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ORIGINAL PAPER

1. A box has 5 blacks and 3 green shirts. One shirt is picked randomly and put another box. The second box has 3 black and 5 green shirts. Now a shirt is picked from second box. What is the probability of it being a black shirt?
   (a) $\frac{4}{9}$ (b) $\frac{29}{72}$ (c) $\frac{8}{72}$ (d) $\frac{3}{16}$

2. What is the probability of getting a sum 9 from two throws of dice?
   (a) $\frac{1}{3}$ (b) $\frac{1}{9}$ (c) $\frac{1}{12}$ (d) $\frac{2}{9}$

3. The predicted rate of response of the dependent variable to change in the independent variable is called:
   (a) Slope (b) Intercept
   (c) Error (d) Regression equation

4. If the value of any regression coefficient is zero., then two variables are:
   (a) Qualitative (b) Correlation
   (c) Dependent (d) Independent

5. If the mean is 11 and median is 13, then value of mode is
   (a) 15 (b) 13 (c) 11 (d) 17

6. Which term of the AP 92, 88, 84, 80, … is 0?
   (a) 22 (b) 23 (c) 24 (d) 32

7. $(1) + (1+1) + (1+1+1) + (1+1+1+\dots n-1 \text{ times }) =$?
   (a) $\frac{n(n+1)}{2}$ (b) $\frac{n(n-1)}{2}$
   (c) n^2 (d) n

8. If roots of $x^2 - 5x + a = 0$ are equal, then $a =$?
   (a) $\frac{25}{5}$ (b) $\pm \frac{25}{4}$
   (c) $\frac{25}{4}$ (d) None pof above

9. Given that limit exits find
   $lt_{(x,y,x)\to(-2,-2,-2)} \frac{\sin((x+2)(y+5)(z+1))}{(x+2)(y+7)}$
   (a) 1 (b) 3/5 (c) 1/2 (d) 0

10. Two men on a $3 - D$ surface want to meet each other. The surface is given by $f(x,y) = \frac{x^{-6}y^7}{x+y}$.
    They make their move horizontally or vertically with the $X - Y$ plane as their reference. It was observed that one man was initially at $(200, 400)$ and the other at $(100,100)$. Their met point is decided as $(0,0)$. Given that they travel in straight lines, will they meet?
    (a) They will meet
    (b) They will not meet
    (c) They meet with probability 0.5
    (d) None of these

11. The graph of the function $y = f(x)$ is symmetrical about the line $x = 2$, then
    (a) $f(x + 2) = f(x - 2)$
    (b) $f(2 + x) = f(2 - x)$
    (c) $f(x) = f(-x)$
    (d) $f(x) = -f(-x)$

12. $\cos^2 2\theta =$?
    (a) $1 - \sin^2 \theta$
    (b) $1 + \sin^2 \theta$
    (c) $1 - \sin^2 2\theta$
    (d) $1 - \sin \theta$

13. Considering Cosine Rule of any triangle ABC, possible measures of angle A includes
    (a) angle A is obtuse
    (b) angle A is acute
    (c) angle A is right angle
    (d) all of above

14. For a skew symmetric even ordered matrix A of integers, which of the following will not hold true?
    (a) $\det(A) = 9$ (b) $\det(A) = 81$
    (c) $\det(A) = 7$ (d) $\det(A) = 4$

15. Which of the following property of matrix multiplication is correct?
    (a) Multiplication is not commutative in general
    (b) Multiplication is associative
    (c) Multiplication is distributive over addition
    (d) All of the mentioned

16. The area enclosed by $3|x| + 4|y| \leq 12$ is
    (a) 6 square units (b) 12 square units
    (c) 24 square units (d) 36 square units

17. Power set of empty set has exactly ……… subset.
    (a) one (n) two (c) zero (d) three

18. Transpose of a column matrix is
    (a) zero matrix (b) diagonal matrix

(c) column matrix   (d) row matrix

19. Constant zero solution of linear ordinary differential equation is called
(a) trivial equation   (b) bypass equation
(c) logical equation   (d) singular equation

20. Dot product of two vectors $\vec{a}$ and $\vec{b}$ is termed as
(a) outer product   (b) inner product
(c) Cartesian Product   (d) Vector Product

21. If $f(x) = \max\{x, x^3\}$, then the number of points where $f(x)$ is not differentiable, are
(a) 1   (b) 2   (c) 3   (d) 4

22. If $y = a\log|x| + bx^2 + x$ has its extreme values at $x = -1$ and $x = 2$, then
(a) $a = 2, b = -1$ (b) $a = 2, b = -\frac{1}{2}$
(c) $a = -1, b = \frac{1}{2}$ (d) None of these

23. If A and B are coefficient of x^n in the expansion of $(1+x)^{2n}$ and $(1+x)^{2n-1}$ respectively, then A/B equals
(a) 1   (b) 2   (c) 1/2   (d) $1/n$

24. What is the cardinality of the Power set of the set $\{0, 1, 2\}$
(a) 8   (b) 6   (c) 7   (d) 9

25. Consider a line passing through $(1,2)$ and $(4,8)$, gradient of this line is equal to:
(a) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) 2   (d) -2

26. If ω is an imaginary cube root of unity, then $(1 + \omega - \omega^2)^7$ is equal to
(a) 128ω (b) -128ω
(c) $128\omega^2$ (d) $-128\omega^2$

27. The complex number $(\sin x + i\cos 2x)$ and $(\cos x - i\sin 2x)$ are conjugate to each other, for
(a) $x = n\pi$ (b) $x = 0$
(c) $x = \left(n + \frac{1}{2}\right)\pi$ (d) No value of x

28. The points $z1, z2, z3, z4$ in the complex plane are the vertices of a parallelogram taken in order, if and only if
(a) $z1 + z4 = z2 + z3$
(b) $z1 + z3 = z2 + z4$
(c) $z1 + z2 = z3 + z4$
(d) None of these

29. Linear programming model which involves fund allocation of limited investments is classified as
(a) Ordination budgeting model
(b) capital budgeting models
(c) fund investments models
(c) funds origin models

30. According to the system of constraints, solution set graphical representation is classified as
(a) region of ordinate solutions
(b) region of intercept solutions
(c) region of vertex solutions
(d) region of feasible solutions

31. Points within set are connected by line segment must follow condition that points must be
(a) included in set
(b) not included in set
(c) included in function
(d) included in objective

32. In mathematical programming, goals represented by objective function include.
(a) profit level
(b) total cost and revenue
(c) percent rate on investment
(d) all of baove

33. Coordinates of midpoint of line joining two points $(16,4)$ and $(36,6)$ are
(a) $(26,5)$ (b) $(5,26)$
(c) $(10,1)$ (d) $(1,10)$

34. In how many ways can a group of 5 men and 2 women be made out of a total 7 men and 3 women?
(a) 63   (b) 90
(c) 126   (d) None of these

35. For individual observations, reciprocal of arithmetic mean is called
(a) geometric mean   (b) harmonic mean
(c) deviation square mean   (d) paired mean

36. AP whose n^{th} term is $2n - 1$ is
(a) 1, 3, 6, …
(b) 2, 3, 5, ...
(c) 1, 3, 5, ...
(d) 5, 3, 1 ...

37. The equation of the straight line passing through the point $(3,2)$ and perpendicular to the line $y = x$ is
(a) $X - Y = 5$ (b) $X + Y = 5$
(c) $X + Y = 1$ (d) $X - Y = 1$

38. Specifying a straight line, how many geometrical parameters should be known?
(a) 1   (b) 2   (c) 3   (d) 4

39. A point equidistant from the lines $4x + 3y + 10 = 0$, $5x - 12y + 26 = 0$ and $7x + 24y - 50 = 0$ is
(a) $(1, -1)$ (b) $(1,1)$
(c) $(0,0)$ (d) $(0,1)$

40. One vertex of the equilateral triangle with Centroid at origin and one side as $x + y - 2 = 0$ is

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

41. Two bus tickets from city A to B and three tickets from city A to C cost Rs.77 but three tickets from city A to C cost $Rs.73$. What are the fares for cities B and C from A?
(a) Rs.17, Rs. 13 (b) Rs.4, Rs. 23
(c) Rs. 13, Rs.17 (d) Rs. 15, Rs. 14

42. In the group $G = \{2,4,6,8\}$ under multiplication modulo 10, the identity element is
(a) 6 (b) 8 (c) 4 (d) 2

43. A partition of $\{1, 2, 3, 4, 5\}$ in the family
(a) $\{(1,2), (3,4), (3,5)\}$
(b) $\{\phi, (1,2), (3,4), (5)\}$
(c) $\{(1,2,3), (5)\}$
(d) $\{(1,2), (3,4,5)\}$

44. Let $P(S)$ denote the power set of set S. Which of the following is always true?
(a) $P(P(S)) = P(S)$ (b) $P(S) \cap S = P(S)\backslash$
(c) $P(S) \cap P(P(S)) = [\phi]$ (d) $S \notin P(S)$

45. Find the remainder when 67^{99} is divided by 7.
(a) 4 (b) 6 (c) 1 (d) 2

46. $G(e, a, b, c)$ is an abelian group with $'e'$ as identity element. The order of the other elements is
(a) 2, 2, 3 (b) 3, 3, 3
(c) 2, 2, 4 (d) 2, 3, 4

47. Period of $3 \sec \frac{x}{3}$ is
(a) π (b) 2π (c) 3π (d) 6π

48. The principal value of $\cos^{-1}(\cos 5)$ is
(a) 5 (b) $\pi - 5$
(c) $5 - \pi$ (d) $2\pi - 5$

49. If $\sin t = \frac{1}{5}$ and $0 < t < \frac{\pi}{2}$, then $\cos(4t) = ?$
(a) 0.3464 (b) 0.8
(c) 0.6928 (d) -0.6928

50. Find the value of $\int \frac{1}{4x^2+4x+5} dx$ is
(a) $\frac{1}{8} \sin^{(-1)}\left(x + \frac{1}{2}\right)$
(b) $\frac{1}{4} \tan^{(-1)}\left(x + \frac{1}{2}\right)$
(c) $\frac{1}{8} \sec^{(-1)}\left(x + \frac{1}{2}\right)$
(d) $\frac{1}{4} \cos^{(-1)}\left(x + \frac{1}{2}\right)$

51. A computer controlled device for training exercises that duplicates the work environment is a
(a) Simulator (b) Duplicator
(c) Trainer (d) None

52. Multi user systems provided cost savings for small business because they use a single processing unit too link several
(a) Personal Computers (b) Workstations
(c) Dumb terminals (d) Mainframes

53. Which part of the computer is used for calculating and comparing?
(a) Disk Unit (b) Control Unit
(c) ALU (d) Modem

54. Which of the following memories need refresh?
(a) SRAM (b) DRAM
(c) ROM (d) All of the above

55. The ALU of a computer normally contains a number of high speed storage element classed
(a) Semiconductor memory
(b) Registers
(c) Hard Disk
(d) Magnetic Disk

56. The representation of decimal number 532.86 in the form of decimal is
(a) 532.65 (b) 532.68
(c) 531.67 (d) 531.68

57. The quantity of double word is
(a) 8 bits (b) 16 bits
(c) 32 bits (d) 64 bits

58. Which protocol provides e-mail facility among different hosts?
(a) FTP (b) SMTP
(c) TELNET (d) SNMP

59. COCOL is an acronym for
(a) Common Basics Oriented Language
(b) Common Oriented Business Language
(c) Common Business Oriented Language
(d) None

60. Which of the following are real time systems?
(a) an on-line real reservation system
(b) a process control system
(c) Aircraft control System
(d) Payroll processing system

61. Which one of the following input devices is user-programmable?
(a) Dumb terminal (b) Smart Terminal
(c) VDT (d) Intelligent terminal

62. A name or number used to identify a storage location is called
(a) A byte (b) A record
(c) An address (d) All of above

63. Full form of URL is?
(a) Uniform Resource Locator

(b) Uniform Resource Link

(c) Uniform Registered Link

(d) Unified Resource Link

64. Second generation of computers consists of which of the following?

(a) Vacuume Tubes   (b) Diodes

(c) VLSI Microprocessors   (d) Transitors

65. MPG is an extension of which type of files?

(a) Audio   (b) Image

(c) Video   (d) Flash

66. Which is odd one?

(a) Inkjet Printers   (b) CRT

(c) Laser Printers   (d) Dot Matrix Printers

67. Which type of switching is used in Internet?

(a) Packet   (b) Telephone

(c) Circuit   (d) Telex

68. What is the meaning of OSI, in terms of computers?

(a) Open Software Interrelation

(b) Open System Interrelation

(c) Open software Interconnection

(d) Open System Interconnection

69. What is meaning of EEPROM?

a) Electronically Erasable Programmable Read Only Memory

b) Electrically Erasable Programmable Read Only Memory

c) Electronically Erasable Programmable Reach Only Memory

d) Electrically Erasable Programmable Reach Only Memory

70. Which among following is responsible for finding and loading operating system into RAM?

(a) Bootstrap Loader   (b) CMOS

(c) BIOS   (d) DMOS

71. Three persons A, B and C are standing in a queue. There are five persons between A and B and eight persons between B and C. If there be three persons ahead of C and 21 persons behind A, what could be the minimum number of persons in the queue?

(a) 40   (b) 27   (c) 41   (d) 28

72. A class of boys stands in a single line; one boy is 19th in order from both the ends, How many boys are there in the class?

(a) 39   (b) 37   (c) 27   (d) 38

73. 517, 235, 639, 841, 792 What will be the first digit of the second highest number after the positions of only the 2nd, 3rd digits within ech number are interchanged?

(a) 7   (b) 8   (c) 9   (d) 2

74. What should come next in the following number series?

9 8 7 6 5 4 3 2 1 8 7 6 5 4 3 2 1 7 6 5 4 3 2 1

(a) 9   (b) 8   (c) 6   (d) 5

75. P, Q, R, S, T, U, V and W are sitting round the circle and are facing the centre:

P is second to the right of T who is the neighbor of R and V.

S is not neighbor of P.

V is the neighbor of U.

Q is not between S and W. W is not between U and S.

Then who is sitting opposite to U?

(a) Q   (b) R   (c) P   (d) W

76. A shepherded had 27 sheep. All but 10 died. How many he left with?

(a) 17   (b) 27   (c) 10   (d) Zero

77. A is three times old as B. C was twice – as old as A four years ago. In dour years time, a will be 31. What are the present ages of B and C.

(a) 9, 50   (c) 9, 46

(c) 10, 46   (d) 10, 50

78. In a group of 15 people, 7 read French, 8 Read English while 3 of them read none of these two. How many of them read French and English both?

(a) 15   (b) 12   (c) 18   (d) 20

79. Find the least number which leaves a remainder of 3 when divided by 5, 6, 7 and 8, but leaves no remainder when divided by 9?

(a) 1458   (b) 1683   (c) 1692   (d) 1598

80. Find out the wrong number in the given sequence of numbers.

22, 33, 66, 99, 121, 279, 594

(a) 33   (b) 121   (c) 279   (d) 594

81. Find out the wrong number in the given sequence of numbers.

6, 13, 18, 25, 30, 37, 40

(a) 37   (b) 30   (c) 40   (d) 25

82. Insert the missing number

8, 7, 11, 12, 14, 17, 17, 22, (…)

(a) 27   (b) 27   (c) 20   (d) 22

83. Insert the missing number

16, 33, 65, 131, 261, (…)

(a) 523   (b) 613   (c) 521   (d) 721

84. If COMPLETED is codes as MOCELPDET, then DIRECTION will be coded as:

(a) RIDTCENOJ   (b) SIDTCENOI

(c) RIDTCENOI   (d) RIETCENOI

85. In a code language COMPUTER is written as RETUPMOC. How is MACHINE written in the same code
   (a) DHFTCHS   (b) HGTIRDM
   (c) ENIHCAM   (d) HGRMSCH

86. If COOL is coded as DQRP, then write the code for HOT
   (a) JQW   (b) IQW
   (c) IQX   (d) IPW

87. Pointing to a girl in photograph. Amar said, "Her mother's brother is the only son of my mother's father." How the girl's mother related to Amar?
   (a) Mother   (b) Sister
   (c) Aunt   (d) Grandmother

88. A is the son of B. C, B's sister has a son D and a daughter E. F is the maternal uncle of D. How is E related to F?
   (a) Sister   (b) Mother
   (c) Cousin   (d) Niece

89. The question given below has a set of three or four statements. Each set of statements is further divided into three segments. Choose the alternative where the third segment in the statement can be logically deducted using both the preceding two, but not just from one of them.
   Statement – I. All papers are books.
   II. All bags are books.
   III. Some purses are bags.
   Conclusions – I. Some papers are bags.
   II. Some books are papers.
   III. Some books are purses.
   (a) Only I follows.
   (b) Only II follows.
   (c) Only I and II follows.
   (d) Both I and II follows.

90. Study the information given below carefully, and answer the questions that follow?
   On a stage, D, N, A and P are standing as described below facing North.
   1) N is 2.5 m to the west of A.
   2) K is 4 m to the right of A.
   3) D is 6 m to the south of K.
   4) P is 9 m to the north of D.
   If a boy walks from N, meets A followed by K, D and then P, how many metres has he walked if he has travelled the straight distance all through?
   (a) 15m   (b) 18m   (c) 21.5m   (d) 22.5m

91. Synonym of ACQUIANT
   (a) Withhold   (b) Conceal
   (c) Familiarise   (d) Risky

92. Synonym of AGGRAVATE
   (a) Decline   (b) Acquire
   (c) Excited   (d) Irritate

93. A remedy for all disease is
   (a) Medicine   (b) Panacea
   (c) Medical   (d) Medica

94. The mistake of placing something in the wrong period of time:
   (a) Misdate   (b) Anachronism
   (c) Misplacement   (d) Prolepsis

95. Find the most opposite meaning of SUBVERSION
   (a) Destabilization   (b) Clarity
   (c) Compliance   (d) Sanity

96. Find the word just opposite to PROVOKE
   (a) Insult   (b) Anger
   (c) Encourage   (d) Soothe

97. Choose the grammatically correct sentences out of the given options
   (a) He parked the car in the front of the bakery.
   (b) He parked an car in the front of the bakery.
   (c) He park the car in the front of the bakery.
   (d) He parked car in the front of the bakery.

98. Which word of the following means 'extremely or unusually small'?
   (a) Webbed   (b) Diminutive
   (c) Awkward   (d) Farthest

99. What is the meaning of the word 'gait'?
   (a) Threshold   (b) Entrance
   (c) Manner of Walking   (d) Speed

100. Fill in the blanks with the correct prepositions.
   We will be staying _____ Kolkata_____next Saturday.
   (a) on, from   (b) for, from
   (c) by, by   (d) in, till

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