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(FOR THE CANDIDATES ADMITTED **24UCS1A1**

DURING THE ACADEMIC YEAR 20 ONLY) **REG.NO. :**

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : NOVEMBER 2024

BSC.COMPUTER SCIENCE(AIDED & SF) **MAXIMUM MARKS: 75**

SEMESTER - I **TIME : 3 HOURS**

PART - III

24UCS1A1 – MATHEMATICS I –STATISTICAL METHODS & LINEAR ALGEBRA

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. What is the mean of the following numbers: 23, 45, 87, 40, 50?
   (a) 49 (b) 59 (c) 65 (d) 34
2. For a random sample of 9 women, the average resting pulse rate is x = 76 beats per minute, and the sample standard deviation is s = 5. The standard error of the sample mean is_____
   (a) 0.557 (b) 0.745 (c) 1.667 (d) 2.778
3. An event in the probability that will never happen is called as_____
   (a) Unsure event (b) Sure event (c) Possible event (d) Impossible event
4. If A is Skew Symmetrical Matrix, then A^t _____
   (a) Diagonal Matrix (b) A (c) –A (d) 0
5. The modulus of Eigenvalues of an Orthogonal Matrix is_____
   (a) 0 (b) -1 (c) 1 (d) 2

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)

6. Write the formula for finding Regression.
7. What is standard error in Sampling Theory.
8. Define Probability.
9. Define Unit Vector.
10. Write the formula for finding Inverse of a Matrix.

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Explain Mean and their types with suitable example.

(OR)

b) From the following data find the value of median

Income (Rs)	4000	4500	5800	5060	6600	5380
No. of Persons	24	26	16	20	6	30

(CONT…2)

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12. a) A Coin was tossed 400 times and the head turned up 216 times. Test the hypothesis that the coin is unbiased.

(OR)

b) Explain the properties of t-Distribution.

13. a) Prove Multiplication Theorem with example.

(OR)

b) A person is known to hit the target in 3 out of 4 shots, whereas another person is known to hit the target in 2 out of 3 shots. Find the Probability of the target being hit at all they both try.

14. a) Multiply these matrices in two ways. First. rows of A times columns of B. Second, columns of A times rows of B. That unusual way produces two matrices that add to AB. How many separate ordinary multiplications are needed?
Both ways

$$\mathbf{AB} = \begin{bmatrix} 3 & 4 \\ 1 & 5 \\ 2 & 0 \end{bmatrix} \begin{bmatrix} 2 & 4 \\ 1 & 1 \end{bmatrix} = \begin{bmatrix} 10 & 16 \\ 7 & 9 \\ 4 & 8 \end{bmatrix}$$

(OR)

b) Write the rules for matrix operations.

15. a) Draw the row and column pictures for the equations x - 2y = 0, x+ y = 6.

(OR)

b) Solve the equations by Cramer's Rule.
x+y+z=2, x-2y+z=3, 2x-y-3z=-1.

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.(K4 (Or) K5)

16. a) Find the Standard Deviation from the following data

Age Under	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**
No. of Persons dying	**15**	**30**	**53**	**75**	**100**	**110**	**115**	**125 (288)**

(OR)

b) The ranking of 10 students in two subjects A and B are as follows

A	**6**	**5**	**3**	**10**	**2**	**4**	**9**	**7**	**8**	**1**
B	**3**	**8**	**4**	**9**	**1**	**6**	**10**	**7**	**5**	**2**

Calculate Rank Correlation Coefficient (406)

17. a) Calculate the Standard Error of Mean from the following data showing the amount paid by 100 firms in Calcutta on the occasion of Durga Puja:

Mid Value (Rs.)	39	49	59	69	79	89	99
No. of firms	2	3	11	20	32	25	7 (903)

(OR)

b) Illustrate the steps for conducting a Hypothesis Test for a Population Mean with example.

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(CONT…3)

18. a) A bag contains 5 White and 3 Black balls. Two balls are drawn at random one after the other without replacement. Find the Probability that both balls drawn are back.

(OR)

b) A box contains 5 white and 8 red balls**.** Two drawings of 3 balls are made such that (a) the balls are replaced before the second trail, and (b) the balls are not replaced before the second trail. Find the Probability that the first drawing will give 3 White and the second 3 Red balls in each case.

19. a) The linear combinations of v = (1, 1,0) and w = (0, 1, 1) fill a plane. Describe that plane. Find a vector that is not a combination of v and w.

(OR)

b) Find the Symmetric Factorization $A = LDL^T$ for the matrix $A=\begin{pmatrix} 1 & 4 & 5 \\ 4 & 2 & 6 \\ 5 & 6 & 3 \end{pmatrix}$.

Is this A invertible? Find also the P Q = L U factorization for Q, which needs row exchanges.

20. a) Find the eigenvalues and eigenvectors of A and A^2 and A^{-1} and A+4I:

$$A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix} \text{ and } A^2 = \begin{bmatrix} 5 & -4 \\ -4 & 5 \end{bmatrix}$$

Check the trace $\lambda 1+\lambda 2$ and the determinant $\lambda 1 \lambda 2$ for A and also A^2.

(OR)

b) Find the Axes of this tilted Ellipse $5x^2+ 8xy+ 5y^2 = 1$.

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