Stat.1101   Business Mathematics (2+1)   Marks: 50

Time: 2 hours

I   Fill in the blanks (10x1=10)

1   If $4, x, 9$ are in Geometric Progression then the value of x is -----------

2   Sum of squares of first 'n' natural numbers is -----------

3   If all terms of an AP are multiplied by the same quantity the resulting sequence is in ------

4   A square matrix is said to be singular if its determinant is ---------------

5   $Log_a (MN) = $ -----------

6   The area included between the curve $y = f(x)$, the x-axis and the ordinates $x = a$ and $x = b$ ----------

7   Rate of change of 'y' with respect to time 't' is -----------

8   If $x = at^2$ and $y = 2at$ then $\dfrac{dy}{dx} = $ -----------

9   The product of the matrix A and its inverse is -------------

10 Derivative of $log x = $ -----------

II   Answer ANY FIVE of the following (5x2=10)

1   Find the sum of $6 + 9 + 12 + \ldots + 30$

2   Find the 12th term of series $4, 12, 36, \ldots \ldots$

3   Distinguish between singular and non singular matrix

4   Distinguish between symmetric and skew symmetric matrices

5   Define inverse of a matrix. Write down the steps to find the inverse of a matrix of order 2

6   Write down the product rule of differentiation

7   $x = 16t + 5t^2$ find $\dfrac{d^2x}{dt^2}$.

II   Answer ANY FIVE of the following (5x4=20)

1   Write any four properties of determinant

2   Evaluate without expanding $\begin{vmatrix} a & a+b & a+b+c \\ 2a & 3a+2b & 4a+3b+2c \\ 3a & 6a+3b & 10a+6b+3c \end{vmatrix}$

P T O

3   The cost function C of manufacturing a certain article is given by the formula

$$C = 5 + \frac{48}{x} + 3x^2$$

where x is the number of articles manufactured. Find minimum value of C .

4   State the rule of integration by parts and use this rule to evaluate $\int xe^x dx$

5   Evaluate $\int \left[\sqrt{x} - \frac{2}{3} x^{1/3} \right] dx$

6   If $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 & 2 \\ 3 & 2 & 5 \end{bmatrix}$ find $2A + 3B$ and $3A - 2B$.

7   If $\begin{bmatrix} x - y & 2x + 3 \\ 2z - y & 3z + w \end{bmatrix} = \begin{bmatrix} -2 & 5 \\ 0 & 13 \end{bmatrix}$ find x, y, z and w.

IV   Answer ANY ONE of the following   (1x10=10)

1   Solve the equations by matrix method

$$x + 2y - z = 3$$
$$3x - y + 2z = 1$$
$$2x - 2y + 3z = 2$$

2   Verify $A \cdot (Adj(A)) = |A| \cdot I = (Adj(A)) \cdot A$ when $A = \begin{bmatrix} 1 & 2 & 1 \\ 5 & 2 & 3 \\ 1 & 1 & 2 \end{bmatrix}$

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