ordinary annuity is greater than the present value of an annuity due

(c)The future value of an ordinary annuity is greater than the future value of an annuity due

(d)The future value of an annuity due is equal to future value of anordinary annuity.(1 mark)

183. An amount is lent at a nominal rate of 4.5% per annum compounded quarterly. What would be the gain in rupees over when compounded annually?

(a)0.56 (b)0.45 (c)0.07 (d)0.85

184. What sum of money will produce Rs. 42,800 as an interest in 3 years and 3 months at 2.5% p.a. simple interest?

(a)Rs. 3,78,000 (b)Rs. 5,26,769 (c)Rs. 4,22,000 (d)Rs. 2,24,000

185. The ratio of principal and the compound interest value for three years (compounded annually) is 216 : 127. The rate of interest is:

(a)0.1777 (b)0.1567 (c)0.1666 (d)0.1587

186. [A stock pays annually an amount of Rs.10 from 6^{th} year onwards. What is the present value of the perpetuity, if the rate of return is 20%?

(a)20.1 (b)19.1 (c)21.1 (d) 22.1

2021 - JANUARY

187. A certain sum amounted to Rs. 575 at 5% in a time in which Rs. 750 amounted to Rs. 840 at 4%. If the rate of interest is simple, find the sum-of

(a) 525 (b)550 (c)515 **(d)500**

188. Find the amount of compound interest, if an amount of Rs. 50,000 is deposited in a bank for one year at the rate of 8% per annum compounded semiannually

(a)3,080 **(b)4,080** (c)5,456 (d)7,856

189. The population of a town increase by 2% of the population at the beginning of the year. The number of year by which the total increases in population would be 40% is :

(a)7 years (b)10 years **(c)17 years** (d)19 years (approx)

190. Find the future value of annuity of Rs. 1,000 made annually for 7 year at interest rate of 14% compounded annually (Given that $1.14^7 = 2.5023$)

(a)Rs. 10,730.7 (b)Rs. 5,365.35 (c)Rs.8,756 (d)Rs.9892.34

191. Two equal amounts of money an deposited in two banks each at 15% p.a. fix 3.5 year in the bank and fix 5 years in the either. The difference between the interest amount from the bank in Rs. 144. Find the sum

(a)Rs. 620 **(b)Rs. 640** (c)Rs. 820 (d)Rs. 840

192. The simple on sum at 4% p.a. for 2 years is Rs. 80. Find the CI on the same

sum for the same period.

(a)Rs. 81.60 (b)Rs. 80.80 (c) Rs. 83.20 (d) Rs. 82.30

193. Which is a better investment 9% p.a. compounded quarterly or 9.1 % p.a. simple interest?

(a)9% compounded (b)9.1% S.T.(c)Both are same(d)Cannot be said

194. The effective rate of interest corresponding to a nominal rate of 7% p.a. compounded quarterly is

(a)7.5% (b)7.6% (c)7.7% **(d)7.18%**

195. Assuming that the discount rate is 7% p.a. how much would pay to. receive Rs. 200 growing at 5% annually for ever?

(a)Rs. 2,500 (b)Rs. 5,000 (c)Rs. 7,500 **(d)Rs. 10,000**

196. A man invested one -third of his capital at 7% one fourth at 8% and the remainder at 10%. If the annual income is Rs. 561. The capital is -

(a)Rs. 4,400 (b)Rs. 5,500 **(c)Rs. 6,600** (d)Rs. 5,800

197. A sum of money is lent at C.I. Rate 20% p.a. 2 years. It would fetch Rs. 482 more if the interest is compounded half yearly. The sumis:

(a)Rs. 19,800 (b)Rs. 19,900 **(c)Rs.20,000** (d)Rs.20,100

198. Rs. 800 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 annually after 10^{th} payment?

(a)Rs. 4,444 (b)Rs. 8,756 (c)Rs. 3,491 **(d)Rs. 8,151.67**

199. What T denote the actual rate of interest in decimal, and n denote the

number of conversion periods, the formula for computing the effective rate of interest E is given by,

(a)$(1 + i)^n$ **(b) $(1 + i)^n$-1** (c)$1 – (1 + i)^n$ (d)$(1 + i)^{-n}$

200. The present value of an Annuity immediate is the same as

(a)Annuity regular for (n - 1) year plus the initial receipt in the beginning of the period.

(b)Annuity regular for (n - 1) years

(c)Annuity regular for (n + 1) years

(d)Annuity regular for (n + 1) years plus the initial receipt in the beginning of the period

2021 - JULY

201. If the desired future value after 5 years with 18% interest rate is Rs. 1,50,000, then the present value (in Rs.) is (Given that $(1.18)^5 = 2.2877$)?

(a)63,712 **(b)65,568** (c)53,712 (d)41,712

202. If discount rate is 14% per annum, then hour much a company has to pay to receive Rs. 280 growing at 9% annually forever?

(a)Rs. 5,600 (b)Rs. 2,800 (c)Rs. 1,400(d)Rs. 4,200

203. If the nominal rate of growth is 17% and inflation is 9% for the five years. Let P be the Gross Domestic Product (GDP) amount at the present year then the projected real GDP after 6 years is:

(a)1.587 P (b)1.921 P (c)1.403 P (d) 2.51 P

204. A loan of Rs. 1,02,000 is to be paid back in two equal annual instalments. If the rate of interest is 4% p.a, compounded annually, then the total interest

charged {in Rs.) under this instalment plan is:

(a)6,160 (b)8,120 (c)5,980 (d)7,560

205. if a person bought a house by paying Rs. 45,00,000 down payment and Rs. 80,000 at the end of each year till the perpetuity. Assuming the rate of interest as 16% the present value of house (in Rs.) is given as:

(a)47,00,000 (b)45,00,000 (c)57,80,000 **(d)50,00,000**

206. Let the operating profit of a manufacturer for five years is given as:

Years	1	2	3	4	5	6
Operating profit (in lakh Rs.)	90	100	106.4	107.14	120.24	157.34

Then the operating profit of Compound Annual Growth Rate (CAGR) for year 6 with respect to year 2 is given that:

(a)9% **(b)12%** (c)11% (d)13%

207. If the cost of capital be 12% per annual, then the net present value (in nearest Rs.) from the given cash flow is given as:

Years	0	1	2	3
Operating profit (in thousands Rs.)	(100)	60	40	50

(a)31048 (b)34185 **(c)21048** (d)24187

208. The future vaiue of annuity of Rs.2,000 for 5 years at 5% compounded annually is given (in nearest Rs.) as:

(a)51,051 (b)21,021 **(c)11,051** (d)61,254

2021 - DECEMBER

209. Mr. X wants to accumulate Rs. 50,00,000 at the end of 10 years. Then how

much amount is required to be invested every year if interest is compounded annually at 10%? (Given that P(10,0.10) = 15.9374298)

(a)Rs. 3,13,726.87 (b)Rs. 4,13,726.87 (c)Rs. 3,53,726.87 (d)Rs. 4,53,726.87

210. A company needs Rs. 10,000 in five years to replace as equipment. How much (in Rs.) should be invested now at an interest rate of 8% p.a. is order to provide for this equipment?

(a)6,000 **(b)6,805** (c)10,000 (d) 11,000

211. The present value of of Rs. 25,000 to be received after 10years at 6% per annum compounded annually is Rs. _____.(1.06^5 = 1.33823)

(a)Rs. 15,960 **(b)Rs. 13,960** (c)Rs. 11,960 (d)Rs. 17,960

2022 JUNE :

212. 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. 12044 **(b)Rs. 2044** (c)Rs. 2040 (d)Rs. 12000

213. Anshika took loan of Rs 1,00,000 @8% for 5 years .what amount will she pay wants if she wants the whole amount in five equal installment ?

(a)26045 **(b)Rs. 25045.63** (c) 28045.50 (d) none

214. If discount rate is 7% per annum, then hour much a company has to pay to receive Rs. 200 growing at 5% annually forever?

(a)2500 (b)Rs. 5000 (c) 7500 (d)**Rs. 10000**

215. A company establishes a sinking fund to provide for the payment of Rs

2,00,000 debt maturity in 20 years contribution to the fund are to be made at the end of every year .find the Amount of each deposit of interest is 10% per annum .?

(a)Rs. 3592.11 **(b)Rs. 3492.11** (c)Rs. 3392.11 (d) None

216. The CAGR of Initial Value of a investment of Rs 15000 and Final Value of Rs 25000 in a 3 years is Is

(a)19% (**b)18.56%** (c) 17.56% (d)17%

217. ABC LTD .Wants to lease out an assets Costing Rs ,3,60,000 for Five Years period .it has a Fixed rental of Rs 1.05.000 .per annum payable annually starting from 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 favourable to company .

(a)yes (b) no (c) it depends d) none

2022 - DECEMBER

218. Rs. 5,000 is invested every month end in an account paying interest @ 12% per annum compounded monthly. What is the future value of this annuity just after making 11^{th} payment? (Given that $(1.01)^{11} = 1.1156$)

A. Rs. 57,800 B. Rs. 56,100 C. Rs. 56,800
D. Rs. 57,100

219. A farmer borrowed 3600 at the rate of 15% simple interest per Annum. At the end of 4 years, he cleared this account by paying Rs. 4000 and a cow. The cost of the cow is:

A. Rs. 1000 B. Rs.1200 C. Rs. 1550 **D. Rs. 1760**

220. Sinking fund factor is the reciprocal of :

A. Present value interest factor of a single cash flow

B. Present value interest factor of an annuity.

C.Future value interest factor of an annuity.

D. Future value interest factor of a single cash flow.

221. Raju investsRs. 20,000 every year in a deposit scheme starting from today for next 12 years. Assuming that interest rate on this deposit is 7% per annum compounded annually. What will be the future value of this annuity? Given that $(1+0.07)^{12} = 2.25219169$.

A. Rs. 540.526 **B. Rs. 382.813** C. Rs.643,483 D. Rs. 357,769

222. Mr A invested Rs. 10,000 every year for next 3 years at the interest rate of 8 percent per annum compounded annually. What is future value of the annuity?

A. 32644 **B. 32464** C. 34264 D. 96442

223. How much amount is required to be invested every year so as to accumulate Rs. 5,00,000 at the end of 12 years if interest is compounded annually at 10%? {Where A(12,0.1)= 21.384284}

A. Rs.23381.65 B. Rs. 24385.85 C. Rs. 26081.65 D. Rs. 28362.75

2024– JUNE

224. Suppose you have decide to make a systematic plan in annual fund with Rs 1,00,000 every year from today for next year where you get return at the rate of

10% per annum compounded annually .what is the future value of this annuity ?

A. Rs. 1735,114 B. Rs1753411 C. Rs. 1735411 D. Rs 1753114

225. Mr Paul invested Rs 1,00,000 in a mutual fund scheme in January 2018 .after one year in January 2019,she got a dividend amounting to Rs 10,000 for first year Rs 12000 for second year ,Rs 16000 for third year ,Rs 18000 for fourth year and Rs 21000 for fifth year in January 2023 .what is compounded annual growth rate (CAGR) for dividend Return ? given $1.2038^4 = 2.1$

A. 20.38% B. 18.59% C. 16.36% D. 15.89%

226. Mr Ram invested a total of Rs 1,00,000 in two different banks for a fixed period .the first bank yield interest 9% per annuam and second bank 11% per annuam ,if the total interest at the end of one year is 9.75% per annuam . then the amount invested in these banks are respectively :

A. Rs. 52,500 ,Rs 47500 B. Rs. 62500 , Rs 37500
C.Rs. 57500 ,Rs 42500 D. Rs 67500,32500

227. A company want to replace its existing tool room machine at the end of 10 years ,the expected cost of machine would be Rs 10,00,000 ,if Management of the company creates a sinking fund ,how much provision needs to made out of Revenue each year which can earn at the rate of 10% compounded annually ? Given A(10,.10)=15.9375425

A. Rs. 74625 B. Rs. 72514 C.Rs. 62745 D Rs 67,245

228. A car is Available for Rs 4,98,200 cash payment or Rs 60,000 cash down payment followed by three equal annual installments,if the rate of interest

charged is 14% per annum compounded yearly ,then total interest charged in the installment plan is given P(3,0.14) =2.32163

A. Rs. 146314 B. Rs. 146137 C.Rs. 128040 D158040

229. Govinda mothers decides to gift him Rs 50,000 every year starting from today for the next five years .Govinda deposits this amount in the bank as and when he receives and get 10% per annum interest rate compounded annually ,what is the present value of the annuity ?(Given p(4.0.10)=3.16987

A. Rs. 2,80,493.5 B. Rs 208593.5 C.Rs. 208943.5 D Rs 258493.5

230. If the discount rate is 10% per annum ,how much amount would you pay to receive Rs 2500 growing at 8% annually forever?

A. Rs. 1,25,000 B. Rs.2,50,000 C.Rs. 1,50,000 D Rs 2,00,000

231. Mr sharad got his retirement benefits amounting to Rs 50,00,000 .he wants to receives a fixed montly sum of amount for his rest of life ,starting afeter one month and theareafter he wants to pass on the same future generation . he expect to earn an interest of Rs 9% compounded annually .detrmine how much perpetuity amount he will receive every month ?

A. Rs. 39500 B. Rs. 38500 C.Rs. 37500 D Rs 36600

232. Jonny wants to have Rs 2,00,000 in his saving account after three year . the rate of interest offered by banks is 8% per annum compounded annually .how much should be invest today to achieve his target amount ?

A. Rs. 147489.10 B. Rs. 158766.44 C.Rs. 171035.59 D 184417.96

CHAPTER 5 : BASIC CONCEPTS OF PERMUTATIONS AND COMBINATIONS

MULTIPLE CHOICE QUESTIONS AND ANSWERS

2006 - NOVEMBER

1. The number of triangles that can be formed by choosing the verticesfrom a set of 12 points, seven of which lie on the same straight line, is:

   (a)185(b) 175

   (c) 115(d) 105

2. A code word is to consist of two English alphabets followed by two distinct numbers between 1 and 9. How many such code words are there?

   (a.) 6,15,800**(b) 46,800**

   (c) 7,19,500(d) 4,10,800

3. A boy has 3 library tickets and 8 books of his interest in the library. Of these 8, he does

not want to borrow Mathematics part-1! unless Mathematics part-! is also borrowed? In how many ways can he choose the three books to be borrowed?

(a)41(b) 51

(c) 61 (d) 71

2007 - FEBRUARY

4. An examination paper consists of 12 questions divided into two parts A and B. Part A contains 7 questions arid part B contains 5 questions. A candidate is required to attempt 8 questions selecting at least 3 from each part. In how many maximum ways can the candidate select the questions?

(a)35(b) 175

(c) 210(**d) 420**

5. A Supreme Court Bench consists of 5 judges. In how many ways, the bench can give a majority decision?

(a) 10 (b) 5

(c) 15 **(d) 16**

6. Given : P (7, k) = 60 P(7, k - 3). Then :

(a) k = 9 (b) k = 8

(c) k = 5 (d) k = 0

7. The number of ways in which n books can be arranged on a shelf so that two particular books are not together is :

(a) (n - 2) × (n - 1)! (b) (n - 2) ×(n + 1)!

(c) (n – 1)× (n + 1)!(d) (n - 2) × (n + 2)!

2007 - MAY

8. In how many ways can the letters of the word FAILURE be arranged so that the consonants may occupy only odd positions?

(a) 576(b) 476

(c) 376(d) 276

9. Five bulbs of which three are defective are to be tried in two lights-points in a dark-room. In how many trials the room shall be lighted?

(a)10(**b)7**

(c) 3(d)None of these

10. In how many ways can a party of 4 men and 4 women be seated at a circular table, so that no two women are adjacent?

(a) 164(b)174

(c)144(d)154

11. The value of $\sum_{r=1}^{5} {}^{5}C_r$ is:

(a)29(**b)31**

(c) 35(d)26

2007 - AUGUST

12. If ${}^{6}P_r = 24\ {}^{6}C_r$, then find r:

(a) 4 (b) 6

(c) 2 (d) 1

13. Find the number of combinations of the letters of the word COLLEGE taken four together:

(a)18(b) 16

(c) 20(d) 26

14. How many words can be formed with the letters of the word 'ORIENTAL' so that A and E always occupy odd places:

(a) 540**(b) 8640**

(c) 8460(d) 8450

2007 - NOVEMBER

15. If ${}^{1000}C_{98} = {}^{999}C_{97} + {}^{x}C_{901}$, find x :

(**a)999(**b) 998

(c)997(d) 1000

16. 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

17. A building contractor needs three helpers out often men supply. In how many ways can these selections take place?

(a) 36 (b) 15

(c) 150 **(d) 120**

2008 - FEBRUARY

18. There are three blue balls, four red balls and five green balls. In how many ways can they be arranged in a row?

(a)26,720 **(b) 27,720**

(c) 27,820 (d) 26,620

19. If C(n, r) : C(n, r +1) = 1 : 2 and C (n, r + 1): C (n, r + 2) = 2:3, determine the value of n and r:

(a) (14,4) (b) (12,4)

(c) (14,6) (d) None.

2008 - JUNE

20. Six seats of articled clerks are vacant in a 'Chartered Accountant Firm'. How many different batches of candidates can be chosen out of ten candidates?

(a)216(**b)210**

(c)220(d)None

21. 'Six persons A, B, C, D, E and F are to be seated at a circular table. In how many ways can this be done, if A must always have either B or C on his right and B must always have either C or D on his right?

(a)3(b)6

(c)12(**d)18**

2008 - DECEMBER

22. `If ${}^{n}P_{r} = {}^{n}P_{r+1}$ and ${}^{n}C_{r} = {}^{n}C_{r-1}$ then find the value of 'n'

(a) 2**(b) 3**

(c) 4(d) 5

23.]How many six digit telephone numbers can be formed by using 1.0 distinct digits?

(a)10^{6}(b)6^{10}

(c)${}^{10}C_{6}$**(d)** **${}^{10}P_{6}$**

24. In how many ways a committee of 6 members can be formed from a group of 7 boys and 4 girls having at least 2 girls in the committee.

(a)731(b)137

(c) 371(d)351

2009 - JUNE

25. Number of ways of painting a face of a cube by 6 colours is_____

(a)36 **(b)6**

(c)24(d)1

26. If _____ ${}^{18}C_{r} = {}^{18}C_{r+2}$ find the value of ${}^{r}C_{5}$.

(a)55(b)50

(c)56(d)None of these

27. 7 books are to be arranged in such a way so that two particular books are always at first and last place. Final the number of arrangements.

(a) 60 (b) 120

(c) 240 (d) 480)

28. Find 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'.

(a) 720 (b) 120

(c) 96 (d) None.

29. In how many ways can 17 billiard balls be arranged if 7 of them are black, 6 red and 4 white ?

(a) 4084080 (b) 1

(c) 8048040 (d) None of these

2009 - DECEMBER

30. (n +1) ! = 20(n-1) !, find n

(a)6(b) 5

(c) 4(d) 10

31. Out of 4 gents and 6 ladies, a committee is to be formed. Find the number of ways the committee can be formed such that it comprises of at least 2 gents and the number of ladies should at least be double of gents.

(a)94**(b) 132**

(c) 136(d) 104

2010-JUNE

32. Six points are on a circle. The number of quadrilaterals that can be formed are:

(a) 30 (b) 360

(c) 15 (d) None of the above

33. The number of ways of arranging 6 boys and 4 girls in a row so that all 4 girls are together is :

(a)6!. 4!(**b)2 (7!. 4!)**

(c)7!. 4!(d)2. (6!. 4!)

34. How many numbers not exceeding 1000 can be made from the digits 1,2, 3, 4, 5, 6, 7, 8, 9 if repetition is not allowed.

(a)364**(b)585**

(c)728(d)819

2010 - DECEMBER

35. A garden is having 6 tall trees in a row. In how many ways can 5 children stand, one in a gap between the trees in order to pose for a photograph?

(a) 24**(b) 120**

(c) 720(d) 30

36. $^{15}C_3 + {}^{15}C_{13}$ is equal to :

`(a) $\mathbf{16_{c_3}}$**(**b)$30_{c_{16}}$

` (c) $15_{c_{16}}$(d)$15_{c_{15}}$

37. How many ways a team of 11 players can be made out of 15 players if one particular player is not to be selected in the team.

` **(a)364(**b)728

` (c) 1,001(d)1,234)

2011 - JUNE

38. Find the number of arrangements of 5 things taken out of 12 things, in which one particular thing must always be included.

(a)39,000(b) 37,600

(c) 39,600(d) 36,000

39. In how many ways a team of 5 can be made out of 7 Boys and 8 Girls, if 2 Girls are compulsory to form a Team.

(a) 2,646 (b) 1,722

(c) 2,702 (d) 980

40. If 15 persons are to be seated around 2 round tables, one occupying 8 persons and another 7 persons. Find the number of ways in which they can be seated.

(a) $\frac{15!}{18!}$

(b) $^{15}C_7\frac{7!}{8!}$

(c)7!.8!

(d)2.$^{15}C_7$ 6! 7!

2011 - DECEMBER

41. In how many ways 3 prizes out of 5 can be distributed amongst 3 brothers equally?

(a)10

(b)45

(c)60

(d)120)

42. There are 12 questions to be answered in Yes or No. How many ways can.these be Answered?

(a) 1024 (b) 2048

(c) 4096 (d) None

2012-JUNE

43. The letters of the word "VIOLENT" are arranged so that the vowelsoccupy even place only. The number of permutations is _____.

(a)144(b) 120

(c) 24(d) 72

44. If ${}^{n}P_4 = 20$ (${}^{n}P_2$) then the value of 'n' is _____.

(a) -2 **(b) 7**

(c) - 2 and 7 both (d) None of these.

2012- DECEMBER

45. A man has 3 sons and 6 schools within his reach. In how many ways, he can send them to school, if no two of his sons are to read in the same school?

(a) ${}^{6}P_2$**(b)** ${}^{6}P_3$

(c) 6^3(d) 3^6

46. How many permutations can be formed from the letters of the word "DRAUGHT", if both vowels may not be separated ?

(a)720 (**b) 1,440**

(c)140 (d) 1,000

47.] If ${}^{13}C_6 + 2\ {}^{13}C_5 + {}^{13}C_4 = {}^{15}C_x$ then, x = _____.

(a) 6(b) 7

(c) 8(d) 9

2013-JUNE

48. A polygon has 44 diagonals then the number of its sides are:

(a) 8(b) 9

(c) ^{10}(**d) 11**

49. The number of words that can be formed out of the letters of the word “ARTICLE” so that vowels occupy even place is:

(a)36

(b)144

(c) 574

(d) 754

50. Number of ways of shaking hands in a group of 10 persons shaking hands to each other are:

(a)45(b) 54

(c) 90(d) 10

2013 - DECEMBER

51. If ${}^{15}C_{3r} = {}^{15}C_{r+3}$, then ‘r’ is equal is

(a) 2**(b) 3**

(c) 4(d) 5

52. How many different words can be formed with the letters of the word “LIBERTY”

(a)4050**(b)5040**

(c) 5400(d)4500

53. In how many ways can a family consist of three children having different birthdays in a leap year

(a) ${}^{365}C_3$ (b)${}^{366^\circ}C_3$-3

(c)366 × 365 × 364(d)${}^{366}C_3$

2014 – JUNE

54. If = ${}^{999}C_{97} + {}^{x}C_{901}$, then the value of x will be :

(a)999

(b)998

(c)997

(d)None of these.

55. If six times the number of permutations of ‘n’ items taken 3 at a time is equal to seven times the number of permutation of (n-1) items taken 3 at a time, then the value of ‘n’ will be:

(a)7

(b)9

(c)13

(d)21

2014 - DECEMBER

56. If ${}^{6}P_{r}$ = 360, then the value of Y is:

(a) 5 (b) 3

(c) **4 (d)** None of these.

57. There are 5 books on English, 4 Books on Tamil and 3 books on Hindi. In how many ways can these books be placed on a shelf if the books on the same subjects are to be together?

(a)1,36,800

(b)1,83,600

(c)1,03,680

(d)1,63,800)

58. 5 Men and 4 Women to sit in a row in such a manner that the women always occupy the even places. The number of such arrangement will be:

(a)126

(b)1056

(c)2080

(d)2880

2015-JUNE

59. The four digit numbers that can be formed out of the seven digits 1,2, 3, 5, 7, 8, 9 such that no digit is repeated in any number and are greater than 3000 are:

(a) 120(b) 480

(c) 600(d) 840)

60. A person has ten friends of whom six are relatives. If he invites five guests such that three of them are his relatives, then the total number of ways in which he can invite them are:

(a) 30(b) 60

(c) 120(d) 75

61. A student has three books on computer, three books on Economics and five books on Commerce. If these books are to be arranged subject wise, then these can be placed on a shelf in the number of ways:

(a) 25290**(b) 25920**

(c) 4230(d) 4320

2015 - DECEMBER

62. An examination paper with 10 questions consists6 questions in mathematics and 4 questions in statistic part. At least one question from each part is to be attempted in how many ways can this be done?

(a) 1024**(b) 945**

(c)1005(d) 1022

63. If ${}^{n}p_{r} = 720$ and ${}^{n}c_{r} = 120$, then value of 'r' is:

(a) 4(b) 5

(c) 6(**d) 3**

64. There are 6 men and 4 women in a group, then the number of ways in which a committee of 5 persons can be formed of them, if the committee is to include at least 2 women are:

(a) 180**(b) 186**

(c) 120(d) 105

2016 - JUNE

65. In how many ways can a selection of 6 out of 4 teachers and 8 students be done so as to include at least two teachers?

(a) 220**(b) 672**

(c) 596(d) 968

66. There are 10 students in a class including 3 girls. The number of ways to arrange them in a row when any two girls out of three never comes together:

(a) ${}^{8}P_{3}\lfloor 7$(b) ${}^{3}P_{3}\lfloor 7$

(c)${}^{8}P_{3}\lfloor 10$(d) None of these

67. The maximumnumber ofpoints of inter section of10 circles will be:

(a) 2(b)20

(c) 90(d)180)

2016- DECEMBER

68. 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**

69. The number of numbers between 1,000 and 10,000, which can be formed by the digits 1,2, 3, 4, 5, 6 without repetition is:

(a) 720(b) 180

(c) 360(d) 540

70. The number of ways in which 4 persons can occupy 9 vacant seats is:

(a)6048 **(b) 3024**

(c) 1512 (d) 4536

2017-JUNE

71. If $^{10}C_3 + 2.\ ^{10}C_4 + {}^{10}C_5 = {}^{n}C_5$ then value of n is:

(a) 10(b) 11

(c) 12 (d) 13

72. The number of parallelograms formed from a set of six parallel lines intersecting another set of four parallel lines is:

(a) 360**(b) 90**

(c) 180(d) 45)

73. The number of words which can be formed by letters of the word 'ALLAHABAD' is:

(a) 7560 (b) 3780

(c) 30240 (d) 15120

2017 - DECEMBER

74. If $^{n}P_{13} : {}^{n+1}P_{12} = 3:4$, then the value of 'n' will be:

(a) 13**(b) 15**

(c) 18(d) 31

75. If 3 books on computer, 3 books on commerce, and 5 books on economics are arranged in such away that the books of same subject are kept together, then the number of ways in which this can be done are:

(a) 4320(b) 35820

(c) 35920**(d) 25920**

2018 - MAY

76. The number of triangle that can be formed by choosing the vertices from a set of 12 points, seven of which lie on the same straight line, is:

(a) 185(b) 175

(c) 115(d) 105

77. If $^{1000}C_{98} = {}^{999}C_{97} + {}^{x}C_{901}$, find x:

(a) 999(b) 998

(c) 997(d) 1,000)

2018 - NOVEMBER

78. A bag contains 4 red, 3 black and 2 white balls. In how many ways 3 balls can be drawn from this bag so that they include at least one black bail?

(a) 64(b) 46

(c) 85(d) None of the above

79. The number of words from the letters of the word BHARAT, in which B and H will never come together, is

(a) 360(**b) 240**

(c) 120(d) None of the above

80. The value of N in $\frac{1}{7!} + \frac{1}{8!} = \frac{N}{9!}$ is

(a)81

(b)78

(c)89

(d)64

81. If ${}^{n}P_{r} = 720$ and ${}^{n}C_{r} = 120$, then r is

(a)3

(b)4

(c) 5

(d)6

2019-JUNE

82. Which of the following is a correct statement.

(a)${}^{n}P_{n}={}^{n}P_{n-1}$

(b)${}^{n}p_{n} = {}^{2n}p_{n-2}$

(C) ${}^{n}P_{n}= {}^{3n}P_{n-3}$

(d)${}^{n}P_{n} = {}^{n(n-1)}P_{n-1}$

83. If these are 40 guests in a party. If each guest takes a shake hand with all the remaining guests. Then the total number of hands shake is _____ :

(a)780

(b)840

(c)1,560

(d)1,600

84. If ${}^{11}C_x = {}^{11}C_{2x-4}$ and $x \neq 4$ than the value of ${}^{7}C_x$ =

(a)20

(b)21

(c)22

(d)23

85. In how many ways can the crew of an eight oared boat be arranged so that 3 of crew can row only on a stroke side and 2 row on the other side?

(a)1,728

(b)256

(c)164

(d)126

2019 - NOVEMBER

86. Three girls and five boys are to be seated in a row so that no two girls sit together. Total no. of ways of this arrangement are:

(a)14,400

(b)120

(C) ${}^{5}p_3$

(d) 3! × 5!)

87. How many numbers can be formed with the help of 2, 3, 4, 5, 6, 1 which are not divisible by 5, given that it is a five-digit no. and digits are not repeating?

(a)600

(b)400

(c)1200

(d)1400

88. How many different groups of 3 people can be formed from a group of 5 people?

(a)5

(b)6

(o) 10

(d) 9

89. In how many ways can 4 people be selected at random from 6 boys and 4 girls if there are to be exactly 2 girls?

(a)90

(b)360

(c)92

(d)480)

90. ${}^{n}P_{3}:{}^{n}P_{2}= 2 : 1$, Find n,

(a)4

(b)7/2

(c)5

(d)2/7

2020 - NOVEMBER

91. A fruity basket contains 7 apples, 6 bananas, and 4 mangoes. How many selections of 3 fruits can be made so that all 3 are apples?

(a)35 ways

(b). 120 ways

(c)165 ways

(d)70 ways

92. Out of 7 boys and 4 girls, a team of a debate club of 5 is to be chosen. The number of teams such that each team includes at least one girl is:

(a)439

(b)429

(c)419

(d)441

93. if ${}^{n}p_{4} = 20\ {}^{n}p_{2}$ where p denotes the number ot permutations, then n is:

(a)4

(b)2

(c)5

(d)7

94. From a group of 8 men and 4 women, 4 persons are to be selected to form a committee so that at least 2 women are there on the committee.

In how many ways can it be done?

(a) 168

(b)201

(c) 202

(d)220

2021 - JANUARY

95. Eight Chairs are numbered from i to 8. Two women and three men are to be seated by allowing one chair for each. First, the women choose the chairs from the chairs numbered 1 to 4 and then men select the chairs from the remaining.

The number of possible arrangement is:

(a) 120

(b)288

(c)32

(a) 1440

96. 'n' locks and 'n' corresponding keys are available but the actual combination is not known. The maximum number of trials that are needed to assigns the keys to the corresponding locks is:

(a)$(n-1)C_2$

(b)$(n+1)C_2$

(c)$\sum_{k=2}^{n}(k-1)$

(d)$\sum_{k=2}^{n} k$

97. There are ten flights operating between city A and city B. The number of ways in which a person can travel from city A to city B and return by different flight is:

(a)90

(b)95

(c)80

(d)78

98. How many four-digit odd numbers can be formed with digits 0,1,2, 3, 4, 7 and 8 ?

(a)150

(b)300

(c)120

(d) 210

99. In how many different ways can the letters of the word 'DETAIL' be arranged so that the vowels occupy only the odd positions?

(a)32

(b)36

(c)48

(d)60

100. ${}^{n}C_{P} + 2\ {}^{n}C_{P-1} + {}^{n}C_{P-2} = ?$

(a)${}^{n+}C_{P}$

(b)${}^{n+2}C_{P}$

(c)${}^{n+1}C_{P+1}$

(d)${}^{n+2}C_{P-1}$

101. A business houses wishes to simultaneously elevate two of its six branch heads. In how many ways can these elevations take placed

(a)12

(b)3

(c)6

(d)15

2021 - JULY

102. If ${}^{n}p_{6} = 20{}^{n}p_{4}$ then the value of n is given by:

(a)n = 5

(b)n = 3

(c)n = 9

(d) n = 8

103.]How many numbers of seven digit numbers which can be formed from the digits 3, 4, 5, 6, 7, 8, 9 no digits being repeated are not divisible by 5?

(a)4320

(b)4690

(c)3900

(d)3890

104.]A person can go from place 'A' to 'B' by 11 different modes of transport but is allowed to return to "A" by any mode other than the one earlier. The number of different ways in which the entire journey can be completed is:

(a)110

(b)10^{10}

(c)9^5

(d) 10^9

105. The number of ways 5 boys and 5 girls can be seated at a round table, so no two boys are adjacent is:

(a)2,550

(**b)2,880**

(c)625

(d) 2,476

2021 - DECEMBER

106. The number of four letter words can be formed using the letters of the word DECTIONARY is

(a)5040

(b)720

(c)90

(d)30240

107. The number of words that can be formed using the letters of the "PETROL" such that the words do not have "P" in the first position, is

(a)720

(b)120

(c)600

(d)540

108. If ${}^{n}p_2 = 12$, then the value of n is

(a)2

(b)3

(c) 4

(d) 6)

109. The number of different ways the letters of the word "DETAIL" can be arranged in such a way that the vowels can occupy only the odd position is

(a)32

(b)36

(c)48

(d)60

110. 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)74,200

(b)96,900

(c)45,990

(d)86,400

JUNE 2022

111. If ${}^{11}C_x = {}^{11}C_{2x-4}$ and $x \neq 4$ than the value of ${}^{7}C_x$ =

(a)20

(b)21

(c)22

(d)23

112. There are 6 point in a line and 4 points in another line . Find number of parallelogram formed?

A.80 B. 70 C. **90** D. 100

113. There are 5 questions each have four options .then in now many different ways can we answer the question ?

A.20 B. 120 **C.1024** D. 60

114. . 8 pepole are seated in a row in ameaning among them the president and vice presedent are to be seated always in the centre what is the arrangement ?

A.7!2! B. **6!2!** C. 6! D. 1!

DEC 2022

115. Then are 20 point in a plane area. How many triangles can be formed by these points if 5 points are collinear?

A. 550 B. 560 **C 1130** D. 1140

116. The number of ways 4 boys and 3 girls can be seated in a row so that they are alternateis:

A. 12 B. 288 **C. 144** D. 256

117. If ${}^{n}P_{r}=3024$ and ${}^{n}C_{r}=126$, then find n and r

A. 9,4 B. 10,3 C. 12,4 D. 11,4

118. How many 3 digit odd numbers can be formed using the digits 5,6,7,8, 9, if the digits can be repeated?

A. 55 **B. 75** C. 65 D. 85

JUNE 2023

117. A committee of 3 men and 4 women is to be formed out of 8 women and 7 gents .Mrs kajal refuse to serve in a committee in which mr yash is members .the number of such committee can be :

A.1530 B.1500 C.1520 **D. 1540**

118. If ${}^{6}P_{2r}=12\ {}^{6}p_{r}$ find r

A.1 **B.2** C.3 D.4

119. In how many different ways the letters of SOFTWARE be arrange so that vowels comes togethers .

A . 720 B.1440 C.2880 **D.4320**

CHAPTER: 6 SEQUENCE AND SEIRES

2006 - NOVEMBER

1. The sum of all natural numbers between 100 and 1000 which are multiple of 5 is:

   (a)98,450 (b)96,450 (c)97,450 (d) 95,450

2. Find n such that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ may be the geometric mean between a and b:

   (a) ½ (b) 1 **(c)** **-½** (d) 0

3. The sum of an A P, whose first term is - 4 and last term is 146 is 7171. Find the value of n.

   (a) 99 (b) 100 **(c) 101** (d) 102

4. If the first term of a G.P exceeds the second term by 2 and the sum to infinity is 50, the series is :

   (a) 10,8, $\frac{32}{5}$, …(b) 10,8, $\frac{5}{2}$,…….(c) 10, $\frac{10}{3}$,$\frac{10}{9}$,…….(d) None

2007 - FEBRUARY

5. Σn^2 defines:

(a) $\frac{n(n+1)(2n+1)}{6}$ (b) $\frac{n(n+1)}{2}$ (c) $\left[\frac{n(n+1)}{2}\right]^2$ (d) None of these

6. Divide 30 into five parts in A.P., such that the first and last parts are in the ratio 2 :3 :

(a) $\frac{24}{5}, \frac{27}{5}$, **6,** $\frac{33}{5}, \frac{36}{5}$ (b) 6, $\frac{36}{5}, \frac{33}{5}, \frac{24}{5}, \frac{27}{5}$ (c) $\frac{27}{5}, \frac{24}{4}, \frac{36}{5}, \frac{33}{5}$, 6 (d) 6, $\frac{24}{5}, \frac{27}{5}, \frac{33}{5}, \frac{36}{5}$

7. If $a^{1/x} = b^{1/y} = c^{1/z}$ and a, b, c are in G.P; the x, y, z are in :

(a)A.P. (b) G.P. (c) Both (a) & (b) (d) None

8. Find the sum to n terms of the series : 7 + 77 + 777 + ... to n terms :

(a) $\frac{7}{9}(10^{n+1} - 10) - \frac{7n}{9}$ (b) $\frac{7}{9}(10^{n+1} - 10) + \frac{7n}{9}$

(c) $\frac{7}{81}(10^{n+1} - 10) - \frac{7n}{9}$ (d) $\frac{7}{81}(10^{n+1} - 10) + \frac{7n}{9}$

2007 - MAY

9. Find the sum of all natural numbers between 250 and 1,000 which are exactly divisible by 3 :

(a)1,56,375 (b) 1,56,357 (c) 1,65,375 (d) 1,65,357

10. If the p^{th} term of a G.P. is x and the qth term is y, then find the nth term :

(a) $\left[\frac{x^{(n-q)}}{y^{(np)}}\right]$ (b) $\left[\frac{x^{(n-q)}}{y^{(n-p)}}\right]^{(p-q)}$ (c) 1 **(d)** $\left[\frac{x^{(n-q)}}{y^{(n-p)}}\right]^{\frac{1}{p-q}}$

11. A person pays Rs. 975 in monthly instalments, each instalment is less than former

by Rs. 5. The amount of first instalment is Rs. 100. In what time will the entire amount be paid?

(a) 26 months **(b) 15 months** (c) Both (a) & (b)(d) 18 months

2007 - August

12. if the sum of n terms of an A.P, is $(3n^2 - n)$ and its common difference is 6, then its first term is :

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

13. Find the sum of the series: 2+ 7 + 12+ ..... 297.

(a)8970 (b)8870 (c)7630 (d)9875

14. A certain bait when dropped to the ground rebounds to $\frac{4}{5}^{\text{th}}$ of the heightfrom which it falls; it is dropped from a height of 100 metres find the total distance it travels before finally coming to rest:

(a) 600m (b) 700m **(c) 900m** (d) 200m

15. In a G.P if the $(p + q)^{th}$ term is m and $(p - q)^{th}$ term is n, then the pth term is:

(a)mn **(b)$\sqrt{mn}$** (c)m^2 (d)n^2

2007 - NOVEMBER

16. The sum of the series :0.5 + 0.55 + 0.555 + ... to n terms is :

(a) $\frac{5n}{9} + \frac{5}{9}[1 - (0.1)^n]$ **(b) $\frac{5n}{9} - \frac{5}{81}[1-(0.1)^n]$**

(c) $\frac{5n}{9} + \frac{5}{81}[1 - (0.1)^n]$ (d) $\frac{5n}{9}+\frac{5}{81}[1 + (0.1)^n]$

17. A contractor who fails to complete a building in a certain specified time is compelled to forfeit Rs. 200 for the first day of extra time required and thereafter

forfeited amount is increased by Rs. 25 for every day. If he loses Rs. 9,450, for how many days did he over-run the contract time?

(a) 19 days **(b) 21 days** (c) 23 days (d) 25 days

18. The first, second and seventh term of A.P. are in G.P. and the common difference is 2, the 2nd term of A.P. is :

(a) 5/2 (b) 2 (c) 3/2 (d)

2008 - FEBRUARY

19. A man employed in a company is promised a salary of Rs. 3,000 every month for the first year and an increment of Rs. 1,000 in his monthly salary every succeeding year. How much does the man earn from the company in 20 years?

(a) Rs. 30,00,000 (b) Rs. 27,50,000(c) Rs. 19,10,000 (d) Rs. 7,90,000

20. If a, b, c are in A.P. and x, y, z are in G.P,

then the value of $x^{(b-c)}. y^{(c-a)}.z^{(a-b)}$is .

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

21. Insert 4 A.M.'s between 3 and 18 :

(a)12, 15, 9, 6 **(b) 6, 9, 12, 15** (c)9, 6, 12, 15(d) 15,12, 9,6

2008 - JUNE

22. If $x = 1 + \frac{1}{3} + \frac{1}{3^2} + \ldots\ldots\ldots\ldots\infty$ and $y = 1 + \frac{1}{4} + \frac{1}{4^2} + \ldots\ldots\ldots\ldots\infty$

Find xy.

(a) 2 (b) 1 (c) 8/9 (d) ½

23. On 1st January every year a person buys National Saving Certificates of value exceeding that of his last year's purchase by Rs. 100. After 10 years, he finds that

the total value of the certificates purchased by him is Rs. 54,500. Find the value of certificates purchased by him in the first year:

(a) Rs. 6,000 (b) Rs. 4,000 **(c) Rs. 5,000** (d) Rs. 5,500

24. Find three numbers in G.P. such that their sum is 21, and the sum of their squares is 189 :

(a) 5, 7, 9 (b) 3, 7, 11 (c) 3, 6,12 (d) 4, 8, 9

2008 - DECEMBER

25. Find the ninth term of the series :$\sqrt{2}$, $5\sqrt{2}$,$9\sqrt{2}$,.....

(a)$25\sqrt{2}$ (b) $31\sqrt{2}$ **(c)$33\sqrt{2}$** (d)$25\sqrt{2}$

26. The sum of how many terms of the sequence 256,128,64,..... is 511.

(a)8 **(b)9** (c)7 (d)None of these

27. (x + 1), 3x, (4x + 2) are in A.P, Find the value of x

(a)2 **(b)3** (c) 4 (d)5

28. Find two numbers whose A.M. is 10 and G.M. is 8.

(a)10,10 **(b)[16,4]** (c)[18,2] (d)[14,6]

2009 - JUNE

29. The sum of terms of an infinite GP is 15. And the sum of the squares of the term is 45. Find the common ratio.

(a) 3/2 (b) 1 (c) -2/3 (d) 2/3 (1 mark)

30. If in an A.P., Tn represents nth term.

If t_7: t_{10} = 5:7 then t_a: t_{11} = _____

(a)13 : 16 **(b) 17 : 23** (c)14:17 (d) 15:19

2008 - DECEMBER

31. Find the sum to infinity of the following series:

1 – 1+1 – 1+1 – 1+ ……∞

(a) 1 (b) ∞ **(c) ½** (d) Does not exist

2010 - JUNE

32. Divide 144 into three parts which are in AP and such that the largest is twice the smallest, the smallest of three numbers will be :

(a) 48 (b) 36 (c) 13 **(d) 32**

33. Sum of series $1 + \frac{4}{5} + \frac{7}{5^2} + \frac{10}{5^3} + \ldots\infty$ is

(a) 15/36 (b) 35/36 **(c) 35/16** (d) 15/16

2010 - DECEMBER

34. If G be Geometric Mean between two numbers a and b, then the valueof $\frac{1}{G^2 - a^2} + \frac{1}{G^2 - b^2}$ is equal to

(a) G^2 (b) $3\,G^2$ **(c) $1/G^2$** (d) $2/G^2$

2011 - JUNE

35. If Sum (S_n) of 'n'- terms of an Arithmetic Progression is $(2n^2 + n)$. What is the difference of its 10^{th} and 1^{st}term ?

(a) 207 **(b) 36** (c) 90 (d) 63

36. Find the product of;

$(243), (243)^{1/6}, (243)^{1/36}, \ldots\ldots\ldots$

(a) 1,024 (b) 27 **(c) 729** (d) 246

37. Insert two Arithmetic means between 68 and 260

(a) 132, 196 (b) 130, 194 (c) 70,258 (d) None of the above.

38. Geometric Mean of P, P^2, P^3 ....., P^n will be :

(a) P^{n+1} **(b)** $\mathbf{P^{\frac{1+n}{2}}}$ (c) $P^{\frac{n(n+1)}{2}}$ (d) None of the above.

2011 - DECEMBER

39. Find the numbers whose arithmetic mean is 12.5 and geometric mean is 10.

(a) 20 and 5 (b) 10 and 5 (c) 5 and 4 (d) None of these

40. If sum of 3 arithmetic means between "a" and 22 is 42, then "a" = _____

(a) 14 (b) 11 (c) 10 **(d) 6**

41. if each month Rs. 100 increases in any sum then find out the total sum after 10 months, if the sum of first month is Rs. 2,000.

(a) Rs. 24,500 (b) Rs. 24,000 (c) Rs. 50,000 (d) Rs. 60,000

42. The sum of all two Digit odd numbers is

(a) 2475 (b) 2575 (c) 4950 (d) 5049

43. If 5^{th} term of a G.P. is $\sqrt[3]{3}$, then the product of first nine terms is

(a) 8 **(b) 27** (c) 243 (d) 9

44. The sum of the third and ninth term of an A.P. is 8. Find the sum of the first 11 terms of the progression.

(a) 44 (b) 22 (c) 19 (d) 11

2012 – JUNE

45. If 8^{th} term of an A.P is 15, then sum of its 15 terms is

(a) 15 (b) 0 **(c) 225** (d) 225/2

46. Find the sum of the infinite terms 2, $\frac{4}{y}, \frac{8}{y^2}, \frac{16}{y^3}$.....; if y >2

(a) $\frac{2y}{y-2}$ (b) $\frac{4y}{y-2}$ (c) $\frac{3y}{y-2}$ (d) None of these.

47. The 4th term of an A.P. is three times the first and the 7tht&rm exceeds twice the third term by 1. Find the first term 'a' and common difference 'd'.

(a) **a = 3, d = 2**(b) a = 4, d = 3(c) a = 5, d = 4(d) a = 6, d = 5

48. 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.

2012-DECEMBER

49. In an A.P., if common difference is 2, Sum of n terms is 49, 7th term is 13 then n = _____.

(a) 0 (b) 5 **(c)7** (d) 13

50. The first term of a G.P. where second term is 2 and sum of infinite term is 8 will be:

(a) 6 (b) 3 **(c) 4** (d) 1

51. If the sum of n terms of an A.P be $2n^2 + 5n$, then its 'n^{th}' term is:

(a)4n – 2 (b) 3n – 4 **(c) 4n + 3** (d) 3n + 4

2013 - JUNE

52. If the sum of n terms of an A.P be $3n^2$ - n and its common difference is 6, then its first term is :

(a)2 (b)3 (c) 4 (d) 5

53. If the sum of the 4th term and the 12th term of an A.P. is 8, what is the sum of the first 15 terms of the progression?

(a)60 (b)120 (c) 110 (d)150

54. If 'n' arithmetic means are inserted between 7 & 71 and 5^{th} arithmetic mean is 27, then 'n' is equal to:

(a) 15 (b) 16 (c) 17 (d) 18

55. In a G.P. the sixth term is 729 and the common ratio is 3, then the first term of G.P .is:

(a) 2 **(b) 3** (c) 4 (d) 7

2013 - DECEMBER

56. An Arithmetic progression has 13 terms whose sum is 143. The third term is 5 so the first term is:

(a) 4 (b) 7 (c)9 **(d) 2**

57. If Geometric mean (G.M.) of a, b, c, d is 3, then G.M. of $\frac{1}{a},\frac{1}{b},\frac{1}{c},\frac{1}{d}$ willbe:

(a) 1/3 (b) 3 (c) 81 (d) 1/81

2014 - JUNE

58. The sum to m terms of the series 1+11+111+…. upto m terms, is equal to:

(a) $\frac{1}{81}$ (10^{m+1}– 9m - 10) (b) $\frac{1}{27}$ (10^{m+1} – 9m -10)

(c) 10^{m+1}-9m-10 (d) None of the

59. The sum of the infinite G.P.

$1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27}$ +……..is equal to:

(a) 1.95 (b) 1.5 (c) 1.75 (d) None of the

60. The value of $1^3+2^3+3^3+4^3+$……$+m^3$ is equal to:

(a)$\left[\frac{m(m+1)}{2}\right]^3$ (b) $\frac{m(m+1)(2m+1)}{6}$ **(c)**$\left[\frac{m(m+1)}{2}\right]^2$ (d) None of these

2014- DECEMBER

61. If x, y, z are the terms in G.P. then the terms $x^2 + y^2$, $xy + yz$, $y^2 + z^2$ are in:

(a)A.P.**(b)** **G.P.** (c) H.P (d)Noneof these

62. If $S_n = n^2p$ and $S_m = m^2p$ $(m \neq n)$is the sum of an A.P., then S_p = _____

(a) p^2 **(b)P^3** (c)$2p^3$ (d)p^4

63. The arithmetic mean of the square of first 2n natural numbers is:

(a) $\frac{1}{6}$ (2n + 1) (4n - 1) (b) $\frac{1}{6}$ (2n - 1) (4n - 1)

(c) $\frac{1}{6}$ (2n - 1) (4n + 1) **(d) $\frac{1}{6}$ (2n + 1) (4n + 1)**

64. If the sum of first 'n' terms of an A.P. is $6n^2 + 6n$, then the fourth term of the series:

(a)120 (b) 72 **(c)48** (d) 24

2015 - JUNE

[65] if S be the sum, P the product and R is the sum of reciprocals of n- terms in G.P then P^2R^n = _____.

(a) S^{2n} **(b) S^n** (c) S^{2n} (d) S^{-n}

65. The sum of the series 1 +11 + 111 + ... to n terms is _____.

(a) $\frac{1}{27}$ $(10^{n+1}$ -9n- 10) (b) 10^{n+1} -9n-10

(c) $\frac{1}{81}$ $(10^{n+1}$ - 9n - 10) (d) None of these

66. If third term and seventh term of an A.P are eighteen and thirty respectively, then sum of first twenty terms will be:

(a) 540 (b) 610 (c) 740 **(d) 810**

2015 - DECEMBER

67. If the sum of 'n' terms of an Arithmetic Progression (A.P) is $3x^2 + 5x$ and its m^{th} term is 164, then the value of m is:

(a) 27 (b) 28 (c) 24 (d) 26

68. If a, b, c are in Arithmetic Progression (A.P.), then the value of a-b+c is:

(a)a (b)-b **(c)b** (d)c (1 mark)

69. Find the two numbers whose geometric mean is 5 and arithmetic mean is 7.5.

(a)10and 5 **(b)13.09and 1.91** (c)12and3 (d)None of the above

2016-JUNE

70. The sum of n terms of the series $\log x + \log \frac{x^2}{y} + \log \frac{x^3}{y^2} +$ ……is

(a) $\frac{n}{2}\left[2n \log\left(\frac{x}{y}\right) + \log xy\right]$ (b) $\frac{n}{2}\left[n \log xy + \log\left(\frac{x}{y}\right)\right]$

(c) $\frac{n}{2}\left[n \log\left(\frac{x}{y}\right) - \log xy\right]$ **(d)** $\mathbf{\frac{n}{2}\left[n \log\left(\frac{x}{y}\right) + \log xy\right]}$

71. A G. P. (Geometric Progression) consists of 2n terms. If the sum of the terms occupying the odd places is S_T and that of terms in the even places is S_2, the common ratio of the progression is:

(a) n (b) $2S_1$ **(c)** $\mathbf{\frac{S_2}{S_1}}$ (d) $\frac{S_1}{S_2}$

72. If $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are in arithmetic progression then a^2, b^2, c^2, are in

(a)Arithmetic Progression (b)Geometric Progression

(c)Both in arithmetic and geometric Progression (d)None of these

2016 - DECEMBER

73. The income of a person is Rs. 5,00,000 in the firm in the first year and he receives

an increase of Rs. 15,000 per year for next 10 years. The total amount he receives in 10 years is:

(a) Rs. 56,75,000 (b) Rs. 72,50,000 (c) Rs. 15,67,500 (d) None of these

74. if the Sum 50 + 45 + 40 + 35 + _____ is zero, then the number of terms is:

(a) 22 (b) 20 **(c) 21** (d) 25

75. The number 2.353535 _____ in $\frac{p}{q}$ form is:

(a) $\frac{235}{99}$ (b) $\frac{234}{99}$ (c) $\frac{230}{99}$ **(d)** $\frac{\mathbf{233}}{\mathbf{99}}$

2017 - JUNE

76. The sum of n terms of the series 1 + (1 + 3) + (1 + 3 + 5) +is

(a) $\frac{\mathbf{n(n+1)\,(2n+1)}}{\mathbf{6}}$ (b) $\frac{n(n+1)(n+2)}{6}$

(c) $\frac{n(n+1)(2n+1)}{3}$ (d) None of these

77. The sum of first 20 terms of a GP is 1025 times the sum of first 10 terms of same GP then common ratio is:

(a) $\sqrt{2}$ **(b) 2** (c)$2\sqrt{2}$ (d) 1/2

78. The value C such that a, - 3, b, 5, c are in A.P. is:

(a) -7 (b) 1 (c)13 **(d) 9**

2017 - DECEMBER

79. The sum of all numbers between 100 and 1000 which are divisible by 11 will be:

(a) 44550 (b) 66770 (c) 55440 (d) 33440

2018-MAY

80. The sum to m terms of the series 1+11+111+.....upto m terms, isequal to:

(a) $\frac{1}{81}$ (10^{m+1} -9 m-10) (b) $\frac{1}{27}$ (10^{m+1} -9 m - 10)

(c) 10^{m+1}-9m - 10 (d) None of these

81. A person pays Rs. 975 in monthly instalments, each instalment is less than former by Rs. 5. The amount of Ist instalment is Rs. 100. In what time will the entire amount be paid?

(a)26 months **(b) 15 months**(c) Both (a) & (b) (d) 18 months.

82. If the sum of n terms of an AP is ($3n^2$– n) and its common difference is 6, then its first term is:

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

83. Insert two arithmetic means between 68 and 260.

(a) 132,196 (b) 130,194 (c) 70, 258 (d) None of the above

2018 – NOVEMBER

84. If the Pth term of an A.P. is 'q' and the qth term is 'p', then its rth term is

(a) p + q – r (b) P + q + r(c) p - q – r (d) p - q

85. The 3rd term of a G.P. is $\frac{2}{3}$ and the 6th term is $\frac{2}{81}$, then the 1st term is

(a) 6 (b) $\frac{1}{3}$ (c) 9 (d) 2

86. The sum of the series - 8, - 6, - 4, ...n terms is 52. The number of terms n is

(a)11 (b) 12 **(c) 13** (d) 10

87. The value of K, for which the terms 7K + 3,4K - 5, 2K + 10 are in A.P., is

(a) 13 (b) -13 (c) 23 **(d) - 23**

2019 - JUNE

88. If the ratio of sum of n terms of two APs is (n+1):(n-1), then the ratio of their m^{th} terms is:

(a)(m + 1): 2m (b)(m + 1) : (m -1)
(c) (2m -1): (m + 1) . **(d)m: (m-1)**

89. IN a GP. If the fourth term is '3' then the product of first seven terms Is

(a)3^5 **(b)3^7** (c)3^6 (d)3^8

90. If2 + 6 + 10 + 14+ 18 + ... + x = 882 then the value of x

(a)78 (b)80 **(c) 82** (d) 86

91. If y = 1 + x + x^2 + ...∞ then x =

(a) $\frac{y-1}{y}$ (b) $\frac{y+1}{y}$ (c) $\frac{y}{y+1}$ d) $\frac{y}{y-1}$ (1 mark)

2019-NOVEMBER

92. If $\frac{(b+c-a)}{a}, \frac{(c+a-b)}{b}, \frac{(a+b-c)}{c}$ are in AP then a, b, c are in:

(a)AP (b)GP **(c)HP** (d)None

93. Sum up to infinity of series.

$\frac{1}{2}+\frac{1}{3^2}+\frac{1}{2^3}+\frac{1}{3^4}+\frac{1}{2^5}+$ ……

(a)19/24 (b)24/19 (c)5/24 (d)None

94. Sum the series $\frac{1}{5}, \frac{1}{5^2}, \frac{1}{5^3}$ …… $\frac{1}{5^n}$.

(a) $\frac{1}{4}\left[1-\left(\frac{1}{5}\right)^n\right]$ **(** b) $\frac{1}{5}\left[1-\left(\frac{1}{4}\right)^n\right]$ (c)both (d) None

95. Find the no. of terms of the series25, 5, 1 ..... $\frac{1}{3125}$

(a)6 (b)7 (c)8 **(d)9**

96. If the sum of five terms of AP is 75. Find the third term of the series

(a)35 (b)30 (c)15 (d)20

97. If the AM and GM of two numbers is 6.5 and 6 the no.'s are:

(a)3 and 2 **(b)9 and 4** (c)81 and 16 (d)None

98. If AM and HM for two numbers are 5 and 3.2, respectively. GM will be:

(a)20 (b)16 **(c) 4** (d) 5

2020 - NOVEMBER

99. Three numbers in G.P. with their Sum 130 and their product 27,000 are:

(a) 10,30,90 (b) 90, 30,10 **(c) (a) and (b) both** (d) 10,20,30

100. The 20^{th} term of arithmetic progression whose 6^{th} term is 38 and 10^{th} term is 66 is:

(a)118 **(b)136** (c)178 (d)210

101. Divide 69 into 3 parts which are in A.P. and are such that the product of first two parts is 460:

(a)20, 23, 26 (b) 21,23,25 (c)19, 23, 27(d)22, 23, 24

2021 - JANUARY

102. The n^{th} terms of the series 3 + 7 + 13 + 21 +31 + ...is

(a)4n – 1 (b)$n^2 + 2n$ **(c)$n^2 + n + 1$** (d)$n^3 + 2$

103. in a geometric progression the 3rd and 6th terms are respectively 1 and -1/8. The first term (a) and common ratio are respectively.

(a) 4 and $\frac{1}{2}$ (b) 4 and $\frac{-1}{4}$ **(c) 4 and $\frac{-1}{2}$** (d) 4 and $\frac{1}{4}$

2021 - JULY

104. The sum of three numbers in a geometric progression is 28. When 7, 2 and 1 are subtracted from the first, second and the third numbers respectively, then the resulting numbers are in arithmetic progression. What is the sum of squares of the original three numbers?

(a)510 (b)456 (c)400 **(d)336**

105. The number of terms of the series: 5+7+9+.....must be taken so thatthe sum may be 480.

(a)20 (b)10 (c)15 (d) 25

106. if the sum of 'n' terms of an AP (Arithmetic Progression) is $2n^2$, the fifth term is ____.

(a)20 (b)50 **(c)18** (d)25

2021 - DECEMBER

107. If the sum and product of three numbers in G.P. are 7 and 8 respectively, then 4th term of the series is

(a)6 (b)4 **(c)8** (d) 16

108. The sum of series 7 + 14 + 21 + ... to 17th term is:

(a)1071 (b)971 (c)1171 (d)1271

109. The sum of first n terms an AP is $3n^2 + 5n$. The series is:

(a)8, 14, 20, 26,….(b)8, 22, 42, 68,…(c)22, 68, 114, ……(d)8, 14, 28, 44, ……

110. The largest value of n for which $\frac{1}{2} + \frac{1}{2^2} + \ldots\ldots\frac{1}{2^n} < 0.998$ is.

(a)9 (b)6 (c)7 **(d) 8**

2022 - JUNE

111. The nth term of the series 9,7,5 and 15,12, 9 are same .find the nth term

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

112. The sum of first 8 terms of G.P is five times the sum of first 4 terms .Find the comman Ratio ?

(a)$\pm\sqrt{2}$ (b)16 (c) $\pm$ (d) 4

113. A person pays Rs. 975 in monthly instalments, each instalment is less than former by Rs. 5. The amount of Ist instalment is Rs. 100. In what time will the entire amount be paid?

(a)26 months **(b) 15 months**(c) Both (a) & (b) (d) 18 months.

2022 - DECEMBER

114. If Arithmetic mean between two numbers is 5 and Geometric mean is 4 then what is the value of Harmonic mean?

A.3.2 B.3.4 C.3.5 D. 36

115. In a G.P. 5th term is 27 8th term is 729. Find its 11th term.

A. 729 B. 6561 C. 2187 D. 19683

116. If pth term of an AP is q and its qth term is p, then what will ho the value of (p + q)th term?

A. 0 B.1 C.p + q – 1 D.2(p + q - 1)

2023- JUNE

117. If 9th and 19th term of An arithmetic Progression are 35 and 75 .respectively ,then 20th term is.

A. 78 B. 79 C.80 D.81

118. How Many numbers Between 74 and 25556 are divisible by 5?

A. 5097 B.5090 C.5095 D.5075

119. If 4^{th} term ,7 term and 10 term of a GP are p,q,r ,respectively

A. $P^2 = q^2+r^2$ B.$P^2 = qr$ C.$q^2 = pr$ D.pqr+pq+1=0

CHAPTER 7 SETS, RELATIONS AND FUNCTIONS

2006 - NOVEMBER

1. Out of 20 members in- a family, 11 like to take tea and 14 like coffee. Assume that each one likes at least one of the two drinks. Find how many like both coffee and tea :

(a) 2 (b) 3 (c) 4 (d) 5

2007 - FEBRUARY

2. In a group of 70 people, 45 speak Hindi, 33 speak English and 10 speak neither Hindi nor English. Find how many can speak both English as well as Hindi:

(a) 13 (b) 19 (c) 18 (d) 28

3. Let R is the set of real numbers,such that the function f:R → Rand g:R → R are defined by $f(x) = x^2 + 3x +1$ and $g(x) = 2x - 3$. Find (fog):

(a)$4x^2 + 6x +1$(b)$x^2 + 6x + 1$

(c) $4x^2 - 6x + 1$(d)$x^2 - 6x + 1$

2007 - MAY

4. !n a survey of 300 companies, the number of companies using different media - Newspapers (N), Radio (R) and Television (T) are as follows :

$n(N) = 200$, $n(R) = 100$, $n(T) = 40$, $n(N \cap R) = 50$, $n(R \cap T) = 20$, $n(N \cap T)$

$= 25$ and $n(N \cap R \cap T) = 5$.

Find the numbers of companies using none of these media :

(a) 20 companies(b) 250 companies

(c) 30 companies(d) 50 companies(

5. f R is the set of real numbers such that the function f: R → R is defined by $f(x) = (x + 1)^2$, then find (fof):

(a) $(x + 1)^2 + 1$(b) $x^2 + 1$

(c) $\{(x + 1)^2 + 1\}^2$(d) None

2007 - AUGUST

6. If f: R → R, f(x) = 2x + 7, then the inverse of fis :

(a) $f^{-1}(x) = (x - 7)/2$ (b) $f^{-1}(x) = (x + 7)/2$

(c) $f^{-1}(x) = (x - 3)/2$ (d) None (1 mark)

2007 - NOVEMBER

7. In a town of 20,000 families it was found that 40% families buy newspaper A, 20% families buy newspaper B and 10% families buy newspaper C, 5% families buy A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all the three newspapers, then the number of families which buy A only is:

(a) 6600 (b) 6300

(c) 5600 (d) 600

8. Let f: R → R be such that $f(x) = 2^x$, then f(x + y) equals:

(a) f(x) + f(y) (b) f(x).f(y)

(c) f(x) ÷ f(y) (d) None of these

2008 - FEBRUARY

9. Out of total 150 students, 45 passed in Accounts, 30 in Economics and 50 in Maths, 30 in both Accounts and Maths, 32 in both Maths and Economics, 35 in both Accounts and Economics, 25 students passed in all the three subjects. Find the numbers who passed at least in any one of the subjects:

(a) 63 (b) 53

(c) 73 (d) None

2008 - JUNE

10. If $f(x) = \frac{2 + x}{2 - x}$, then $f^{-1}(x)$:

(a) $\frac{2(x - 1)}{x + 1}$ (b) $\frac{2(x + 1)}{x - 1}$

(c) $\frac{x + 1}{x - 1}$ (d) $\frac{x - 1}{x + 1}$

2008 - DECEMBER

11. If A = {1,2, 3, 4,}

B = {2, 4, 6, 8,}

f (1) = 2, f (2) = 4, f (3) = 6 and

f (4) = 8, And f: A → B then $f^{-1}$is :

(a) {(2,1), (4, 2), (6,3), (8,4)}

(b) {(1,2), (2,4), (3,6), (4,8)}

(c) {(1,4), (2, 2), (3, 6), (4, 8)}

(d) None of these

12. If f (x) = x^2 + x- 1 and 4f (x) = f (2x) then find 'x'.

(a) 4/3 (b) 3/2

(c) -3/4 (d) None of these

13. If A = {p, q, r, s}

B = {q, s, t}

C = {m, q, n}

Find C - {A ∧ B)

(a) {m, n} (b) {p, q}

(c) {r, s} (d) {p, r}

2009 - DECEMBER

14. X = { x, y, w, z}, y = {1,2,3,4}

H = {(x, 1), (y, 2), (y, 3), (z, 4), (x, 4)}

(a) H is a function from X to Y

(b) H is not a function from X to Y

(c) H is a relation from Y to X

(d) None of the above (1 mark)

15. Given the function f(x) = (2x + 3), then the value of f(2x) - 2f(x) + 3 will be-:

(a) 3 (b) 2

(c) 1 (d) 0

(d) f(x) = 2x + 3

f(2x) - 2f(x) + 3

16. If f (x) = 2x + h then find f(x + h) - 2f (x)

(a) h-2x (b) 2x-h

(c) 2x + h (d) None of these

2010-JUNE

17. If A = {x : x^2 -3x + 2 = 0},

B = {x :x^2 + 4x - 12 = 0}, then

B - A is Equal to

(a) {-6} (b) {1}

(c) {1,2} (d) {2,-6}

18. If F : A → R is a real valued function defined by f(x) =$\frac{1}{x}$, then A = _____.

(a) R (b) R - {1}

(c) R - {0} (d) R - N

19. In the set N of all natural numbers the relation R defined by a R b "if and only if, a divide b", then the relation R is :

(a) Partial order relation (b) Equivalence relation

(c) Symmetric relation (d) None of these

2010 - DECEMBER

20. For any two sets A and B, An(A' U B) = _____, where A' representthe compliment of the set A

(a) A ∩ B (b) AUB

(c) A'UB (d) None of these

21. If f: R → R, f(x) = x+1,

g : R → R g(x) = x^2+1

then fog(-2) equals to

(a) 6 (b) 5

(c) -2 (d) None

22. If A⊂B, then which one of the following is true

(a) A∩ B =B (b) A∪B =B

(c) A∩ B =A^1 (d) A∩ B = φ

23. If f(x- 1) = x^2- 4x + 8 , then f (x + 1) =

(a) x^2+8 (b) x^2+7

(c) x^2+4 (d) x^2- 4x

2011 - JUNE

24. There are 40 students, 30 of them passed in English, 25 of them passed in Maths and 15 of them passed in both. Assuming that every Student has passed at least in one subject. How many student's passed in English only but not in Maths.

(a) 15(b) 20

(c) 10(d) 25

25. If A = {± 2, ± 3}, B = {1,4,9} and

F = {(2, 4), (- 2, 4), (3, 9), (- 3, 4)} then 'F' is defined as :

(a) One to one function from A into B.

(b) One to one function from A onto B.

(c) Many to one function from A onto B.

(d) Many to one function from A into B.

26. If f(x) =$\frac{x}{\sqrt{1+x^2}}$ and g (x) =$\frac{x}{\sqrt{1-x^2}}$ Find fog ?

(a) x (b) $\frac{1}{x}$

(c)$\frac{x}{\sqrt{1-x^2}}$(d) $x\sqrt{1-x^2}$

2011 - DECEMBER

27. f(x) = 3+x, for - 3< x <0 and 3 - 2x for 0< x <3, then Value of f(2) will be

(a) - 1 (b) 1

(c) 3 (d) 5

28. If A = (1,2, 3, 4, 5), B = (2, 4) and C = (1,3, 5) then (A - C) × B is

(a) {(2, 2), (2, 4), (4, 2), (4, 4), (5, 2), (5, 4)}

(b) {(1,2), (1,4), (3, 2), (3, 4), (5, 2), (5, 4)}

(c) {{2, 2), (4, 2), (4, 4), (4, 5)}

(d) {{2, 2), (2, 4), (4, 2), (4, 4)}

29. For any two sets A and B the set (AUB')' is Equal to (where^1 denotes compliment of the set)

(a) B-A (b) A-B

(c) A' - B' (d) B' - A'

2012 - JUNE

30. The number of proper sub set of the set {3, 4, 5, 6, 7} is

(a) 32 **(b) 31**

(c) 30 (d) 25

31. On the set of lines, being perpendicular is a _____ relation.

(a) Reflexive **(b) Symmetric**

(c) Transitive (d) None of these.

32. The range of the function f: N → N; $f(x) = (-1)^{x-1}$, is

(a) {0,-1} **(b) {1,-1}**

(c) {1,0} (d) {1,0,-1} (1 mark)

33. The minimum value of the function $x^2 - 6x + 10$ is _____.

(a) 1 (b) 2

(c) 3 (d) 10

2012 - DECEMBER

34. For a group of 200 persons, 100 are interested in music, 70 in photography and 40 in swimming, Further more 40 are interested in both music and photography, 30 in both music and swimming, 20 in photography and swimming and 10 in all the three. How many are interested in photography but not in music and swimming?

(a) 30 (b) 15

(c) 25 **(d) 20**

35. If f: R → R is a function, defined by f(x) = 10x - 7, if $g(x) = f^{-1}(x)$, then g(x) is equal to

(a) $\frac{1}{10x-7}$ (b) $\frac{1}{10x+7}$

(c) $\mathbf{\frac{x+7}{10}}$ (d) $\frac{x-7}{10}$

36. The number of elements in range of constant function is

(a) One (b) Zero

(c) Infinite (d) Indetermined

2013 - JUNE

37. Let A = {1,2, 3}, then the relation R ={1,1), (2, 3), (2, 2), (3, 3), (1,2)}is:

(a) Symmetric (b) Transitive

(c) Reflexive (d) Equivalence

38. If f(x) = x + 2, g (x) = 7^x, than g of(x) = _____

(a) 7^x. x + 2 . 7^x (b) 7^x + 2

(c) 49 (7^x) (d) None of these

39. If f(x) = log $\left(\frac{1+x}{1-x}\right)$,then f$\left(\frac{2x}{1+x^2}\right)$is equal to:

(a) f(x) **(b) 2f(x)**

(c) 3f(x) (d) -f(x)

2013 - DECEMBER

40. If f(x) = $(a - x^n)^{1/n}$, a > 0 and 'n' is a positive integer, then f(f(x)) = _____.

(**a) x** (b) a

(c) $x^{1/n}$ (d) $a^{1/n}$

41. Of the 200 candidates who were interviewed for a position at call centre, 100 had a two-wheeler, 70 had a credit card and 140 had a mobile phone, 40 of them had both a two-wheeler and a credit card, 30 had both a credit card and a mobile phone, 60 had both a two-wheeler and a mobile phone, and 10 had all three. How many candidates had none of the three?

(a) 0 (b) 20

(c) 10 (d) 18

42. If f(x) = $\frac{x^2-25}{x-5}$ then f(5) is

(a) 0 (b) 1

(c) 10 **(d) not defined**

2014 - JUNE

43. Let A={1,2,3} and B={6,4,7}. Then, the relation R={(2,4), (3,6)} will be:

(a) Function from A to B

(b) Function from B to A

(c) Both A and B

(d) Not a function

44. In a class of 50 students, 35 opted for Mathematics and 37 opted for Commerce. The number of such students who opted for both Mathematics and Commerce are:

(a) 13 (b) 15

(c) 22 (d) 28

45. The range of {(1,0), (2,0), (3,0), (4,0), (0,0)} is:

(a) {1,2,3,4,0} **(b) {0}**

(c) {1,2,3,4} (d) None of these

2014 - DECEMBER

46. Let N be the set of all Natural numbers; E be the set of all even natural numbers then the function

f: N →E defined as f(x) = 2x + x ∈ N is:

(a) One-one into **(b) One-one onto**

(c) Many-one into (d) Many-one onto

47. If A = {2, 3}, B = {4, 5}, C = {5, 6}, then A × (B ∩ C) = _____

(a) {(5, 2), (5, 3)} **(b) {(2, 5), (3, 5)}**

(c) {{2, 4), (3, 5)} (d) {{3, 5), (2, 6)}

48. If S = {1,2, 3) then the relation {(1,1), (2,2), (1,2), (2,1)} is symmetric and

(a) Reflexive but not transitive

(b) Reflexive as well as transitive

(c) Transitive but not reflexive

(d) Neither transitive nor reflexive

49. If f(x) = $\frac{x}{x-1}$, then $\frac{f(x/y)}{f(y/x)}$ =

(a) x/y (b) y/x

(c) -x/y (d) -y/x

2015 - JUNE

50. If N be the set of all natural numbers and E be the set of all even natural numbers then the function f: N → E, such that f(x) = 2x for all X ∈ N is

(a) one-one onto (b) one-one into

(c) many-one onto (d) constant

2015 - DECEMBER

51. If A = {x, y, z}, B = {a, b, c, d}, then which of the following relation from the set A to set B is a function?

(a) {(x, a), (x, b), (y, c), (z, d)}

(b) {(x, a), (y, b), (z, d)}

(c) {(x, c), (z, b), (z, c)}

(d) {a, z), (b, y), (c, z), (d, x)}

52. In a class of 80 students, 35% students can play only cricket, 45% students can play only table tennis and the remaining students can play both the games. In all how many

students can play cricket?

(a) 55 **(b) 44**

(c) 36 (d) 28

53. If f(x) = 2x + 2 and g(x) = x^2, then the value of fog (4) is:

(a) 18 (b) 22

(c) 34 (d) 128

2016-JUNE

54. If set A = $\left\{x: \frac{x}{2} \in z, 0 \leq x \leq 10\right\}$,

B = {x : x is one digit prime number}

and$C=\left\{x: \frac{x}{3} \in N,\ x \leq 12\right\}$

then A ∩ (B ∩ C) is equal to -

(a) φ (b) Set A

(c) Set B (d) Set C

55. The domain (D) and range (R) of the function f(x) = 2 - | x+1 | is

(a) D = Real numbers, R = (2, ∞)

(b) D = Integers, R = (0, 2)

(c) D = Integers, R = (- ∞, ∞)

(d) D = Real numbers, R = (- ∞, 2)

2016- DECEMBER

56. If R is the set of all real numbers, then the function f: R→R defined by f(x) = 2^x

(a) one-one onto **(b) one-one into**

(c) many-one into (d) many-one onto

57. The inverse function $f^{-1}$of f(x) = 100x is:

(a) $\frac{x}{100}$ (b) $\frac{1}{100x}$

(c) $\frac{1}{x}$ (d) None of these

58. The number of subsets of the set formed by the word Allahabad is:

(a) 128 (b) 16

(c) 32 (d) 64

2017-JUNE

59. The range of function f defined by f(x) = $\frac{x}{x^2+1}$ is:

(a) {x: $\frac{-1}{2}$< x <$\frac{1}{1}$}(b) {x: $\frac{-1}{2}$≤ x <$\frac{1}{2}$}

(c) {x: $\frac{-1}{2}$≤ x ≤$\frac{1}{2}$} (d) {x: x >$\frac{1}{2}$ or x <$\frac{-1}{2}$}

60. In a group of students 80 can speak Hindi, 60 can speak English and 40 can speak English and Hindi both, then number of students is:

(a) 100 (b) 140

(c) 180 (d) 60

61. If f(x) = $\frac{x-1}{x}$ and g(x) = $\frac{1}{1-x}$ then (fog) (x) is equal to:

(a) x - 1 **(b) x**

(c) 1 - x (d) - x (1 mark)

2017 - DECEMBER

62. Iff(x) = $\frac{x+1}{x+2}$,then $f\left\{f\left(\frac{1}{x}\right)\right\}$ = _____.

(a) $\frac{2x+3}{3x+5}$ (b) $\frac{2x+5}{3x+2}$

(c) $\frac{3x+2}{5x+3}$ **(**d) $\frac{5x+2}{2x+3}$

63. In a class of 35 students, 24 like to play cricket and 16 like to play football. Also each student likes to play at least one of the two games. How many students like to play both cricket and football?

(a) 5 (b) 11

(c) 19 (d) 8

2018-MAY

64. Let N be the set of all natural numbers; E be the set of all even natural numbers then the function;

F:N⇒ E defined as f(x) = 2x – V ×∈N is =

(a) One-one-into (b) Many-one-into

(c) One-one onto (d) Many-one-onto (1 mark)

65. In a town of 20,000 families it was found that 40% families buy newspaper. A, 20% families buy newspaper B and 10% families buy newspaper C, 5% families buy A and B,

3% buy B and C and 4% buy A and C if 2% families buy ail the three newspapers, then the number of families which buy A only is:

(a) 6600 (b) 6300

(c) 5600 (d) 600

66. The numbers of proper sub set of the set {3,4,5,6,7} is:

(a) 32 **(b) 31**

(c) 30 (d) 25

2018 - NOVEMBER

67. A is {1,2,3,4} and B is {1,4,9,16,25} if a function f is defined from set A to B where $f(x) = x^2$ then the range of f is:

(a) {1,2,3,4} **(b) {1,4,9,16}**

(c) {1,4,9,16,25} (d) None of these

68. If A = {1,2} and B = {3,4}. Determine the number of relations from A and B:

(a) 3

(b) 16

(c) 5

(d) 6

69. If A = {1,2,3,4,5,6,7} and B = {2,4,6,8}. Cardinal number of A - B is:

(a) 4

(b) 3

(c) 9

(d) 7

70. Identity the function from the following:

(a) {(1,1), (1,2), (1,3)} (b) {(1.1), (2,1), (2,3)}

(c) {(1,2), (2,2), (3,2),(4,2)} (d) None of these

2019 - JUNE

71. If A = {1,2, 3,4, 5, 6, 7, 8, 9}

B = {1,3, 4, 5, 7, 8}; C = {2, 6, 8} then find (A - B) ∪ C

(a) {2, 6}

(b) {2, 6, 8}

(c) {2, 6, 8, 9}

(d) None (1 mark)

72. A = {1 2 34….. 10} a relation on A, R = {(x, y)/x + y = 10, x ∈A, Y ∈ A,x ≥ Y} then domain of R^{-1} is

(a) {1,2, 3, 4, 5}

(b) {0, 3, 5, 7, 9}

(c) {1,2, 4, 5, 6, 7}

(d) None (1 mark)

73. The no. of subsets of the set {3, 4, 5} is :

(a) 4

(b) 8

(c) 16

(d) 32

74. If $f(x) = x^2$ and $g(x) = \sqrt{x}$ then

(a) go f(3) = 3

(b) go f(-3) = 9

(c) go f(9) = 3

(d) go f(-9) = 3

75. If A = {a, b, c, d}; B = {p, q, r, s} which of the following relation is a function from A to B

(a) R, = {(a, p), (b, q), (c, s)}

(b) R_2 = {(p, a), (b, r), (d, s)}

(c) R_3 = {{b, p), (c, s), (b, r)}

(d) R_4 = {{a, p), (b, r), (c, q), (d, s)}

2019 - NOVEMBER

76. $(A^T)^T$= ?

(a) A

(b) A^T

(c) $A^T .A^T$

(d) A^{2T}

77. f(n) = f(n - 1) + f(n - 2) when n = 2, 3, 4 ……. f(0) = 0,f(1) = 1 then f(7) = ?

(a) 3

(b) 5

(c) 8

(d) 13

78. $f(x) = \frac{x+1}{x}$ find $f^{-1}(x)$

(a) 1/(x-1)

(b) 1 /(y - 1)

(c) $\frac{1}{y}$-1

(d) x

2020 - NOVEMBER

79. Two finite sets respectively have x and y number of elements. The total number of subsets of the first is 56 more than the total number of subsets of the second. The value of x and y respectively.

(a) 6 and 3

(b) 4 and 2

(c) 2 and 4

(d) 3 and 6

80. The set of cubes of the natural number is:

(a) A null set

(b) A finite set

(c) An infinite set

(d) A finite set of three numbers

81. The inverse function $f^{-1}$of f(y) = 3y is:

(a) 1/3y

(b) y/3

(c) -3y

(d) 1/y

2021 - JANUARY

82. The set of cubes of natural number is

(a) Null set

(b) A finite set

(c) An infinite set

(d) Singleton Set

83. In the set of all straight lines on a plane which of the following is Not 'TRUE'?

(a) Parallel to an equivalence relation

(b) Perpendicular to is a symmetric relation

(c) Perpendicular to is an equivalence relation

(d) Parallel to a reflexive relation

84. Let F : R R be defined by

$$f(x) = \begin{cases} 2x \text{ for } x > 3 \\ x^2 \text{ for } 1 < x \leq 3 \\ 3x \text{ for } x \leq 1 \end{cases}$$

The value of f(-1) + f(2) + f(4) is

(a) 9

(b) 14

(c) 5

(d) 6

85. The number of integers from 1 to 100 which are neither divisible by 3 nor by 5 nor by 7 is

(a) 67

(b) 55

(c) 45

(d) 33

2021 - JULY

86. The range of the function F defined by f(x) = $\sqrt{16 - x^2}$ is

(a) [-4, 0]

(b) [-4, 4]

(c) [0,4]

(d) [+4, 4]

87. Let A = R-{3} and B = R -{1}. Let f(x) → Bdefined by f(x) = $\frac{x-2}{x-3}$. What is the value of $f^{-1}\left(\frac{1}{2}\right)$?

(a) 2/3

(b) 3/4

(c) 1

(d) -1

88. If $F(x) = x^2 - 1$ and $g(x) = |2x + 3|$, then Fog (3) - g of (-3) = ?

(a) 71

(b) 61

(c) 41

(d) 51

89. Let U be the universal set, A and B are the subsets of U. If n(U) = 650,n(A) = 310

n(A ∩ B) = 95 and n(B) = 190, then $n(\overline{A} \cap \overline{B})$is equal to ($\overline{A}and\overline{B}$ are thecomplement of A and B respectively):

(a) 400

(b) 200

(c) 300

(d) 245

2021 - DECEMBER

90. Out of a group of 20 teachers in a School, 10 teach Mathematics, 9 teach Physics and 7 teach Chemistry. 4 teach Mathematics and Physics but none teach both Mathematics and Chemistry. How many teach Chemistry and Physics; how many teach only Physics?

(a) 2, 3

(b) 3,2

(c) 4,6

(d) 6, 4

91. If a is related to b if and only if the difference in a and b is an even integer. This relation is

(a) symmetric, reflexive but not transitive

(b) symmetric, transitive but not reflexive

(c) transitive, reflexive but not symmetric

(d) equivalence relation

92. If $u(x) = \frac{1}{1-x}$,then $u^{-1}(x)$ is:

(a) $\frac{1}{x-1}$

(b) 1-x

(c) 1 - $\frac{1}{x}$

(d) $\frac{1}{x}$ -1

DEC 2022:

93. If A={1, 2, 3, 4, 5, 7, 8, 9} and B = {2, 4, 6, 7, 9} then how many proper subset of A ∩ B can be created

A. 16 **B. 15** C. 32 D. 31

15. Let A = {1, 2, 3} and consider the relation R = {(1,1),(2,2),(1,0),(1,2),(2,3),(1,3)}.

Then R is

A. symmetric and transitive B. reflexive but not transitive

C. reflexive but not symmetric D. neither symmetric, nor transitive

81. The number of subsets of the set {0, 1, 2, 3} is

A. 2 B. 4 C. 8 **D. 16**

JUNE 2023

1. Given Relation R={(1, 2),(2 3) } on the sets A = {1,2,3} ,the minimum numbers of ordered parts which when A added to R make equivalence relation is

A. 5 B. 6 **C. 7** D. 8

94. In a Survey shows that 74% of the Indian like grapes ,whereas 68% like bananas .what percentage of the indian like both grapes and bananas if every body likes either fruit?

(a) 42% (b) 26%

(c) 58% (d) 48%

95. If R be a relation defined on the set of Real numbers as "xRy-(X-Y) is divisible by 5" then x,y belong R then relation R is

A. **Equivalence** B. Anti symmetrid

C. Sysmmertic but not transitive D. Sysmmertic but not Relaxive

96. If A = {a,b,c}

B = {b,c,d}; C = {a,d,c} then find (A - B) x(B ∩ C) is equal to

A. {(a,d) ,(c,d)}; **B. {(a,c) ,(a,d)}**

C. {(c,a) ,(d,a)} D. {(a,c) ,(a, d) (b,d};

97. If F (x): N-R is a Function defined as F(x)= 4x+3 , X∈ N then $F^{-1}(x)$

(a)4+ $\frac{x+3}{4}$ (b) $\frac{x+3}{4}$

(c) $\frac{\mathbf{x-3}}{\mathbf{4}}$ (d) $\frac{3x+3}{4}$

CHAPTER 8 BASIC CONCEPTS OF DIFFERENTIAL AND INTEGRAL CALCULUS

2006 - NOVEMBER

[1] 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) f

(c) -1 (d) None (1 mark)

[2] The derivative of x^2 log x is :

(a) 1+2 log x (b) 2 log x

(c) x (**1** + 2 log x) (d) None of these **(1** mark)

[3] $\int_1^1 (e^x + e^{-x})\, dx$is :

(a) e - e^{-1}(b) e^{-1} - e

(c) e + e^{-1} (d) None (1 mark)

[4] $\int \frac{8x^2}{(x^3+2)^3}$ dx is equal to :

(a) - $\frac{4}{3}$ $(x^3 + 2)^2$ + C (b) - $\frac{4}{3}$ $(x^3 + 2)^{-2}$ + C

(c) $\frac{4}{3}$ $(x^3 + 2)^2$ + C (d) None of these (1 mark)

2007 - FEBRUARY

[5] If x = y log (xy), then $\frac{dy}{dx}$ is equal to:

(a) $\frac{x+y}{x\,(1+\log xy)}$

(b) $\frac{x-y}{x\,(1+\log xy)}$

(c) $\frac{x+y}{x\,(\log x+\log y)}$

(d) $\frac{x-y}{x\,(\log x+\log y)}$

(1 mark)

[6] 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 (1 mark)

[7] Evaluate : $\int \frac{dx}{\sqrt{x^2+a^2}}$:

(a) $\frac{1}{2}$ log $(x + \sqrt{x^2 + a^2})$+C (b) log $(x + \sqrt{x^2 + a^2})$ +C

(c) log $(x\sqrt{x^2 + a^2})$ +C (d) $\frac{1}{2}$ log $(x\sqrt{x^2 + a^2} + a^2)$ + C (1 mark)

[8] The value of $\int_0^2 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{2-x}}dx$ is :

(a) 0 (b) 3

(c) 2 (d) 1 (1 mark)

2007 - MAY

[9] If $f(x) = x^k$ and $f^{-1}(1) = 10$, then the value of k is :

(a) 10 (b) -10

(c) 1/10 (d) None (1 mark)

[10] Given $x = 2t + 5$; $y = t^2 - 2$, then $\frac{dy}{dx}$ is calculated as :

(a) t (b) 1/t

(c) - t/t (d) None (1 mark)

[11] The integral of $(e^{3x} + e^{-3x}) / e^x$ is :

(a) $\frac{e^{2x}}{2} + \frac{e^{-4x}}{4} + C$ (b) $\frac{e^{2x}}{2} - \frac{e^{-4x}}{4} + C$

(c) $e^{2x} - e^{-4x} + C$ (d) None of these (1 mark)

[12] $\int x^2 e^{3x} dx$ is :

(a) $x^2.e^{3x} - 2xe^{3x} + 2e^{3x} + C$

(b) $\frac{e^{3x}}{3} - \frac{x \cdot e^{3x}}{9} + 2e^{3x} + C$

(c) $\frac{x^2 \cdot e^{3x}}{3} - \frac{2x \cdot e^{3x}}{9} + \frac{2}{27} e^{3x} + C$

(d) None of these (1 mark)

[13] $\int_1^2 \frac{2x}{1+x^2}$ dx:

(a) $\log_e \frac{5}{2}$ (b) $\log_e 5 - \log_e 2 + 1$

(c) $\log_e \frac{2}{5}$ (d) None of these (1 mark)

2007 - AUGUST

[14] If $x^y = y^x$, then $\frac{dy}{dx}$ gives :

(a) $\frac{x\,(x \log y - y)}{y\,(y \log x - x)}$ (b) $\frac{x\,(y \log x - x)}{y\,(x \log y - y)}$

(c) $\frac{y\,(x \log y - y)}{x\,(y \log x - x)}$ (d) None of these (1 mark)

[15] If $x^3 - 2x^2y^2 + 5x + y = 5$, then $\frac{dy}{dx}$ at x = 1 and y = 1 is :

(a) 4/3 (b) -5/4

(c) 4/5 (d) - 4/3 (1 mark)

[16] The value of $\int_1^c \frac{(1+\log x)}{x}$ dx is : [Given Loge =1]

(a) 1/2 (b) 3/2

(c) 1 (d) 5/2 (1 mark)

[17] Find $\int \frac{x^3}{(x^2+1)^3}$ dx :

(a) $\frac{1}{4}\left[\frac{2x^2+1}{(x^2+1)^2}\right]$ (b) $-\frac{1}{4}\left[\frac{2x^2+1}{(x^2+1)^2}\right]$

(c) $\frac{1}{2}\left[\frac{2x^2+1}{(x^2+1)^2}\right]$ (d) $-\frac{1}{2}\left[\frac{2x^2+1}{(x^2+1)^2}\right]$ (1 mark)

2007 - NOVEMBER

[18] If $y = (x + \sqrt{x^2 + m^2})^n$ then $\frac{dy}{dx}$ = :

(a) $\frac{ny}{\sqrt{x^2+m^2}}$ (b) ny

(c) $-\frac{ny}{\sqrt{x^2+m^2}}$ (d) None (1 mark)

[19] If xy (x - y) = 0, find $\frac{dy}{dx}$:

(a) $\frac{y\,(2x-y)}{x\,(2y-x)}$ (b) $\frac{x\,(2x-y)}{y\,(2y-x)}$

(c) $\frac{y\,(2y-x)}{x\,(2x-y)}$ (d) None of these (1 mark)

[20] If $y=\sqrt{x}^{\sqrt{x}^{\ldots\ldots\infty}}$ then $\frac{dy}{dx}$ is equal to :

(a) $\frac{y^2}{\log x}$ (b) $\frac{y^2}{2-y\log x}$

(c) $\frac{y^2}{x(2-y\,\log x)}$ (d) None (1 mark)

[21] $\int \frac{1}{x^2-a^2}dx$ is :

(a) log (x - a) - log (x + a) + C

(b) $\log x-\frac{a}{x+a}+C$

(c) $\frac{1}{2a}\log\left(\frac{x-a}{x+a}\right)+C$

(d) None of these (1 mark)

[22] The value of $\int_0^1 \frac{dx}{(1+x)(2+x)}$ is :

(a) log $\frac{3}{4}$ (b) log $\frac{4}{3}$

(c) log 12 (d) None (1 mark)

[23] If $y=1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+\ldots\ldots+\frac{x^n}{n}+\ldots\ldots\ldots\infty$

then $\frac{dy}{dx}$ - y is equal to :

(a) 1 (b) - 1

(c) 0 (d) None (1 mark)

2008 - FEBRUARY

[24] 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 (1 mark)

[25] 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 (1 mark)

[26] $\int \frac{e^{\log e^x}}{x}$dxis:

(a) x^{-1} + C (b) x + C

(c) x^2 + C (d) None (1 mark)

2008 - JUNE

[27] 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) (1 mark)

[28] If $x^m y^n = (x + y)^{m+n}$, then find $\frac{dy}{dx}$:

(a) $\frac{x}{y}$ (b) $\frac{y}{x}$

(c) xy (d) None (1 mark)

[29] Evaluate$\int \frac{1}{(x-1)(x-2)}$ dx:

(a) $\log\left(\frac{x-2}{x-1}\right) + C$(b) log[(x-2)(x-1)] + C

(c) $\log\left(\frac{x-1}{x-2}\right) + C$ (d) None (1 mark)

[30] $\int_1^4 (2x + 5)$dx and the value is :

(a) 10 (b) 3

(c) 30 (d) None (1 mark)

2008 - DECEMBER

[31] If f (x) = $a^x x^a$ then find f (x).

(a) f (x) [a + log a] (b) f (x) $\left[\frac{a}{x} - \log a\right]$

(c) f (x) $\left[\frac{a}{x} - \log a\right]$ (d) f (x) [a + x log a] (1 mark)

[32] $\int \frac{1}{x(x^5+1)}$ dx

(a)$\log\left(\frac{x^5}{x^5-1}\right) + C$ (b)$\frac{1}{5}\log\left(\frac{x^5}{x^5+1}\right) + C$

(c) $\frac{1}{3}\log\left(\frac{x^5}{x^5+1}\right) + C$ (d) $\frac{1}{3}\log\left(\frac{x^5+1}{x^5}\right) + C$ (1 mark)

2009 - JUNE

[33] Find the value of $\int_{-3}^{3} x\sqrt{8-x^2}\,dx$

(a) 1 (b) - 1

(c) 0 (d) None of these (1 mark)

[34] 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 (1 mark)

[35] Evaluate $\int x\, c^x\, dx$

(a) $e^x(x+1) + c$ (b) $e^x(x-1) + c$

(c) $e^x + c$ (d) $x - e^x + c$ (1 mark)

[36] Find $\int \frac{x^3}{(x^2+1)^3}\,dx$

(a) $1/4\ (x^2 + 1)^{-2} + 1/2\ (x^2 + 1)^{-1} + C$

(b) $1/4\ (x^2 + 1)^{-1} - 1/2\ (x^2 + 1) + c$

(c) $1/4\ (x^2 + 1)^{-1} - 1/2(x^2+1)^{-1} + c$

(d) None of these (1 mark)

2009 - DECEMBER

[37] $\int \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right) dx$

(a) $2x^{1/}\left(\frac{1}{3}x - 1\right)$ (b) $2x^{1/2}\left(\frac{1}{3}x + 1\right)$

(c) $2\left(\frac{1}{3}x + x^{1/2}\right)$ (d) None of these. (1 mark)

[38] $\int_0^1 \left(\frac{1-x}{1+x}\right) dx$

(a) 2 log 2 - 1 (b) 4 log 2 - 1

(c) 2 log 2 (d) None of these (1 mark)

[39] $x = 2t + 5$ and $y = t^2 - 5$, then $\frac{dy}{dx}$= ?

(a) t (b) -1/t

(c) 1/t (d) 0 (1 mark)

[40] $x = at^2$ y - 2 at, $\frac{dy}{dx}$= ?

(a) 1/t (b) -1/t

(c) t (d) None of the above (1 mark)

[41] Find the second derivative of y = $\sqrt{x+1}$

(a) ½ $(x+1)^{-½}$ (b) -1/4 $(x+1)^{3/2}$

(c) 1/4 $(x+1)^{-½}$ (d) None of these. (1 mark)

2010 - JUNE

[42] Equal to

(a) $\int \frac{dx}{\sqrt{3x+4}-\sqrt{3x+1}} \frac{2}{27}[(3x+4)^{32}-(3x+1)^{32}]+c$

(b) $\frac{2}{27}[(3x+4)^{3/2}+(3x+1)^{3/2}]+c$

(c) $\frac{2}{3}[(3x+4)^{3/2}-(3x+1)^{3/2}]+c$

(d) None of these. (1 mark)

[43] $\int_1^2 \frac{x\,dx}{x^2+2}$= _____

(a) log $\sqrt{2}$ (b) log $\sqrt{3}$

(c) log $\frac{1}{\sqrt{2}}$(d) log$\frac{1}{\sqrt{3}}$ (1 mark)

[44] 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) $y\frac{d^2y}{dx^2}+2\left(\frac{dy}{dx}\right)^2+1=0$ (1 mark)

[45] If a_1, a_2, a_3 represents first, second and third terms of an AP respectively, the first term is 2 and $(a_1 + a_2)a_3$ is minimum, then the common difference is equal to

(a) 5/2 (b) -5/2

(c) 2/5 (d) -2/5 (1 mark)

2010 - DECEMBER

[46] The cost function for the production of x units of a commodity is given by

$C(x) = 2x^3 - 15x^2 + 36x + 15$

The cost will be minimum when 'x' is equal to

(a) 3 (b) 2

(c) 1 (d) 4 (1 mark)

[47] $\int \frac{6x+4}{(x-2)\,(x-3)}$ dx is equal to

(a) 22 log (x-3) -16 (x-2) (b) 11 log (x-3) - 8 (x-2)

(c) 22 log (x-3) -16 log (x-2) (d) 22 log (x-3) + 16 log (x-2)

(1 mark)

[48] $\int \frac{1}{x(1+\log x)^2}$ dx is equal to

(a) - $\frac{1}{2(1+\log x)^2}$ + c (b) $\frac{1}{(1+\log x)}$ + c

(c) - $\frac{1}{(1+\log x)}$ + c (d) None of these

(1 mark)

2011 - JUNE

[49] Solve : $\int_{-1}^{1}(e^x - e^{-x})\,dx$

(a) 0 (b) 1

(c) 12 (d) None of the above. (1 mark)

[50] Solve : $\int \frac{(\log x^x)^2}{x^3}$.dx

(a) $\frac{3}{2}$ $(\log x)^3$ + C (b) $\frac{1}{3}$ $(\log x)^3$ + C

(c) $\frac{1}{6}$ $(\log x)^3$ + C $\frac{3}{7}$ $(\log x)^3$ + C (1 mark)

[51] If f(x) = ${}^xC_3$; then f'(1) = ?

(a) $\frac{1}{6}$ (b) $\frac{-1}{6}$

(c) $\frac{5}{6}$ (d) $\frac{-5}{6}$ (1 mark)

[52] Given, y = $\int (e^{a\log x} + e^{x\log a})dx$; then $\frac{dy}{dx}$

(a) $x^a\,a^x$ (b) $x^a + a^x$

(c) $ax^{x-1}+a^x\log a$ (d) None of the above. (1 mark)

[53] If f(x) = $3x^2-\frac{2}{x^3}$, f(1) = 0 and f(x) = _____.

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

(c) x^3+x^{-2} -2 (d) None of these. (1 mark)

2011 - DECEMBER

[54] $\int_{-1}^{1} \frac{|x|}{x} dx$ = _____

(a) - 1 (b) 0

(c) 1 (d) 2 (1 mar

[55] $\frac{d}{dx}\left[2^{\log_2 x}\right]$ =_____

(a) 1 (b) 0

(c) 1/2 (d) $2^x.\log_2 x$ (1 mark)

[56] $\int \frac{e^x}{(1+x)^3} dx - \int \frac{e^x}{2(1+x)^2} dx$ = _____

(a) 0 (b) $\frac{e^x}{2(1+x)^2} + C$

(c) - $\frac{e^x}{2(1+x)^2} + C$ (d) $\frac{e^x}{(1+x)^2} + C$ (1 mark)

[57] 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)$\frac{dY}{dx}(1 + \log x) - \frac{d}{dx}(1 + \log x)$(1 mark)

2012 - JUNE

[58] If g(x) = - $\sqrt{25 - x^2}$, then $\text{Lim}_{x\to 1} \frac{g(x)-g(1)}{x-1}$ is equal to _____.

(a) 0 (b) $1/\sqrt{24}$

(c) $\sqrt{24}$ (d) None of these. (1 mark)

[59] If-x = c t, y = c/t, then $\frac{dy}{dx}$ is equal to:

(a)1/t (b) $t.e^t$

(c) -1/t2 (d) None of these. (1 mark)

[60] $\int_0^1 \frac{dx}{[ax+b(1-x)]^2}$= _____

(a) a/b (b) b/a

(c) ab (d) 1/ab (1 mark)

[61] If $y = e^{a\log x} + e^{x\log a}$, then $\frac{dy}{dx}$=

(a) $x^a + a^x$ (b) $a\,x^{a-1} + a^x \log a$

(c) $a\,x^{a-1} + x\,a^{x-1}$ (d) $x^x + a^a$ (1 mark)

2012 - DECEMBER

[62] $\int 2^{3x}.\,3^{2x}.\,5^x.\,dx =$ _____

(a) $\frac{2^{3x}.3^{2x}.5^x}{\log(720)} + c$ (b) $\frac{2^{3x}.3^{2x}.5^x}{\log(360)} + c$

(c) $\frac{2^{3x}.3^{2x}.5^x}{\log(180)} + c$ (d) $\frac{2^{3x}.3^{2x}.5^x}{\log(90)} + c$ (1 mark)

[63] 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) ±3

(c) ± 6 (d) None of these. (1 mark)

[64] The equation of the tangent to the curve, $f = x^3 - 2x + 3$, at the point (2, 7) is -

(a) y = 2x - 13 (b) y = 10x

(c) y = 10x - 13 (d) y = 10 (1 mark)

[65] 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 (1 mark)

2013 - JUNE

[66] If $y = \log_y x$, then $\frac{dy}{dx}$ is equal to:

(a) $\frac{1}{x + \log y}$ (b) $\frac{1}{x + x\log y}$

(c) $\frac{1}{1 + x\log y}$ (d) $\frac{1}{y + \log x}$ (1 mark)

[67] $\int_1^2 \frac{(\log_e(ex))^n}{x}\,dx$ (n + - 1) is equal to:

(a) $\left[\frac{(\log_e(2e))^{n+1}-1}{n+1}\right]$ (b) $[(\log_e(2e))^{(n+1)}+1]$

(c) $\frac{(\log_e(2e))^{n+1}}{n+1} - \frac{(\log_e 2)^{n-1}}{n+1}$ (d) None of these (1 mark)

[68] 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 (1 mark)

[69] $\int 2^{3x}.\ 3^{2x}.\ 5^x\ dx$ = _____

(a) $\frac{2^{3x}.3^{2x}.5^x}{\log(270)} + C$ (b) $\frac{2^{3x}.3^{2x}.5^x}{\log(360)} + C$

(c) $\frac{2^{3x}.3^{2x}.5^x}{\log(180)} + C$ (d) $\frac{2^{3x}.3^{2x}.5^x}{\log(90)} + C$(1mark)

2013 – DECEMBER

[70] The points on the curve $y = x^3 - x^2 - x + 1$,where the tangent is paralle 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) (1 mark)

[71] $\int (a)^{2x} dx$_____

(a) $\frac{a^{2x}}{2 \log a}$ (b) $\frac{2.a^{2x}}{\log a}$

(c) $\frac{a^{2x}.\log a}{2}$ (d) None of these (1 mark)

2014-JUNE

[72] $\int_0^5 \frac{x^2 dx}{x^2+(5-x)^2}$is eaual to _____.

(a) 5 (b) $\frac{5}{2}$

(c) 1 (d) None of these (1 mark)

[73] If $y = ae^{nx} + be^{-nx}$, then $\frac{d^2y}{dx^2}$ is equal to _____.

(a) n^2y (b) $-n^2y$

(c)ny (d) None of these (1 mark)

2014 - DECEMBER

[74] The value of definite integral $\int_0^2 |1 - x|\ dx$ = _____.

(a) 0 (b) 1/2

(c) 3/2 (d) 1 (1 mark)

[75] If $y = 1 + \frac{x}{\lfloor 1} + \frac{x^2}{\lfloor 2} + \ \ldots\ldots\ldots\ldots + \frac{x^n}{\lfloor n} + \ \ldots\ldots\ldots\ldots$, then the value of $\frac{dy}{dx}$ - y = _____

(a) 1 (b) 0

(c) 2 (d) - 1 (1 mark)

2015 - JUNE

[76] The value of $\int_0^{1/2} \frac{dx}{\sqrt{3-2x}}$ is

(a) 1 (b) 1 - $\sqrt{3/2}$

(c) $\sqrt{3}$ - $\sqrt{2}$ (d) $\sqrt{2}$ - $\sqrt{3}$ (1 mark)

[77] The value of $\int_0^2 xe^{x^2} dx$ is

(a) 1 (b) e -1

(c) (e/2) -1 (d) $\frac{1}{2}$ (e^4 -1) (1 mark)

[78] If $x^p y^q = (x + y)^{p+q}$, then $\frac{dy}{dx}$ is equal to _____

(a) $\frac{q}{p}$ (b) $\frac{x}{y}$

(c) $\frac{y}{x}$ (d) $\frac{p}{q}$ (1 mark)

[79] If e^{xy} - 4xy = 4 then $\frac{dy}{dx}$ = _____

(a)$\frac{y}{x}$ (b) $\frac{-y}{x}$

(c)$\frac{x}{y}$ (d) $\frac{-x}{y}$(1 mark)

2015 - DECEMBER

[80] If $u= 3t^4 + 5t^3 + 2t^2 + t + 4$, then the value of $\frac{du}{dt}$ at t = -1 is:

(a) 0 (b) 1

(c) 2 (d) 5 (1 mark)

[81] The value of $\int_1^2 \frac{1-x}{1+x} dx$ is equal to: J 1 1 +x

(a) log $\frac{3}{2}$ - 1 (b) 2 log$\frac{3}{2}$ - 1

(c) $\frac{1}{2}$ log $\frac{3}{2}$ -1 (d) $\frac{1}{2}$ log $\frac{2}{3}$ -1 (1 mark)

[82] 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) - $\frac{1}{4}$ (1 mark)

2016 - JUNE

[83] $\int_0^2 \frac{3^{\sqrt{x}}}{\sqrt{x}}$ dx is equal to _____

(a) $\frac{2\sqrt{2}}{\log_e 3}$ (b) 0

(c) $\frac{2}{\log_e 3}\left(3^{\sqrt{2}}-1\right)$ (d) $\frac{3^{\sqrt{2}}}{\sqrt{2}}$ (1 mark)

[84] $\int \frac{x}{(x^2+1)(x^2+2)}$ dx is equal to _____

(a) $\log\left(\frac{x^2+1}{x^2+2}\right)+c$ (b) $\frac{1}{2}\log\left(\frac{x^2+1}{x^2+2}\right)+c$

(c) $\frac{1}{2}\log\left(\frac{x^2+2}{x^2+1}\right)+c$ (d) $-\log\left(\frac{x^2+1}{x^2+2}\right)+c$ (1 mark)

[85] 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) $\frac{y}{y^2-1}$ (1 mark)

2016 - DECEMBER

[86] Differential Co-efficient of $\log_e\left(\sqrt{x-1}+\sqrt{x+1}\right)$ with respect to x is:

(a) $\frac{1}{2\sqrt{x^2-1}}$ (b) $\frac{1}{2\sqrt{x^2+1}}$

(c) $\frac{1}{2(x^2-1)}$ (d) $\frac{1}{\sqrt{x-1}+\sqrt{x+1}}$ (1 mark)

[87] 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) ± (d) ± $\sqrt{2}$ (1 mark)

[88] $\int_1^e \frac{e^x(x\log_e x+1)}{x}$ dx is equal to:

(a) e + 1 (b) e^e

(c) e - 1 (d) e^x + 1 (1 mark)

2017 - JUNE

[89] 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) $2y = 3x^2-8x + c$ (1 mark)

[90] The value of $\int_1^2 \frac{x}{x^2+1}\,dx$ is equal to:

(a) $\log_e\left(\frac{5}{2}\right)$ (b) $\frac{1}{2}\log_e\left(\frac{5}{2}\right)$

(c) $\log_e(5) - \log_e 2 + c$ (d) None of these. (1 mark)

[91] 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) $-\frac{1}{2b}$ (1 mark)

2017 - DECEMBER

[92] The value of $\int e^e[f(x) + f'(x)]dx =$ _____

(a) $e^x f(x) + c$ (b) $e^x f'(x) + c$

(c)$\left[\frac{f'(x)}{f(x)}\right] + c(d)e^x\left[\frac{f'(x)}{f'(x)}\right] + c$ (1 mark)

[93] If $x^y = e^{x-y}$ then $\frac{dy}{dx}$ is equal to:

(a) $\frac{2\log x}{(1 + \log x)^2}$ (b) $\frac{\log x}{(1 +\log x)}$

(c) $\frac{\log x}{(1+\log x)^2}$ (d) None of the above

(1 mark)

[94] If $y = 1 + \frac{x}{\lfloor 1} + \frac{x^2}{\lfloor 2} + \frac{x^3}{\lfloor 3} + \ldots\ldots\ldots\ldots\ldots\infty$ then the value of $\frac{dy}{dx}$ is equalto:

(a) x (b) y

(c) 1 (d) 0 (1 mark)

[95] $\int x.e^{x^2} dx$ is equal to:

(a) $2e^{x^2}+c$ (b) $e^{x^2}+c$

(c) $\frac{1}{2}.e^{x^2}+c$ (d) $xe^{x^2}+c$ (1 mark)

[96] If $x = at^2$, $y = 2at$ then the value of $\frac{dy}{dx}$ at t = 2 is:

(a) 2 (b) 4

(c) $\frac{1}{2}$ (d) $\frac{1}{4}$ (1 mark)

[97] If y = log x^x then $\frac{dy}{dx}$ is equal to:

(a) log ex (b) log $\frac{e}{x}$

(c) log $\frac{x}{e}$ (d) 1 (1 mark)

2018- MAY

[98] The value of $\int_1^2 \frac{1-x}{1+x} dx$ is equal to:

(a) log $\frac{3}{2}$ -1 (b) 2 log$\frac{3}{2}$ -1

(c) $\frac{1}{2}$ log $\frac{3}{2}$ x (d) $\frac{1}{2}$ log $\frac{2}{3}$ -1 (1 mark)

[99] $\int_0^2 \frac{3^{\sqrt{x}}}{\sqrt{x}} dx$ is equal to

(a) $\frac{2\sqrt{2}}{\log_e 3}$ (b) 0

(c) $\frac{2(3\sqrt{2}-1)}{\log_e 3}$ (d) $\frac{3\sqrt{2}}{\sqrt{2}}$ (1 mark)

[100] The value of $\int_0^2 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{2-x}} dx$ is:

(a) 0 (b) 3

(c) 2 (d) 1 (1 mark)

[101] The cost function for the production of x units of a commodity is given by C(x) = $2x^3$ + $15x^2$ + 36x + 15 The cost will be minimum. When 'x' is equal to:

(a) 3 (b) 2

(c) 1 (d) 4 (1 mark)

2018 - NOVEMBER

[102] Let x = at^3, y = $\frac{a}{t^2}$. Then $\frac{dy}{dx}$ =

(a) $\frac{-1}{t^6}$ (b)$\frac{-3a}{t^6}$

(c) $\frac{1}{3at^6}$(d) None of the above (1 mark)

[103]$\int$ x(x^2 +4)^{5}dx is equal to

(a) $(x^2 + 4)^6 + c$ (b) $\frac{1}{12}(x^2 + 4)^6 + c$

(c) $\frac{1}{6}(x^2 + 4)^6 + c$ (d) None of the above

(1 mark)

[104] $\int_{-1}^{3}(1 + 3x - x^3)\,dx$ is equal to

(a) -4 (b) 4

(c) 3 (d) - 3 (1 mark)

[105] xy= 1 then $y^2 + \frac{dy}{dx}$= ?

(a) 1 (b) 0

(c) 2 (d) None of the above (1 mark)

2019 - JUNE

[106] If the given cost function of commodity is given by $C = 150x - 5x^2 + \frac{x_3}{6}$, where C stands for cost and x stands for output, if theaverage cost is equal to the marginal cost then the output x = _____.

(a) 5

(b) 10

(c) 15

(d) 20 (1 mark)

[107] If $2^x - 2^y = 2^{x-y}$ then $\frac{dy}{dx}$ at x = y = 2

(a) 1

(b) 2

(c) 4

(d) 5 (1 mark)

[108] $\int_{2}^{3} \frac{\sqrt{x}}{\sqrt{5-x}+\sqrt{x}}\,dx$ =

(a) 1

(b) 1/2

(c) 2

(d) 3/2 (1 mark)

[109] $\int e^x (x^2 + 2x)\,dx$ =

(a) x^x. e^2 + c

(b) e^x. x + c

(c) -e^x x^2 + c

(d) -e^x. x + c (1 mark)

[110] ∫ log(a^x) dx =

(a) log a $\left(\frac{x^2}{2}\right)$ + c

(b) log a $\left(\frac{x}{2}\right)$ + c

(c) x log a^x - x + c

(d) x log a^x + c (1 mark)

2019 - NOVEMBER

[111]∫ a^xdx

(a) x^x(1 + log x)

(b) 1 + log x

(c) x. log x

(d)$\frac{a^x}{\log a}$ + c 0 mark)

[112] ∫x.e^xdx.

(a) e^x (x-1) + c

(b) e^x. x + e^x + c

(c) log x + e^x + c

(d) $\frac{x^2}{e^x}$ + c (1 mark)

[113] ∫ $(4x + 3)^6$dx.

(a) $\frac{1}{28}$ $(4x + 3)^7$ + c

(b) $\frac{1}{7}$ $(4x + 3)^7$ + c

(c)$\frac{1}{6}$ $(4x + 3)^6$ + c

(d) $\frac{4x}{5}$ + $\frac{3}{5}$+ c (1 mark)

[114] $\int_1^1(2x^2 - x^3)\,dx$.

(a) 4/3

(b) 1

(c) 2

(d) 2/3 (1 mark)

[115] $\frac{d}{dx}$ (x. logx)

(a) x (1+logx)

(b) 1 + logx

(c) e^xx.logx

(d) x^2 (logx) (1 mark)

[116] Differentiate x^x w.r.t x.

(a) x^x (1 + logx)

(b) y/x

(c) -y/x

(d) y + x^xlogx(1 mark)

[117] $\int x^2 \cdot e^x dx$

(a) 2x. e^x

(b) e^x (x^2 - 2x)

(c) x^2. e^x - e^x. (2x) + 2

(d) e^x(x-1) (1 mark)

2020 - NOVEMBER

[118] $\int xe^x dx$ is equal

(a) e^x(x+ 1) + c

(b) e^x (x+2) + c

(c) e^x(x-1) + c

(d) None (1 mark)

[119] $\int e^x$ (x logx + 1) x^{-1} dx is equal to

(a) e^x + c

(b) e^xlogx + c

(c) $\frac{e^x}{\log x}$+ c

(d) e^x $(logx)^2$ + c (1 mark)

[120] If y = x (x -1) (x - 2) then dy/dx Is:

(a) - 6x

(b) $3x^2$-6x + 2

(c) 6x + 4

(d) $3x^2$- 6x (1 mark)

[121] The average cost function of a good is 2Q + 6 + $\frac{13}{Q}$ where Q is thequantity produced.

The approx cost at Q = 15 is:

(a) 42 §

(b) 36

(c) 66

(a) 130 (1 mark)

[122] $\int_2^8 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{10-x}}$dx is equal to

(a) 4

(b) 3

(c) 2

(d) None (1 mark)

2021 - JANUARY

[123] The cost function of production is given by C(x) =$\frac{x^3}{2}$ $15x^2$ + 36xwhere x,

Denotes the number of items produced.

The level of output for which marginal cost is minimum and the level of output for which the average cost is minimum are given by, respectively.

(a) 10 and 15

(b) 10 and 12

(c) 12 and 15

(d) 15 and 10 (1 mark)

[124] $\int_1^2 e^x \left(\frac{1}{x} - \frac{1}{x^2}\right) dx =$

(a) e $\left(\frac{e}{2} - 1\right)$

(b) a (e-1)

(c) a

(d) e^2 (e - i) (1 mark)

2021 - JULY

[125] In a market there are 30 shops to allocate to people. If they allocate. X shops then their monthly expenses, in rupees, is given by p(x) * $-8x^2$ + 400x -1,000, then the number of shops should they allocate to minimize the expenses:

(a) 0

(b) 30

(c) 25

(d) 10 (1 mark)

[126] The cost function C(x) = 125 + 500x - x^2 + $\frac{x^3}{3}$ 0 ≤ x ≤ 100 and thedemand, function for the items is given by, p(x) = 1500-x then the marginal profit when 18 items are sold is:

(a) 751

(b) 571

(c) 676

(d) 876 (1 mark)

[127] If f(x) = $3_e x^4$then f^1 (x) - $4x^3$fx +$\left(\frac{1}{3}\right)$f(0) - f^1 (0) is equal to:

(a) 0

(b) ex^2

(c) 1

(d) -1 (1 mark)

[128] The value of $\int_{-2}^{2} f(x)\, dx$, where f(x) = 1 + n, x ≤ 0, f(x) = 1 - 2x, n ≥ 0 is:

(a) 20

(b) -2

(c) -4

(d) 0 (1 mark)

2021 - DECEMBER

[129] The cost for producing x units is 500 - $20x^2$ + x^3 / 3. The marginal cost is minimum at x = _____.

(a) 5

(b) 10

(c) 40

(d) 50 (1 mark)

[130] If $y = \frac{x^4}{e^x}$ then $\frac{dy}{dx}$ is equal to:

(a) $x^3 (4 - x) / (e^x)^2$

(b) $x^3 (4 - x) / e^x$

(c) $x^2(4-x)/e^x$

(d) $x^3 (4x -1) / e^x$(1 mark)

[131] The speed of a train at a distance x (from the starting point) is given by $3x^2 - 5x + 4$. What is the rate of change (of distance) at x = 1 ?

(a) -1

(b) 0

(c) 1

(d) 2(1 mark)

[132] Integrate with respect to x, $1/ [x(\log x)^2]$.

(a) - 1 / log x + k

(b) 1/logx + k

(c) log x

(d) x (1 mark)