

MATHS, STATS & REASONING

All Questions is compulsory.

1. Find the two numbers such that the 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
2. If $3^x = 2$, $5^y = 3$ and $2^z = 5$, find the value of multiply of x.y.z
(a) 0
(b) 1
(c) 2
(d) None of these
3. Using matrix Cramers method
 $\Delta x=6$, $\Delta y=12$, $\Delta z=18$, $\Delta=3$, Find x, y and z values
(a) $\frac{1}{2}, \frac{1}{4}, \frac{1}{6}$
(b) $-\frac{1}{2}, -\frac{1}{4}, -\frac{1}{6},$
(c) 2, 4, 6
(d) None
4. if $A = \begin{bmatrix} 4 & 6 \\ 2 & 3 \end{bmatrix}$
(a) is a singular matrix
(b) Non-singular matrix
(c) Identity matrix
(d) Symmetric matrix
5. SD of first five consecutive natural numbers is
(a) $\sqrt{10}$
(b) $\sqrt{8}$
(c) $\sqrt{3}$
(d) $\sqrt{2}$
6. The Q.D. of 6 numbers 15, 8, 36, 40, 38, 41 is equal to
(a) 12.5
(b) 25
(c) 13.5
(d) 37

7. Find the probable error if $r = \frac{2}{\sqrt{10}}$ and $n = 36$.
- (a) 0.6745
 - (b) 0.06745
 - (c) 0.5287
 - (d) None
8. If the regression line of y on x is given by $Y = x + 2$ and Karlpearson's coefficient of correlation is 0.5 then $\frac{\sigma_y^2}{\sigma_x^2} = \underline{\hspace{2cm}}$
- (a) 3
 - (b) 2
 - (c) 4
 - (d) None
9. 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%
10. In how many ways can the letters of words "ACCOUNTANT" be arranged if vowels always occur together?
- (a) 7560
 - (b) 7650
 - (c) 7660
 - (d) 7550
11. 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
12. A.M. of regression coefficients is
- (a) Equal to r
 - (b) Greater than or equal to r
 - (c) Half of r
 - (d) None of these

13. If a coin is Tossed 5 times then the probability of getting Tail and Head occurs alternatively is
- (a) $\frac{1}{8}$
(b) $\frac{1}{16}$
(c) $\frac{1}{32}$
(d) $\frac{1}{64}$
14. If mean and variance are 5 and 3 respectively then relation between p & q is
- (a) $p > q$
(b) $p < q$
(c) $p = q$
(d) p is symmetric
15. 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 will amount to Rs. 2,250 is:
- (a) $16\frac{2}{3}$ years
(b) 20 years
(c) 16 years
(d) $6\frac{2}{3}$ years
16. If $(\sqrt{3}+2)$ is a root of a quadratic equation $x^2 + px + q = 0$ then the value of p and q.
- (a) (4,-1)
(b) (4,1)
(c) (-4,1)
(d) (2,3)
17. In how many ways 5 gents and 5 ladies sit at a round table; if no two ladies are to sit together.
- (a) 720
(b) 120
(c) 2,880
(d) 34,600
18. The prices and quantities of 3 commodities in base and current years are as follows:
- | P_0 | P_1 | q_0 | q_1 |
|-------|-------|-------|-------|
| 12 | 14 | 10 | 20 |
| 10 | 8 | 20 | 30 |
| 8 | 10 | 30 | 10 |
- The Laspayer price index is
- (a) 118.13
(b) 107.14
(c) 120.10
(d) None

19. The cost of living index numbers in years 2015 and 2018 were 97.5 and 115 respectively. The salary of a worker in 2015 was Rs. 19500. How much additional salary was required for him in 2018 to maintain the same statement of living as in 2015?
- (a) Rs. 3000
 - (b) 4,000
 - (c) 3,500
 - (d) 4,500
20. Which is called an ideal index number?
- (a) Laspayer's index number
 - (b) Pasche's index number
 - (c) Fisher's index number
 - (d) Marshall Edgeworth index number
21. Trend in semi average is
- (a) Linear
 - (b) Parabola
 - (c) Exponential
 - (d) None of these
22. Standard deviation is _____ times of $\sqrt{MD \times QD}$
- (a) $\frac{2}{3}$
 - (b) $\frac{4}{5}$
 - (c) $\sqrt{\frac{15}{8}}$
 - (d) $\sqrt{\frac{8}{15}}$
23. If the curve $Y^2 = AX^4 + B$ Passes through the point $P(1, 2)$. The value of $\frac{dy}{dx}$ at P is 4. Then
- (a) $A=4, B=0$
 - (b) $A=0, B=4$
 - (c) $A=2, B=0$
 - (d) $A=1, B=2$
24. Geometric Mean of P, p^2, p^3, \dots, p^n will be:
- (a) P^{n+1}
 - (b) $P^{\frac{n+1}{2}}$
 - (c) $P^{\frac{n+1}{n+1}}$
 - (d) None of the above

25. 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
26. Two equal sums of money were lent at simple interest at 11 p.a. for $3\frac{1}{2}$ years and $4\frac{1}{2}$ years respectively. If the difference in interests for two periods was Rs. 825 then each sum is :
(a) Rs. 8,250
(b) Rs. 8,500
(c) Rs. 7,500
(d) Rs. 9,250
27. Coefficient of quartile deviation is $\frac{1}{4}$ then Q_3/Q_1 is
(a) $\frac{5}{3}$
(b) $\frac{4}{3}$
(c) $\frac{3}{4}$
(d) $\frac{3}{5}$
28. If $\sigma^2 = 100$ and coefficient of variation = 20% then $\bar{x} =$
(a) 60
(b) 70
(c) 80
(d) 50
29. Given that
- | | | | | | |
|---|----|----------------|---|---------------|---|
| X | -3 | $-\frac{3}{2}$ | 0 | $\frac{3}{2}$ | 3 |
| Y | 9 | $\frac{9}{4}$ | 0 | $\frac{9}{4}$ | 9 |
- The Karlpearson's coefficient of correlation is
(a) Positive
(b) Zero
(c) Negative
(d) None
30. The first, second and third month salaries of a person are in the ratio 2:4:5. The difference between the product of the salaries of first 2 months & last 2 months is 4,80,00,000. Find the salary of the first month.
(a) Rs. 4,000
(b) Rs. 6,000
(c) Rs. 12,000
(d) Rs. 8,000

31. If $A = \begin{pmatrix} 0 & 2 & 2 & 3 \\ 3 & 2 & 1 & 0 \end{pmatrix}; B = \begin{pmatrix} 0 & 3 \\ 1 & 2 \\ 2 & 1 \\ 3 & 0 \end{pmatrix}$

- (a) $AB \neq BA$
 (b) $AB = BA$
 (c) AB exists BA not exists
 (d) AB not exists BA exists
32. On what sum will the compound interest at 5% per annum for two years compounded annually be Rs. 1640?
 (a) Rs. 18000
 (b) Rs. 20000
 (c) Rs. 16000
 (d) None
33. In how many ways the word "arrange" be arranged such that the 2 'r' do not come together?
 (a) 1000
 (b) 900
 (c) 800
 (d) None
34. The sum of mean and SD of a series is $a+b$, if we add 2 to each observation of the series then the sum of mean and SD is
 (a) $a + b + 2$
 (b) $6 + a + b$
 (c) $4 + a - b$
 (d) $a + b + 4$
35. For a symmetric distribution
 (a) Mean = Median = Mode
 (b) Mode = 3 Median - 2 Mean
 (c) Mode = $\frac{1}{3}$ Median = $\frac{1}{2}$
 (d) None
36. For the distribution
- | | | | | | | |
|---|---|---|----|----|----|---|
| X | 1 | 2 | 3 | 4 | 5 | 6 |
| F | 6 | 9 | 10 | 14 | 12 | 8 |
- The value of median is
 (a) 3.5
 (b) 3
 (c) 4
 (d) None of these
37. Which of the following is positional average?
 (a) Median
 (b) GM
 (c) HM
 (d) AM

38. In a moderately skewed distribution the values of mean & median are 12 & 18 respectively. The value of mode is
(a) 6
(b) 12
(c) 15
(d) None of these
39. The missing number in the series : 104, 109, 99, 114, 94, ?
(a) 69
(b) 78
(c) 120
(d) None of these
40. Which of the following is odd one :-
835, 734, 642, 751, 853, 981, 532
(a) 751
(b) 853
(c) 981
(d) 532
41. A man starts from a point, walks 4 miles North, turns to his right and walks 2 miles, again turns to his right and walks 2 miles, again turns to his right and walks 2 miles. In which direction would he be now from his starting point?
(a) North
(b) South
(c) East
(d) West
42. $\int (\log x)^2 dx$
(a) $x (\log x)^2 - 2x \log x + 2x + k$
(b) $x (\log x)^2 - 2x + k$
(c) $2x \log x - 2x + k$
(d) None of these
43. Given $A = \{2, 3\}$, $B = \{4, 5\}$, $C = \{5, 6\}$ then $A \times (B \cap C)$ is :
(a) $\{(2, 5), (3, 5)\}$
(b) $\{(5, 2), (5, 3)\}$
(c) $\{(2, 3), (5, 5)\}$
(d) None of these
44. If the sum of n terms is $2n^2 + 5n$ then its n th term is
(a) $4n - 3$
(b) $3n - 4$
(c) $4n + 3$
(d) $3n + 4$
45. If ${}^6P_r = 24 {}^6C_r$, then find r :
(a) 4
(b) 6
(c) 10
(d) 120
46. If the difference of S.I and C.I is Rs. 72 at 12 % for 2 years. Calculate the amount.

- (a) 8,000
(b) 6,000
(c) 5,000
(d) 7,750
47. The solution of the inequality $8x+6 < 12x+14$ is
(a) $(-2, 2)$
(b) $(0, -2)$
(c) $(2, \infty)$
(d) $(-2, \infty)$
48. The AM of 15 observations is 9 and the AM of first 9 observations is 11 and then AM of remaining observations is
(a) 11
(b) 6
(c) 5
(d) 9
49. Histogram can be shown as
(a) Ellipse
(b) Rectangle
(c) Hyperbola
(d) Circle
50. If $\log_2 x + \log_8 x + \log_{32} x = \frac{23}{15}$ then the value of x is
(a) 8
(b) 5
(c) 2
(d) None of these
51. A sum of money invested of compound interest doubles itself in four years. It becomes 32 times of itself at the same rate of compound interest in
(a) 12 years
(b) 16 years
(c) 20 years
(d) 24 years
52. How many numbers greater than 2000 can be formed with the digits 1, 2, 3, 4, 5 with each digit distinct?
(a) 216
(b) 120
(c) 24
(d) 240
53. Gopal started walking 2 km straight from his school. Then he turned right and walked 1 km. Again he turned right and walked 1 km to reach his house. If his house is south-east from his school, then in which direction did Gopal start walking from the school ?
(a) East
(b) West
(c) South
(d) North

54. P, T, V, R, M, D, K and W are sitting around a circular table facing the centre. V is second to the left of T. T is fourth to the right of M. D and P are not immediate neighbours of T. D is third to the right of P. W is not an immediate neighbor of P. P is to the immediate left of K.
What is R's position with respect to V ?
(a) Third to the right
(b) Fifth to the right
(c) Third to the left
(d) Second to the left
55. Ogive graph is used for finding
(a) Mean
(b) Mode
(c) Median
(d) None
56. Histogram is used for finding
(a) Mode
(b) Mean
(c) First Quartile
(d) None
57. Which of the following graph is suitable for cumulative frequency distribution?
(a) Ogives
(b) Histogram
(c) G.M
(d) A.M
58. $\alpha\beta$ are the roots of the $2x^2+3x+7=0$. Then the value of $\alpha\beta^{-1}+\alpha^{-1}\beta$ is
(a) 2
(b) $3/7$
(c) $7/2$
(d) $-19/14$
59. 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 interest amount at the end of 13 years is :
(a) Rs. 12621.50
(b) Rs. 7613
(c) Rs. 12613.10
(d) Rs. 7316
60. If ${}^{13}C_6 + 2{}^{13}C_5 + {}^{13}C_4 = {}^{15}C_x$, then $x =$ _____
(a) 6
(b) 7
(c) 8
(d) 9

61. If $F : R \rightarrow R$, $f(x) = x+1$,
 $G : R \rightarrow R$ $g(x) = x^2+1$
then fog(-2) equals to
(a) 6
(b) 5
(c) -2
(d) None
62. Roy walks 2 km to East, then turns North-West and walks 3 km. Then he turns south and walks 5 km. Then again he turns West and walks 2 km. Finally he turns North and walks 6 km. In which direction, is he from the starting point ?
(a) South-West
(b) South-East
(c) North -West
(d) North-East
63. A, B, C, X, Y, Z are seated in a straight line facing North. C is third to the right of Z and B sits second to the right of C. X sits to the immediate right of A. How many persons are seated between A and C ?
(a) One
(b) Two
(c) Three
(d) Four
64. series is continuous.
(a) Open ended
(b) Exclusive
(c) Close ended
(d) Unequal call intervals
65. If variance of a random variable x is 23, then what is the variance of $2x+10$?
(a) 56
(b) 33
(c) 46
(d) 92
66. If a random variable x assumes the values 0, 1 and 2 with probabilities 0.30, 0.50 and 0.20, then its expected value is
(a) 1.50
(b) 3
(c) 0.90
(d) 1
67. $E(13x+9)=$
(a) $13x$
(b) $13E(x)$
(c) $13E(x) + 9$
(d) 9
68. The maximum value of the variance of a binomial distribution with parameters n and p is
(a) $n/2$
(b) $n/4$
(c) $np(1 - p)$
(d) $2n$

(Directions Q 69 to 72) Two or Three statements are followed by two conclusions I and II, you have to take the two given statements to be true, disregarding the commonly known facts and then decide which of the given conclusions logically follows from the two given statements?

69. **Statement:** Some Chairs are glasses.
All tree are Chairs
Conclusions: I. Some trees are glasses.
II. Some glasses are trees.
(a) Only I follows
(b) Only II follows
(c) Both I and II follows
(d) Neither I nor II follows
70. **Statement:** All papers are pens.
All pens are erasers.
Conclusions: I. Some erases are papers.
II. Some pens are no papers.
(a) Only I follows
(b) Only II follows
(c) Either I or II follows
(d) Neither I nor II follows
71. **Statement:** Only dogs are animals.
No historian is an animal.
Conclusions: I. Some dogs are not historians.
II. Some historians are not dogs.
(a) Only conclusion I follows.
(b) Only conclusion II follows.
(c) Neither I nor II follows.
(d) Both conclusion I and II follows.
72. **Statement:** All roads are poles
No poles are Bungalows.
Conclusions: I. Some roads are Bungalows.
II. Some Bungalows are poles.
(a) Only conclusion I follows.
(b) Only conclusion II follows.
(c) Both conclusions are correct.
(d) Neither I nor II follows.
73. An experiment succeeds twice as often as it fails. What is the probability that in next five trials there will be three success.
(a) $192/243$
(b) $19/243$
(c) $80/243$
(d) $50/243$

74. The binomial distribution with mean 3 and variance 2 is.
- (a) $\left(\frac{2}{3} + \frac{1}{3}\right)^9$
- (b) $\left(\frac{2}{6} + \frac{1}{6}\right)^9$
- (c) $\left(\frac{2}{3} + \frac{1}{3}\right)^6$
- (d) $\left(\frac{2}{5} + \frac{1}{5}\right)^9$
75. If 1.5 per cent of items produced by a manufacturing units are known to be defective, what is the probability that a sample of 200 items would contain no defective item?
- (a) 0.05
- (b) 0.15
- (c) 0.20
- (d) 0.22
76. The standard deviation of a Poisson variety is 1.732. What is the probability that the variety lies between -2.3 to 3.68?
- (a) 0.65
- (b) 0.11
- (c) 0.35
- (d) None of the
77. The quartile deviation of a normal distribution with mean 10 and SD 4 is
- (a) 0.675
- (b) 6.75
- (c) 2.70
- (d) 3.20
78. S borrows Rs. 5,00,000 to buy a house. If he pays equal instalments for 20 years and 10% interest on outstanding balance what will be the equal annual instalment?
- (a) Rs. 48792.72
- (b) Rs. 58729.84
- (c) Rs. 57829.61
- (d) None of these
79. The future value of an annuity of Rs. 1,000 made annually for 5 years at the interest of 14% compounded annually is: [Given that $(1.14)^5 = 1.92541$]
- (a) Rs. 5,610
- (b) Rs. 6,610
- (c) Rs. 6,160
- (d) Rs. 5,160

80. Ramesh wants to retire and receive Rs. 4,000 a month. He wants to pass this monthly payment to future generations after his death. He can earn an interest of 8% compounded annually. How much will he need to set aside to achieve his perpetuity goal?
- (a) Rs. 6,00,000
(b) Rs. 6,50,000
(c) Rs. 6,25,000
(d) Rs. 6,80,000
81. An examination paper with 10 question consist of 6 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
82. If a, b, c are in A.P. and x, y, z are in G.P. then the value of $x^{(b-c)} \cdot y^{(c-a)} \cdot z^{(a-b)}$ is:
- (a) 1
(b) 0
(c) $b(c - a)$
(d) None
83. After qualifying out of 400 professionals, 112 joined service, 120 started practice and 160 joined assistantship. There were 32, who were in both practice and service, 40 in both practice and assistantship and 20 in both service and assistantship. There were 12 who did all the three. Find how many could not get any of these.
- (a) 88
(b) 244
(c) 122
(d) None
84. If a relation $R = \{(1,1), (2,2), (1,2), (2,1)\}$ is symmetric on $A = \{1,2,3\}$ then R is
- (a) Reflexive but not Transitive
(b) Transitive but not Reflexive
(c) Reflexive and Transitive
(d) Neither Reflexive nor Transitive
85. 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) $\{(x,z), (b,y), (c,z), (d,x)\}$

86. 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) $\frac{p}{q}$
87. Raman starts walking in the morning facing the Sun. After sometime, he turned to the left later again he turned to his left. At what direction is Raman moving now ?
- (a) East
 - (b) West
 - (c) South
 - (d) North
88. Five boys A, B, C, D and E are standing in a row. D is on the right of E, B is on the left of E but on the right of A. D is one the left of C, who is standing on the extreme right. Who is standing in the middle ?
- (a) B
 - (b) C
 - (c) D
 - (d) E
89. Eight friends A, B, C, D, E, F, G and H are sitting in a circle facing centre, not necessarily in the same order. D sits third to the left of A. E sits to the immediate right of A. B is third to left of D. G is second to the right of B. C is neighbour of B. C is third to left of H. Who amongst the following is sitting exactly between F and D ?
- (a) C
 - (b) E
 - (c) H
 - (d) A
90. 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
91. Preeti has a son, named Arun. Ram is Preeti's brother. Neeta too has a daughter named Reema. Neeta is Ram's sister. What is Arun's relationship to Reema?
- (a) Brother
 - (b) Nephew
 - (c) Cousin
 - (d) Uncle

92. Given that:
A is the mother of B.
C is the son of A.
D is the brother of E.
E is the daughter of B.
Who is grandmother of D ?
(a) E
(b) B
(c) C
(d) A
93. **Directions :** Question are based on the information provided below:
(i) 'A x B' means 'A is Mother of B'.
(ii) 'A - B' means 'A is Brother of B'.
(iii) 'A + B' means 'A is Sister of B'.
(iv) 'A ÷ B' means 'A is father of B'.
Which of the following means 'R' is maternal uncle of 'T' ?
(a) $R - M \times T$
(b) $R + M \times T$
(c) $T \times M - R$
(d) $T + M \div R$
94. If ROSE is written as TQUG, how BISCUIT can be written in that code?
(a) DKUEWKV
(b) CJTDVJU
(c) DKVEWKV
(d) DKUEWKY
95. If MEKLF is coded as 91782 and LLLJK as 88867, how can IHJED is coded as ?
(a) 97854
(b) 64512
(c) 54610
(d) 75632
96. If the inflexion points of a Normal Distribution are 6 and 14. Find its standard Deviation?
(a) 4
(b) 6
(c) 10
(d) 12
97. A sample of 100 dry battery cells tested to find the length of life produced the following results: $\bar{X} = 12$ hours, $\sigma = 3$ hours. What percentage of battery cells are expected to have life less than 6 hours?
[Area under the normal curve from $z = 0$ to $z = 2$ is 0.4772]
(a) 2.28%
(b) 2.56%
(c) 4.56%
(d) 1.93%

98. Which of the following is false in case of normal distribution.
- (a) it is multi model
 - (b) mean = median = mode
 - (c) it is symmetric
 - (d) Total area is 1
99. The wages of workers of factory follows:
- (a) Binomial distribution
 - (b) Poisson distribution
 - (c) Normal distribution
 - (d) Chi-square distribution
100. In time series seasonal variations can occur within a period of:
- (a) Four years
 - (b) Three years
 - (c) One year
 - (d) Nine years
