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QUESTION PAPER JULY 2021 BASED ON MEMORY BUSINESS MATHS AND LOGICAL REASONING & STATISTICS

1. If $xy + yz + zx = -1$, then the value of $\left(\frac{x+y}{1+xy} + \frac{z+y}{1+zy} + \frac{x+z}{1+2x}\right)$ is
 - (a) xyz
 - (b) $\frac{-1}{yz}$
 - (c) $\frac{1}{xyz}$
 - (d) $\frac{1}{x+y+z}$
2. If $\log_4 x + \log_{16} x + \log_{64} x + \log_{256} x = \frac{25}{6}$ then the value of x is
 - (a) 64
 - (b) 4
 - (c) 16
 - (d) 2
3. Let U be the universal set, A and B are the subsets of U . if $n(U) = 650$, $n(A) = 310$, $n(A \cap B) = 95$ and $n(B) = 190$, then $n(\bar{A} \cap \bar{B})$ is equal to (\bar{A} and \bar{B} are the complement of A and B , respectively)
 - (a) 400
 - (b) 200
 - (c) 300
 - (d) 245
4. 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) $[-4, 4]$
5. Let $A = \mathbb{R} - \{3\}$ and $B = \mathbb{R} - \{1\}$. Let $f: A \rightarrow B$ defined by $f(x) = \frac{x-2}{x-3}$. What is the value of $f^{-1}\left(\frac{1}{2}\right)$?
 - (a) $\frac{2}{3}$
 - (b) $\frac{3}{4}$
 - (c) 1
 - (d) -1

6. If $f(x) = x^2 - 1$ and $g(x) = |2x+3|$, then $f \circ g(3) - g \circ f(-3) =$
- 71
 - 61
 - 41
 - 51
7. The number of terms of the series: $5 + 7 + 9 + \dots$ must be taken so that the sum may be 480
- 20
 - 10
 - 15
 - 25
8. If the sum of 'n' terms of an AP (Arithmetic Progression) is $2n^2$, the fifth term is _____
- 20
 - 50
 - 16
 - 25
9. 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 number respectively, then the resulting numbers are in arithmetic progression. What is the sum of squares of the original three numbers?
- 510
 - 456
 - 400
 - 336
10. 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?
- $k^2 + 3k - 2 = 0$
 - $k^2 - 2k + 3 = 0$
 - $k^2 - 2k - 3 = 0$
 - $k^2 - 3k + 2 = 0$
11. The cost of 2 oranges and 3 apples is ₹ 28. If the cost of an apple is doubles then the cost of 3 oranges and 5 apples is ₹ 75. The original cost of 7 oranges and 4 apples (in ₹) is
- 59
 - 47
 - 71
 - 63
12. The value of 'K' is _____, if 2 is a root of the following cubic equation: $x^3 - (k + 1)x + k = 0$
- 2
 - 6
 - 1
 - 4
13. The sum of square of any real positive quantities and its reciprocal is never less than
- 1
 - 2
 - 3
 - 4
- 14. Related to matrix algebra now deleted from the syllabus**
15. If $y = 4 + 9 \sin 5x$ then which holds good?

- (a) $-5 \leq y \leq 13$
(b) $-4 \leq y \leq 8$
(c) $0 < y < 1$
(d) $-5 < y < 5$
16. 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) $n = 8$
17. 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
18. A person can go from place 'A' to 'B' by 11 different modes of transport but is allowed the return back to "A" by any mode other than the one earlier. The number of different ways, the entire journey can be complete is _____
(a) 110
(b) 10^{10}
(c) 9^5
(d) 10^9
19. The number of ways 5 boys and 5 girls can be seated at a round table, so no two boys are adjacent is _
(a) 2550
(b) 2880
(c) 625
(d) 2476
20. A sum of ₹ 7500 amounts to ₹ 9075 at 10% p.a., interest being compounded yearly in a certain time. The simple interest (in ₹) on the same sum for the same time and the same rate is
(a) 1000
(b) 1250
(c) 1800
(d) 1500
21. A loan of ₹ 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 ₹) under this instalment plan is
(a) 6160
(b) 8120
(c) 5980
(d) 7560
22. If the desired future value of after 5 years with 18% interest rate is ₹ 1,50,000, then the present value (in ₹) is (Given that $(1.18)^5 = 2.2877$)
(a) 63,712
(b) 65,568
(c) 53,712
(d) 41,712

23. What is the compound interest (in ₹) on a sum of ₹ 12,600 for $1\frac{1}{2}$ years at 20% per annum if the interest is compounded half yearly? (Nearest to a Rupee)
- (a) 4271
(b) 4171
(c) 4711
(d) 4117
24. A sum of ₹ x amounts to ₹ 27,900 in 3 years and to ₹ 41,850 in 6 years at a certain rate percent per annum, when the interest is compounded yearly. The value of x is
- (a) 16080
(b) 18600
(c) 18060
(d) 16800
25. 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) 1.587P
(b) 1.921P
(c) 1.403P
(d) 2.51P
26. If a person bought a house by paying ₹ 45,00,000 down payment and ₹ 80,000 at the end of each year till the perpetuity, assuming the rate of interest as 16%, the present value of house (in ₹ is given as)
- (a) 47,00,000
(b) 45,00,000
(c) 57,80,000
(d) 50,00,000
27. Let the operating profit of a manufacturer for five years is given as:

Year	1	2	3	4	5	6
Operating Profit (in lakh ₹)	90	100	106.4	107.14	120.24	157.35

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

- (a) 9%
(b) 12%
(c) 11%
(d) 13%
28. If discount rate is 14% per annum, then how much a company has to pay to receive ₹ 280 growing at 9% annually forever.
- (a) ₹ 5,600
(b) ₹ 2,800
(c) ₹ 1,400
(d) ₹ 4,200
29. The effective rate of return for 24% per annum convertible monthly is given as
- (a) 24%
(b) 26.82%
(c) 18%
(d) 24.24%
30. If the cost of capital be 12% per annum, then the net present value (in nearest ₹) from the given cash flow is given as

Year	0	1	2	3
Operating profit (in thousands ₹)	(100)	60	40	50

- (a) 31048
 (b) 34185
 (c) 51048
 (d) 24187
- 31.** A certain sum amounts to ₹ 15748 in 3 years at simple interest at $r\%$ p.a. The same sum amounts to ₹ 16,510 at $(r + 2)\%$ p.a. simple interest in the same time. What is the value of r ?
- (a) 10%
 (b) 8%
 (c) 12%
 (d) 6%
- 32.** What is the difference (in ₹) between the simple interest and the compound interest on a sum of ₹ 8,000 for $2\frac{2}{5}$ years at the rate of 10% p.a., when the interest is compounded yearly?
- (a) 135.75
 (b) 129.50
 (c) 151.75
 (d) 147.20
- 33.** The future value of annuity of ₹ 2,000 for 5 years at 5% compounded annually is given (in interest ₹) as
- (a) 51051
 (b) 21021
 (c) 15624
 (d) 61254
- 34.** 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, $P(x) = -8x^2 + 400x - 1000$, then the numbers of shops should they allocate to minimize the expenses.
- (a) 0
 (b) 30
 (c) 25
 (d) 10
- 35.** The cost function $C(x) = 125 + 500x - x^2 + x^3/3$, $0 \leq x \leq 100$ and the demand function for the items is given by, $p(x) = 1500 - x$, then marginal profit when 18 item are sold is
- (a) 751
 (b) 571
 (c) 676
 (d) 875
- 36.** If $f(x) = 3e^{x^4}$ then $f'(x) - 4x^3f(x) + \left(\frac{1}{3}\right)f(0) - f'(0)$ is equal to
- (a) 0
 (b) e^{x^2}
 (c) 1
 (d) -1
- 37.** The value of $\int_{-2}^2 f(x) dx$, where $f(x) = 1+x, x \leq 0; f(x) = 1 - 2x, x \geq 0$ is
- (a) 20
 (b) -2
 (c) -4

- (d) 0
- 38.** The salaries of A,B and C are of ratio 2:3:5. If the increment of 15%, 10% and 20% are done to their respective salaries, then find the new ratio of the salaries.
- (a) 23:33:60
 (b) 33:23:60
 (c) 23:60:33
 (d) 33:60:23
- 39.** 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) 27
- 40.** If $A : B = 5 : 3$, $B : C = 6 : 7$ and $C : D = 14 : 9$ then the value of $A : B : C : D$
- (a) $20 : 14 : 12 : 9$
 (b) $20 : 9 : 12 : 14$
 (c) $20 : 9 : 14 : 12$
 (d) $20 : 12 : 14 : 9$
- 41.** Choose the missing term in the series.... 1, 1, 8, 4, 27, _____ 64, 16
- (a) 27
 (b) 11
 (c) 9
 (d) 125
- 42.** The wrong term in the series 225, 196, 169, 144, 121, 100, 77, 64, is _____
- (a) 121
 (b) 77
 (c) 100
 (d) 169
- 43.** If DELHI is coded as EFMIJ then JAIPUR is coded as _____
- (a) JQVSBK
 (b) QVSKBJ
 (c) BJQVSK
 (d) KBJQVS
- 44.** If FRAME is coded as 0618011305 then ARISE is coded as _____
- (a) 0118091905
 (b) 0119091805
 (c) 0118190905
 (d) 0118091805
- 45.** If CLOCK is coded as 34235 and TIME as 8679, then MOTEL is coded as
- (a) 27894
 (b) 72964
 (c) 72894
 (d) 77684
- 46.** A and B start moving towards each other from two places 200m apart. After walking 60 m, B turns left and goes 20 m, then he turns right and goes 40m. He then turns right again and comes back to the road

on which he had started walking. If A and B walk with the same speed, what is the distance between them now?

- (a) 80 m
- (b) 70 m
- (c) 40 m
- (d) 60 m

47. There are four town PQR and T. Q is to the south-west of P, R is to the east of Q and south-east of P, and T is to the north of R in line with QP. In which direction of P is T located?

- (a) North
- (b) North-East
- (c) East
- (d) South-East

48. Five friends A, B, C, D and E are staying in the same locality. B's house is to east of A's house and to the north of C's house. C's house is to the west of D's house. D's house in which direction with respect to A's house?

- (a) North-East
- (b) South-East
- (c) North-West
- (d) South-West

49. One morning, after sunrise, Vikram and Shailesh were standing in a lawn with their backs toward each other. Vikram's shadow fell exactly towards left hand side. Which direction was Shailesh facing?

- (a) South-West
- (b) West
- (c) South
- (d) East-South

50. Pointing towards "A", "B" said: "Your mother is the younger sister of my mother". "A is related to "B" as ____

- (a) Uncle
- (b) Cousin
- (c) Nephew
- (d) Father

51. Shyam's mother said to Shayam " my mother has a son whose son is Ram". Shayam is related to Ram as

-
- (a) Uncle
 - (b) Cousin
 - (c) Nephew
 - (d) Grandfather

52. Amit said "This girl is the wife of the grandson of my mother", How Amit related to the girl?

- (a) Father-in-law
- (b) Grandson
- (c) Father
- (d) son

53. A is the son of C; C and Q are sisters; Z is the mother of Q and P is the son of Z. which of the following statements is true?

- (a) A and P are cousins
- (b) C and P are sisters

- (c) P is the maternal uncle of A
 (d) A is the maternal uncle of P
54. A,B,C,D and E are sitting on a bench. A is sitting next to B, C is sitting next to D, D is not sitting with E who is on the left end of the bench. C is on the second position from the right. A is to the right of B and E. A and C are sitting together. In which position A is sitting between?
 (a) C and D
 (b) D and E
 (c) B and C
 (d) B and D
55. Five girls are sitting on a bench to be photographed. Seema is to the left of Rani and to the right of Bindu. Mary is to the right of Rani. Reeta is between Rani and Mary. Who is sitting immediate right to Reeta?
 (a) Seema
 (b) Rani
 (c) Bindu
 (d) Mary
56. Six friends P, Q, R, S, T and U are sitting around the hexagonal table each at one corner and are facing the centre of the hexagonal. P is second to the left of U. Q is neighbor of R and S. T is second to the left of S. Which one is sitting opposite to S?
 (a) R
 (b) P
 (c) Q
 (d) T
57. A, B, C, D, E, F and G are sitting in a row facing North:
 1. F is to the immediate right of E.
 2. E is 4th to the right of G.
 3. C is the neighbor of B and D
 4. Person who is third to the left of D is at one of ends.
 Who are to the right of D?
 (a) E and F only
 (b) G,B and C
 (c) E,F and A
 (d) G and B only

58. Related to syllogism now deleted from the syllabus

59. Related to syllogism now deleted from the syllabus

60. Related to syllogism now deleted from the syllabus

61. Expenditures of a Company (in Million Rupees) per item in various Years

Year	Item of Expenditures				
	Salary	Fuel and Transport	Bonus	Interest on loans	Taxes
1998	288	98	3.00	23.4	83
1999	342	112	2.52	32.5	108
2000	324	101	3.84	41.6	74
2001	336	133	3.68	36.4	88
2002	420	142	3.96	49.4	98

What is the average amount of interest per year which the company had to pay during this period?

- (a) 33.66

- (b) 36.66
(c) 31.66
(d) 39.66
62. There are n numbers. When 50 is subtracted from each of these number the sum of the numbers so obtained is -10. When 46 is subtracted from each of the original n numbers, then the sum of numbers, so obtained is 70. What is the mean of the original n numbers?
(a) 56.8
(b) 25.7
(c) 49.5
(d) 53.8
63. The mean of ' n ' observation is ' X '. if K is added to each observation, then the new mean is _____
(a) X
(b) XK
(c) $X - K$
(d) $X + K$
64. If $y = 3 + 1.9x$, and mode of x is 15, then the mode of y is:
(a) 15.9
(b) 27.8
(c) 35.7
(d) 31.5
65. The mean deviation of the numbers 3,10,6,11,14,17,9,8,12 about the mean is (correct to one decimal place)
(a) 8.7
(b) 4.2
(c) 3.1
(d) 9.8
66. The standard deviation of 1 to 9 natural numbers is _____
(a) 6.65
(b) 2.58
(c) 6.75
(d) 5.62
67. The probable value of mean deviation when $Q_3=40$ and $Q_1 = 15$ is _____
(a) 15
(b) 18.75
(c) 17.50
(d) 0
68. If the numbers are 5,1,8,7,2, then the coefficient of variation is
(a) 56.13%
(b) 59.13%
(c) 48.13%
(d) 44.13%
69. If every observation is increased by 7 then
(a) Standard Deviation increases by 7
(b) Mean deviation increases by 7
(c) Not affected at all
(d) Quartile Deviation increases by 7

70. If a school has 14 teachers, their heights (in cm) are:
172, 173, 164, 178, 168, 169, 173, 172, 173, 164, 178, 168, 169, 173 then average deviation of this data is
- (a) 2.43 approx.
 - (b) 3.93 approx.
 - (c) 3.43 approx.
 - (d) 2.92 approx.
71. If the relationship between x and y is given by $2x+3y = 10$ and the range of y is 10, then what is the range of x ?
- (a) 10
 - (b) 18
 - (c) 8
 - (d) 15
72. If the sum of the profit of the deviation of X and Y from their means is zero the correction coefficient between X and Y is:
- (a) Zero
 - (b) Positive
 - (c) Negative
 - (d) 10
73. If the slope of the regression line is calculated to be 5.5 and the intercept 15 then the value of Y when X is 6 is
- (a) 88
 - (b) 48
 - (c) 18
 - (d) 78
74. If $Y=9X$ and $X = 0.01Y$, then r is equal to:
- (a) -0.1
 - (b) 0.1
 - (c) 0.3
 - (d) -0.3
75. The straight – line graph of the linear equal $Y = a + b X$, slop is horizontal if:
- (a) $b = 1$
 - (b) $b \neq 0$
 - (c) $b = 0$
 - (d) $a = b \neq 0$
76. If $b_{yx} = -1.6$ and $b_{xy} = -0.4$, then r_{xy} will be
- (a) 0.4
 - (b) -0.8
 - (c) 0.64
 - (d) 0.8
77. The consumer price index goes up from 120 to 180 when salary goes up from 240 to 540, what is the increase in real terms?
- (a) 80
 - (b) 150
 - (c) 120
 - (d) 240

78. The weighted aggregative price index numbers for 2001 with 2000 as the base year using Paashe's Index Number is

Commodity	Price (in ₹)		Quantities	
	2000	2001	2000	2001
A	10	12	20	22
B	8	8	16	18
C	5	6	10	11
D	4	4	7	8

- (a) 112.32
 (b) 112.38
 (c) 112.26
 (d) 112.20
79. The weighted aggregative price index numbers for 2001 with 2000 as the base year using Marshal – Edgeworth Index Number is

Commodity	Price (in ₹)		Quantities	
	2000	2001	2000	2001
A	10	12	20	22
B	8	8	16	18
C	5	6	10	11
D	4	4	7	8

- (a) 112.26
 (b) 112.20
 (c) 112.32
 (d) 112.38
80. The weighted aggregative price index numbers for 2001 with 2000 as the base year using Fisher's Index Number is

Commodity	Price (in ₹)		Quantities	
	2000	2001	2000	2001
A	10	12	20	22
B	8	8	16	18
C	5	6	10	11
D	4	4	7	8

- (a) 112.32
 (b) 112.20
 (c) 112.38
 (d) 112.26
81. Related to time series deleted from the syllabus
82. There were 200 employees in a office in which 150 were married. Total male employees were 160 out of which 120 were married. What was the number of female unmarried employees?
 (a) 30

- (b) 40
 - (c) 50
 - (d) 10
- 83.** Data collected on religion from the census report are
- (a) Primary data
 - (b) Unclassified data
 - (c) Sample data
 - (d) Secondary data
- 84.** Which of the following diagram is the most appropriate to represents various heads in total cost?
- (a) Pie chart
 - (b) Bar graph
 - (c) Multiple line chart
 - (d) Scatter plot
- 85.** In a graphical representation of data, the largest numerical value is 4 the smallest numerical value is 25. If classes desired are 4 then which class interval is
- (a) 45
 - (b) 5
 - (c) 20
 - (d) 7.5
- 86.** In graphical representation of data, ideographs are also called as
- (a) Picto-graphs
 - (b) Asymmetry graphs
 - (c) Symmetry graphs
 - (d) Pictograms
- 87.** ____ means separating items according to similar characteristics grouping them into various classes.
- (a) Classification
 - (b) Editing
 - (c) Separation
 - (d) Tabulation
- 88.** Frequency density of a class interval is the ratio of _____
- (a) Class frequency to the total frequency
 - (b) Class length to class frequency
 - (c) Class frequency to the cumulative
 - (d) Frequency of that class interval to the corresponding class length
- 89.** A graph that uses vertical bars to represent data is called a
- (a) Line graph
 - (b) Scatter plot
 - (c) Vertical graphs
 - (d) Bar graph
- 90.** A biased coin is such that the probability of getting a head is thrice the probability of getting a tail. If the coin is tossed 4 times, what is the probability of getting a head all the times?
- (a) $\frac{2}{5}$
 - (b) $\frac{81}{128}$
 - (c) $\frac{81}{256}$
 - (d) $\frac{81}{64}$

91. If there are 16 phones, 10 of them are Android and 6 of them are of Apple, then the probability of 4 randomly selected phones to include 2 Android and 2 Apple phone is
- 0.47
 - 0.51
 - 0.37
 - 0.27
92. If there are 48 marbles marked with numbers 1 to 48, then the probability of selecting a marble having the number divisible by 4 is
- $1/2$
 - $2/3$
 - $1/3$
 - $1/4$
93. If in a class, 60% of the student study Mathematics and Science and 90% if the student study Science, then the probability of a student studying Mathematics given that he/she is already studying Science is
- $1/4$
 - $2/3$
 - 1
 - $1/2$
94. A bag contains 7 Blue and 5 Green balls. One ball is drawn at random. The probability of getting a Blue ball is _____
- $5/12$
 - $12/35$
 - $7/12$
 - 0
95. The probability that a football team loosing a match at Kolkata is $3/5$ and winning a match at Bengaluru is $6/7$, the probability of the team winning at least on match is _____
- $3/35$
 - $18/35$
 - $32/35$
 - $17/35$
96. The value of K for the probability density function of a variate X is equal to
- | | | | | | | | |
|--------------|----|----|----|----|----|----|-----|
| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| P (X) | 5K | 3K | 4K | 6K | 7K | 9K | 11K |
- 39
 - $1/40$
 - $1/49$
 - $1/45$
97. In normal distribution, mean, median and mode are
- Zero
 - Not Equal
 - Equal
 - Null
98. If X is a Poisson variate such that $P(x = 1) = 0.7$, $(x = 2) = 0.3$, then $P(x = 0) =$
- $e^{6/7}$
 - $e^{-6/7}$
 - $e^{-2/3}$

(d) $e^{-1/3}$

99. If X is a binomial variate with $p = 1/3$, for the experiment of 90 trials, then the standard deviation is equal to

(a) $-\sqrt{5}$

(b) $\sqrt{5}$

(c) $2\sqrt{5}$

(d) $\sqrt{15}$

100. For a certain type of mobiles, the length of time between charges of the battery is normally distribution with a mean of 50 hours and a standard deviation of 15 hours. A person owns the probability that the length of time will be between 50 and 70 hours is (Given $\Phi(1.33) = 0.9082$, $\Phi(0) = 0.5$)

(a) -0.4082

(b) 0.5

(c) 0.4082

(d) -0.5