1. All questions are compulsory.
2. The question paper consists of 8 questions.
3. Question number 1 is a multiple choice type question of one mark.
4. Question number 2 is a very short answer type question of one mark.
5. Question numbers 3 to 4 are short answer type -I question of two marks each.
6. Question numbers 5 to 6 are short answer type -II question of three marks each.
7. Question numbers 7 to 8 are Long answer type -I question of four marks each.
8. There is no overall choice in the paper. However internal choice is provided in 1 question of 3 marks and in 1 question of 4 marks.
9. Use of calculators is not permitted.

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1. The value of the determinant remains unchanged if - - - - -.
   (A) any two rows or columns are interchanged
   (B) the number of rows is equal to number of columns
   (C) Any two rows or columns are identical
   (D) its rows and columns are interchanged

2. Define sacrificing ratio.

3. Find x,y,z if $\left\{ 2\begin{bmatrix} 2 & 1 \\ -1 & 0 \\ 3 & 1 \end{bmatrix} - \begin{bmatrix} 3 & 2 \\ -3 & 1 \\ 4 & 1 \end{bmatrix} \right\} \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$.

4. The cost function of a firm is given by $C(x) = 2x^2 + x - 5$. Find
   (i) Average cost   (ii) Marginal cost.

5) Express the matrix $A = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$ as the sum of symmetric and skew-symmetric matrix.

6) If the Profit function is given as $P(x) = 112x - 500 - \frac{28}{15}x^2$. Find the level of output for which the profit is maximum.

OR

Given the cost function $C(x) = 300x - 10x^2 + \frac{1}{3}x^3$. Calculate the output at which Marginal Cost is minimum.

7. Solve the following system of equations using matrix method

$2x - 3y + 5z = 11$
$3x + 2y - 4z = -5$
$x + y - 2z = -3$

8. X, Y and Z enter into a partnership with capitals of Rs 15,000, Rs 12,000 and Rs 9,000 respectively. The partnership agreement provides for 5% interest on capitals, an annual salary of Rs 3,000 to X and an expense allowance of Rs 600 to Z before distributing profits of the firm. Find the share received by each partner in a profit of Rs 12,000 after one year, if they agree to share the profit in proportion to their respective capitals.

OR

Rajesh starts a business with a capital of Rs 4,00,000. After 3 months, he is joined by Mahesh who brings in Rs 6,00,000. After six months, Shiela joins with a capital of Rs 10,00,000. The year's profit is Rs 5,40,000. What is the profit of each partner, if they share profit in the ratio of adjusted capital invested by them?

*** The End ***