

Quantitative Aptitude

All questions are compulsory.

All questions carry 1 mark

Total Marks 100
Time Allowed: 2 hrs

1. If $a : b = 4 : 1$ then $\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}}$ is
 - (a) $5/2$
 - (b) 4
 - (c) 5
 - (d) none of these
2. The sum of the series $\frac{1}{\sqrt{3}} + 1 + \frac{3}{\sqrt{3}} + \dots$ to 18 terms is
 - (a) $9841 \frac{(1+\sqrt{3})}{\sqrt{3}}$
 - (b) 9841
 - (c) $\frac{9841}{\sqrt{3}}$
 - (d) none of these
3. If R is the set of positive rational number and E is the set of real numbers then
 - (a) $R \subseteq E$
 - (b) $R \subset E$
 - (c) $E \subset R$
 - (d) none of these
4. The value of $\sum_{r=1}^{10} r \cdot {}^r P_r$
 - (a) ${}^{11}P_{11}$
 - (b) ${}^{11}P_{11-1}$
 - (c) ${}^{11}P_{11} + 1$
 - (d) None of these
5. Find the present value of an annuity of ₹1,000 payable at the end of each year for 10 years, if the rate of interest is 6% compounding per annum.
 - (a) ₹7,360
 - (b) ₹7,802
 - (c) ₹7,630
 - (d) None of these.

6. If $x^{1/p} = y^{1/q} = z^{1/r}$ and $xyz = 1$, then the value of $p + q + r$ is
 (a) 1
 (b) 0
 (c) $\frac{1}{2}$
 (d) None of these
7. Evaluate $\int_0^1 xe^x dx$ and the value is
 (a) -1 (b) 10 (c) $\frac{10}{9}$ (d) +1
8. The value of $\log_2 [\log_2 \{\log_3 (\log_3 27^3)\}]$ is equal to
 (a) 1 (b) 2 (c) 0 (d) none of these
9. If α, β are the roots of equation $x^2 - 5x + 6 = 0$ and $\alpha > \beta$ then the equation with roots $(\alpha^2 + \beta)$ and $(\alpha + \beta^2)$ is
 (a) $x^2 - 9x + 99 = 0$
 (b) $x^2 - 18x + 90 = 0$
 (c) $x^2 - 18x + 77 = 0$
 (d) None
10. Given that $\log_{10} 2 = x$ and $\log_{10} 3 = y$, the value of $\log_{10} 60$ is expressed as
 (a) $x - y + 1$
 (b) $x + y + 1$
 (c) $x - y - 1$
 (d) None of these
11. The denominator of a fraction exceeds the numerator by 2. If 5 be added to the numerator the fraction increases by unity. The fraction is.
 (a) $\frac{5}{7}$ (b) $\frac{1}{3}$ (c) $\frac{7}{9}$ (d) $\frac{3}{5}$
12. The sum of the infinite G. P. $1 - \frac{1}{3} + \frac{1}{9} - \frac{1}{27} + \dots$ is
 (a) 0.33 (b) 0.57 (c) 0.75 (d) none of these
13. The simple interest on a sum of money at 12% p.a. for two years is ₹3,600. The compound interest on the same sum for two years at the same rate is:
 (a) ₹18,816
 (b) ₹3,806
 (c) ₹15,000
 (d) ₹3,816
14. Let $y = \sqrt{2x} + 3^{2x}$ then $\frac{dy}{dx}$ is equal to
 (a) $(1/\sqrt{2x}) + 2 \cdot 3^{2x} \log_e 3$
 (b) $1/\sqrt{2x}$
 (c) $2 \cdot 3^{2x} \log_e 3$
 (d) none of these

15. If $L + M + N = 0$ and L, M, N are rationals the roots of the equation $(M+N-L)x^2 + (N+L-M)x + (L+M-N) = 0$ are
 (a) real and irrational
 (b) real and rational
 (c) imaginary and equal
 (d) real and equal
16. A man saves ₹200 at the end of each year and lends the money at 5% compound interest. How much will it become at the end of 3 years?
 (a) ₹565.25
 (b) ₹630.50
 (c) ₹662.02
 (d) ₹666.50
17. If N is the set of natural numbers and I is the set of positive integers, then
 (a) $N = I$ (b) $N \subset I$ (c) $N \subseteq I$ (d) none of these
18. If $\log_2 x + \log_4 x + \log_{16} x = 21/4$, these x is equal to
 (a) 8 (b) 4 (c) 16 (d) none of these
19. The sum of two numbers is 8 and the sum of their squares is 34. Taking one number as x form an equation in x and hence find the numbers. The numbers are
 (a) (7, 10)
 (b) (4, 4)
 (c) (3, 5)
 (d) (2, 6)
20. A dietitian wishes to mix together two kinds of food so that the vitamin content of the mixture is at least 9 units of vitamin A, 7 units of vitamin B, 10 units of vitamin C and 12 units of vitamin D. The vitamin content per Kg. of each food is shown below:

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

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

- | | | | |
|---------------------|----------------------|---------------------|-----------------------|
| (a) $2x + y \leq 9$ | (b) $2x + y \geq 30$ | (c) $2x + y \geq 9$ | (d) $2x + y \geq 9$ |
| $x + y \leq 7$ | $x + y \leq 7$ | $x + y \geq 7$ | $x + y \geq 7$ |
| $x + 2y \leq 10$ | $x + 2y \geq 10$ | $x + y \leq 10$ | $x + 2y \geq 10$ |
| $2x + 3y \leq 12$ | $x + 3y \geq 12$ | $x + 3y \geq 12$ | $2x + 3y \geq 12$ |
| $x > 0, y > 0$ | | | $x \geq 0, y \geq 0,$ |

21. Raju wants to retire and receive ₹5,000 per month and wants to continue this for future generations after his death. He can earn interest of 8 % compounded annually. How much he should set aside now to achieve his perpetuity goal?
- (a) ₹40,000
 (b) ₹65,000
 (c) ₹62,500
 (d) None of these
22. If ${}^nC_{r-1} = 56$, ${}^nC_r = 28$ and ${}^nC_{r+1} = 8$, then r is equal to
- (a) 8 (b) 6 (c) 5 (d) none of these
23. The number of ways in which 12 students can be equally divided into three groups is
- (a) 5775 (b) 7575 (c) 7755 (d) none of these
24. $f(x) = x^2/e^x$ then $f'(1)$ is equal to _____
- (a) $-1/e$
 (b) $1/e$
 (c) e
 (d) None of these
25. The sum of the infinite G.P. $14, -2, +2/7, -2/49 + \dots$ is
- (a) $4\frac{1}{12}$ (b) $12\frac{1}{4}$ (c) 12 (d) none of these
26. $\left[(x^n)^{n-\frac{1}{n}} \right]^{\frac{1}{n+1}}$ is equal to
- (a) x^n (b) x^{n+1} (c) x^{n-1} (d) none of these
27. If α and β are the roots of $x^2 = x + 1$ then value of $\frac{\alpha^2}{\beta} - \frac{\beta^2}{\alpha}$ is
- (a) $2\sqrt{5}$ (b) $\sqrt{5}$ (c) $3\sqrt{5}$ (d) $-2\sqrt{5}$
28. If I is the set of isosceles triangles and E is the set of equilateral triangles, then
- (a) $I \subset E$ (b) $E \subset I$ (c) $E = I$ (d) none of these
29. If $y = (x + \sqrt{x^2 + 1})^m$ then $(x^2 - 1) (dy / dx)^2 - m^2 y^2$ is proved to be
- (a) -1 (b) 1 (c) 0 (d) none of these
30. The age of a person is twice the sum of the ages of his two sons and five years ago his age was thrice the sum of their ages. Find his present age.
- (a) 60 years (b) 52 years (c) 51 years (d) 50 years
31. The range of the function $f(x) = \log_{10}(1 + x)$ for the domain of real values of x when $0 \leq x \leq 9$ is
- (a) $[0, 1]$ (b) $[0, 1, 2]$ (c) $[0, 1]$ (d) none of these

32. Let $Y = \sqrt{2x} + 3^{2x}$ then $\frac{dy}{dx}$ is equal
 (a) $(1/\sqrt{2x}) + 2 \cdot 3^{2x} \log_e 3$
 (b) $1 / \sqrt{2x}$
 (c) $2 \cdot 3^{2x} \log_e 3$
 (d) none of these
33. The number of ways in which 15 mangoes can be equally divided among 3 students is
 (a) $15 / 5^4$ (b) $15 / 5^3$ (c) $15 / 5^3$ (d) none of these
34. The set of cubes of the natural number is
 (a) an null set (b) an infinite set (c) a finite set (d) none of these
35. $[1 - \{1 - (1 - x^2)^{-1}\}^{-1}]^{-1/2}$ is equal to
 (a) x (b) $1/x$ (c) 1 (d) none of these
36. One student is asked to divide a half of a number by 6 and other half by 4 and then to add the two quantities. Instead of doing so the student divides the given number by 5. If the answer is 4 short of the correct answer then the number was
 (a) 320 (b) 400 (c) 480 (d) none of these.
37. If $y^{a-b} x y^{b-c} x y^{c-a} x y^{-a-b}$ is
 (a) y^{a+b} (b) y (c) 1 (d) $1/y^{a+b}$
38. The wages of 8 men and 6 boys amount to ₹33. If 4 men earn ₹4.50 more than 5 boys determine the wages of each man and boy.
 (a) (₹1.50, ₹3) (b) (₹3, ₹1.50) (c) (₹2.50, ₹2) (d) (₹2, ₹2.50)
39. A sum of money amounts to ₹9,800 after 5 years and ₹12,005 after 8 years at the same rate of simple interest. The rate of interest per annum is:
 (a) 5%
 (b) 8%
 (c) 12%
 (d) 15%
40. A firm makes two types of products : Type A and Type B. The profit on product A is ₹20 each and that on product B is ₹ 30 each. Both types are processed on three machines M1, M2 and M3. The time required in hours by each product and total time available in hours per week on each machine are as follows:

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

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

- | | | | |
|-------------------------|---------------------------|---------------------------|-------------------|
| (a) $x_1 + x_2 \leq 12$ | (b) $3x_1 + 3x_2 \geq 36$ | (c) $3x_1 + 3x_2 \leq 36$ | (d) None of these |
| $5x_1 + 2x_2 \leq 50$ | $5x_1 + 2x_2 \leq 50$ | $5x_1 + 2x_2 \leq 50$ | |
| $2x_1 + 6x_2 \leq 60$ | $2x_1 + 6x_2 \geq 60$ | $2x_1 + 6x_2 \leq 60$ | |
| | $x_1 \geq 0, x_2 \geq 0$ | $x_1 \geq 0, x_2 \geq 0$ | |

Directions (Qs. 41-45): Ten students are A to J are sitting in a row facing west.

- (i) B and F are not sitting on either of the edges.
(ii) G is sitting left of D and H is sitting to the right of J.
(iii) There are four persons between E and A.
(iv) I is the north of B and F is the south of D.
(v) J is between A and D and G is in E and F.
(vi) There are two persons between H and C.
41. Who is sitting at the seventh place counting from left?
(a) H (b) C (c) J (d) Either H or C
42. Who among the following is definitely sitting at one of the ends?
(a) C (b) H (c) E (d) Cannot be determined
43. Who are immediate neighbours of I?
(a) BC (b) BH (c) AH (d) Cannot determined
44. Who is sitting second left of D?
(a) G (b) F (c) E (d) J
45. If G and A interchange their positions, then who become the immediate neighbours of E?
(a) G and F (b) Only F (c) Only A (d) J and H
46. If $A = 1$, $FAT = 27$, $FAITH = ?$
(a) 44 (b) 45 (c) 46 (d) 36
47. Seema is the daughter-in-law of Sudhir and sister-in-law of Ramesh. Mohan is the son of Sudhir and only brother of Ramesh. Find the relation between Seema and Mohan.
(a) Sister-in-law (b) Aunt (c) Cousin (d) Wife
48. Babu is Rahim's neighbour and his house is 200 meters away in the north-west direction. Joseph is Rahim's neighbour and his house is located 200 meter away in the south-west direction. Gopal is Joseph's neighbour and he stays 200 meters away in the south-east direction. Roy is Gopal's neighbour and his house is located 200 meters away in the north-east direction. Then where is the position of Roys' house in relation to Babu's?
(a) South-east (b) South-west (c) North (d) North-east
49. Pointing to a lady in a photograph. Meera said. "Her father's only son's wife is my mother-in-law" How is Meera's husband related to that lady in the photo?
(a) Nephew (b) Uncle (c) Son (d) Father

50. A tourist drives 10 km towards west and turns to left and takes a drive of another 4 km. He then drives towards east another 4 km and then turns to his right and drives 5 km. Afterwards he turns to his left and travels 6 km. In which direction is he from the starting point?
 (a) North (b) East (c) West (d) South
51. If DELHI is coded 73541 and CALCUTTA as 82589662, how can CALICUT be coded?
 (a) 5279431 (b) 5978213 (c) 8251896 (d) 8543962
52. Suresh introduces a man as "He is the son of the woman who is the mother of the husband of my mother". How is Suresh related to the man?
 (a) Uncle (b) Son (c) Cousin (d) Grandson
53. Among her children, Ganga's favourites are Ram and Rekha. Rekha is the mother of Sharat, who is loved most by his uncle Mithun. The head of the family is Ram Lal, who is succeeded by his sons Gopal and Mohan. Gopal and Ganga have been married for 35 years and have 3 children. What is the relation between Mithun and Mohan.
 (a) Uncle
 (b) Son
 (c) Brother
 (d) No Relation
54. A man starts from a point, walks 4 miles towards north and turns left and walks 6 miles, turns right and walks for 3 miles and again turns right and walks 4 miles and takes rest for 30 minutes. He gets up and walks straight 2 miles in the same direction and turns right and walks one mile. What is the direction he is facing?
 (a) North
 (b) South
 (c) South-East
 (d) West
55. In a certain language, MADRAS is coded NBESBT, how DELHI is coded in that code?
 (a) EMMJI
 (b) EFMIJ
 (c) EMFIJ
 (d) JIFEM
56. A taxi driver commenced his journey from a point and drove 10 kms towards north and turned to his left and drove another 5 kms. After waiting to meet a friend here, he turned to his right and continued to drive another 10 km. He has covered a distance of 25 kms so far, but in which direction would he be now?
 (a) South
 (b) North
 (c) East
 (d) South-east

57. Six members of a family namely A, B, C, D, E and F are travelling together. 'B' is the son of C but C is not the mother of B. A and C are married couple. E is the brother of C. D is the daughter of A. F is the brother of B. How many male members are there in the family.
- (a) 3
(b) 2
(c) 4
(d) 1
58. Out of 1,000 persons, 25 per cent were industrial workers and the rest were agricultural workers. 300 persons enjoyed world cup matches on TV. 30 per cent of the people who had not watched world cup matches were industrial workers. What is the number of agricultural workers who had enjoyed world cup matches on TV?
- (a) 260 (b) 240 (c) 230 (d) 250
59. Pointing towards A, B said "Your mother is the younger sister of my mother". How is A related to B?
- (a) Uncle (b) Cousin (c) Nephew (d) Father
60. A is B's wife husband's brother. C and D are sisters of B. How is A related to C?
- (a) Brother (b) Sister-in-law (c) Wife (d) Sister
61. The index number is a special type of average
- (a) false (b) true (c) both (d) none
62. The average salary of a group of unskilled workers is ₹ 10,000 and that of a group of skilled workers is ₹ 15,000. If the combined salary is ₹ 12,000, then what is the percentage of skilled workers?
- (a) 40% (b) 50% (c) 60% (d) None of these
63. Most of the commonly used frequency curves are
- (a) Mixed
(b) Inverted J-shaped
(c) U-shaped
(d) Bell-shaped.
64. When we are not concerned with the magnitude of the two variables under discussion, we consider
- (a) Rank correlation coefficient
(b) Product moment correlation coefficient
(c) Coefficient of concurrent deviation
(d) (a) or (b) but not (c)
65. The mean of a binomial distribution with parameter n and p is
- (a) $n(1-p)$ (b) $np(1-p)$ (c) np (d) $\sqrt{np(1-p)}$
66. The distribution of profits of a company follows

- (a) J-shaped frequency curve
 (b) U-shaped frequency curve
 (c) Bell-shaped frequency curve
 (d) Any of these.
67. A is the mother of D and sister of B. B has a daughter C who is married to F. G is the husband of A. How is G related to D?
 (a) Uncle (b) Husband (c) Son (d) Father
68. A sample study of the people of an area revealed that total numbers of women were 40% and the percentage of coffee drinkers were 45 as a whole and the percentage of male coffee drinker was 20. What was the percentage of female non-coffee drinkers?
 (a) 10 (b) 15 (c) 18 (d) 20
69. If there are two groups with 75 and 65 as harmonic means and containing 15 and 13 observation then the combined HM is given by
 (a) 65 (b) 70.36 (c) 70 (d) 71
70. An aeroplane flies from A to B at the rate of 500 km/hour and comes back from B to A at the rate of 700 km/hour. The average speed of the aeroplane is
 (a) 600 km. Per hour
 (b) 583.33 km. Per hour
 (c) 100 35 km. per hour
 (d) 620 km. Per hour.
71. What is the HM of $1, 1/2, 1/3, 1/n$?
 (a) n (b) $2n$ (c) $\frac{2}{(n+1)}$ (d) $\frac{n(n+1)}{2}$
72. If the AM and GM for two numbers are 6.50 and 6 respectively then the two numbers are
 (a) 6 and 7
 (b) 9 and 4
 (c) 10 and 3
 (d) 8 and 5
73. A binomial distribution is
 (a) never symmetrical.
 (b) never positively skewed.
 (c) never negatively skewed.
 (d) symmetrical when $p = 0.5$.
74. The formula should be independent of the unit in which or for which price and quantities are quoted in
 (a) Unit Test
 (b) Time Reversal Test
 (c) Factor Reversal Test

- (d) None
75. For Poisson fitting to an observed frequency distribution,
- we equate the Poisson parameter to the mean of the frequency distribution.
 - we equate the Poisson parameter to the median of the distribution.
 - we equate the Poisson parameter to the mode of the distribution.
 - none of these.
76. When the product of price index and the quantity index is equal to the corresponding value index then the test that holds is
- Unit Test
 - Time Reversal Test
 - Factor Reversal Test
 - none holds
77. Product moment correlation coefficient may be defined as the ratio of
- The product of standard deviations of the two variables to the covariance between them
 - The covariance between the variables to the product of the variances of them
 - The covariance between the variables to the product of their standard deviations
 - Either (b) or (c).
78. Since Blood Pressure of a person depends on age, we need consider
- The regression equation of Blood Pressure on age
 - The regression equation of age on Blood Pressure
 - Both (a) and (b)
 - Either (a) or (b)
79. If $u + 5x = 6$ and $3y - 7v = 20$ and the correlation coefficient between x and y is 0.58 then what would be the correlation coefficient between u and v ?
- 0.58
 - 0.58
 - 0.84
 - 0.84
80. The interval $(\mu - 3\sigma, \mu + 3\sigma)$ covers
- 95% area of a normal distribution.
 - 96% area of a normal distribution.
 - 99% area of a normal distribution.
 - all but 0.27% area of a normal distribution.
81. What is the coefficient of variation of x , characterised by the following probability density function: $f(x) = \frac{1}{4\sqrt{2\pi}} e^{-(x-10)^2/32}$ for $-\infty < x < \infty$
- 50
 - 60
 - 40
 - 30
82. In case of an even number of observations which of the following is median?
- Any of the two middle-most value
 - The simple average of these two middle values
 - The weighted average of these two middle values

- (d) Any of these
83. The average salary of a group of unskilled workers is ₹ 10,000 and that of a group of skilled workers is ₹ 15,000. If the combined salary is ₹ 12,000, then what is the percentage of skilled workers?
 (a) 40% (b) 50% (c) 60% (d) none of these
84. For 10 pairs of observations, No. of concurrent deviations was found to be 4. What is the value of the coefficient of concurrent deviation?
 (a) $\sqrt{0.2}$ (b) $-\sqrt{0.2}$ (c) 1/3 (d) -1/3
85. Laspeyre's method and Paasche's method do not satisfy
 (a) Unit Test
 (b) Time Reversal Test
 (c) Factor Reversal Test
 (d) b & c
86. The purpose determines the type of index number to use
 (a) yes (b) no (c) may be (d) may not be
87. _____ satisfies circular test
 (a) G.M. of price relatives or the weighted aggregate with fixed weights
 (b) A.M. of price relatives or the weighted aggregate with fixed weights
 (c) H.M. of price relatives or the weighted aggregate with fixed weights
 (d) None
88. The presence of extreme observations does not affect
 (a) AM (b) Median (c) Mode (d) Any of these
89. If the SD of the 1st n natural numbers is 2, then the value of n must be
 (a) 2 (b) 7 (c) 6 (d) 5
90. If the rank correlation coefficient between marks in management and mathematics for a group of student in 0.6 and the sum of squares of the differences in ranks in 66, what is the number of students in the group?
 (a) 10 (b) 9 (c) 8 (d) 11
91. There are two urns. The first urn contains 3 red and 5 white balls whereas the second urn contains 4 red and 6 white balls. A ball is taken at random from the first urn and is transferred to the second urn. Now another ball is selected at random from the second arm. The probability that the second ball would be red is
 (a) 7/20 (b) 35/88 (c) 17/52 (d) 3/20
92. If $P(A) = a$, $P(B) = b$ and $P(A \cap B) = c$ then the expression of $P(A' \cap B')$ in terms of a, b and c is

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

93. If the sum of squares of difference of ranks, given by two judges A and B, of 8 students in 21, what is the value of rank correlation coefficient?
- (a) 0.7
 - (b) 0.65
 - (c) 0.75
 - (d) 0.8
94. While computing rank correlation coefficient between profit and investment for the last 6 years of a company the difference in rank for a year was taken 3 instead of 4. What is the rectified rank correlation coefficient if it is known that the original value of rank correlation coefficient was 0.4?
- (a) 0.3
 - (b) 0.2
 - (c) 0.25
 - (d) 0.28
95. A, B and C are three mutually exclusive and exhaustive events such that $P(A) = 2P(B) = 3P(C)$. What is $P(B)$?
- (a) $6/11$
 - (b) $3/11$
 - (c) $1/6$
 - (d) $1/3$
96. If the quartile deviation of a normal curve is 4.05, then its mean deviation is
- (a) 5.26
 - (b) 6.24
 - (c) 4.24
 - (d) 4.80
97. If an annual time series consisting of even number of years is coded, then each coded interval is equal to:
- (a) Half year
 - (b) One year
 - (c) Both (a) and (b)
 - (d) Two years
98. If the two quartiles of $N(\mu, \sigma^2)$ are 14.6 and 25.4 respectively, what is the standard deviation of the distribution?
- (a) 9
 - (b) 6

- (c) 10
- (d) 8

99. For a group of students, 30 %, 40% and 50% failed in Physics, Chemistry and at least one of the two subjects respectively. If an examinee is selected at random, what is the probability that he passed in Physics if it is known that he failed in Chemistry?

- (a) $1/2$
- (b) $1/3$
- (c) $1/4$
- (d) $1/6$

100. For open-end classification, which of the following is the best measure of central tendency?

- (a) AM
- (b) GM
- (c) Median
- (d) Mode