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(FOR THE CANDIDATES ADMITTED **25UCS1A1**

DURING THE ACADEMIC YEAR 2025ONLY) **REG.NO. :**

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

END-OF-SEMESTER EXAMINATIONS :NOVEMBER-2025

B. Sc (Computer Science)Aided-SF **MAXIMUM MARKS: 75**

SEMESTER: I **TIME : 3 HOURS**

PART - III

25UCS1A1– MATHEMATICS – STATISTICAL METHODS & LINEAR ALGEBRA

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. Measure of central tendency is _____

   (a)Mean Deviation (b) Quartile Deviation(c) Standard Deviation (d) Mean

2. If the null hypothesis is false then which of the following is accepted?

   (a)Null Hypothesis (b) Positive Hypothesis

   (c) Negative Hypothesis (d) Alternative Hypothesis.

3. The number of ways of arranging the letters of the words DANGER, so that no vowel occupies odd place,is_____

   (a) 36 (b) 48 (c) 144 (d) 96

4. In replacement analysis the maintenance cost is a function of_____

   (a**)** time (b) resale value (c) initial investment (d) none of these

5. EOQ stands for_____

   (a) Ensemble Ordering Quantity (b) Electronic Ordering Quantity

   (c**)** Economic Ordering Quantity (d) Electrical Ordering Quantity

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

6.Define median.

7. Define standard error.

8.Write the condition for independent event.

9.Write the formula for length of matrix.

10.Define similar matrix.

SECTION – B (5 X 5 = 25 MARKS)

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

11. a) Find mean for the following data:

No.oflabours	0-10	10-20	20-30	30-40	40-50	50-60
No.of days working	2	6	9	7	4	2

(OR)

(CONTD …. 2)

b)Find rank correlation coefficient for the following data:

X	78	89	96	69	59	79	68	62
Y	121	72	88	60	81	87	123	92

12.a)A random sample of 800 units from a large consignment showed that 200 were damaged. find 95% confidence limit for the population proportion of damaged units in the consignment

(OR)

b) A soap manufacturing company was distributing a particular brand of soap through a large number of retails shop. Before a heavy advertisement campaign, the mean sale per week per shop was 140 dozen. After the campaign, a sample of 26 shops was taken and the mean sales was found to be 147 dozen with standard deviation 16. Can you consider the advertisement effective?-Justify

13.a)Find $\cos\theta$ for the vector $v = \begin{bmatrix}2\\1\end{bmatrix}$ and$w = \begin{bmatrix}1\\2\end{bmatrix}$.

(OR)

b) Reduce this system to upper triangular form by two operations:$2x + 3y + z = 8$, $4x + 7y + 5z = 20. -2y + 2z = 0$. circle the pivots, solve by back substitution for z, y, x.

14.a)Use row operation to show that the $det\begin{bmatrix}1 & a & a^2\\1 & b & b^2\\1 & c & c^2\end{bmatrix} = (b-a)(c-a)(c-b)$.

(OR)

b)Show that A and B are similar by finding M so that $B = M^{-1}AM$ for $A = \begin{bmatrix}1 & 1\\1 & 1\end{bmatrix}$ and $B = \begin{bmatrix}1 & -1\\-1 & 1\end{bmatrix}$.

15.a) Find the determinant of the matrix $A = \begin{bmatrix}1 & 2 & -1\\3 & 8 & 2\\4 & 9 & -1\end{bmatrix}$.

(OR)

b) Check the matrix $A = \begin{bmatrix}2 & -1 & 0\\-1 & 2 & -1\\0 & -1 & 2\end{bmatrix}$ is positive definite.

SECTION – C (5 X 8 = 40 MARKS)

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

16. a)Find Quartile Deviation for the following data:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No.of student	5	7	8	12	28	22	10	8

(OR)

b) Find Regression for the following data:

X	1	2	3	4	5
y	2	5	3	8	7

(CONT….3)

17.a) A company producing LED bulbs fund that means life span of the population of its bulbs is 2000 hours with a standard deviation of 150 hours. A sample of 100 bulbs randomly chosen is found to have the mean life span of 1950 hours. Test at 5% level of signification whether the mean life span of the bulbs is significantly different from 2000 hours

(OR)

b)The heights of 10 males of a given locality are found to be 70, 67, 62, 68, 61, 68, 70, 64, 64, 66 inches. Is it reasonable to believe that the average height is greater than 64 inches? Test at 5% significance level assuming that for a degree of freedom P (t>1.83) =0.05.

18. a)Two cards are drawn from a pack of 52 cards in succession. Find the probability that both are jack when the first drawn card is (i) replaced (ii) not replaced

(OR)

b)A coin is tossed twice. Events E and F are defined on second toss. Find
$(i)P(E \cup F)\ (ii)\ P(E|F)\ (iii)\ P(\bar{E}|F)\ (iv)\ are\ the\ \ events\ E\ and\ F\ is\ independent.$

19.a)Multiply these row exchange matrices in the order $PQ, QP\ and\ P^2$ for $P = \begin{bmatrix}0 & 1 & 0\\1 & 0 & 0\\0 & 0 & 1\end{bmatrix}\ and$

$Q = \begin{bmatrix}0 & 0 & 1\\0 & 1 & 0\\1 & 0 & 0\end{bmatrix}$. Find another non-diagonal matrix whose square is $M^2 = I$.

(OR)

b)Verify that $(AB)^T$ equals B^TA^T but those are different from A^TB^T for $A = \begin{bmatrix}1 & 0\\2 & 1\end{bmatrix}$,

$B = \begin{bmatrix}1 & 3\\0 & 1\end{bmatrix}$.If AB=BA how do you prove that$B^TA^T = A^TB^T$.

20.a) Solve this linear equation by Cramer's Rule

$2x_1 + x_2 = 1, x_1 + 2x_2 + x_3 = 0, x_2 + 2x_3 = 0.$

(OR)

b) Find the Eigen value and Eigen vectors of the matrix $A = \begin{bmatrix}1 & -1 & 0\\-1 & 2 & -1\\0 & -1 & 1\end{bmatrix}$

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