Seat No. : 1181

ME-102

May-2017

B.B.A., Sem.-II

CC-112 : Business Mathematics

Time : 3 Hours] **[Max. Marks : 70**

1. (a) Find $\frac{dy}{dx}$: 4

(i) $Y = 2x^3 \cdot \log x$

(ii) $Y = (2x - 5) / (x + 2)$

OR

Find $\frac{dy}{dx}$:

(i) $Y = (3x^2 - 2x + 7) / (3x + 2)$

(ii) $Y = e^x \cdot 2^x \cdot \log x$

(b) Find $\frac{dy}{dx}$ for $y = 5x^2 - 25$ by using method of definition. 5

OR

Find $\frac{dy}{dx}$ for $y = (2x^2 + 7x - 54)^{15}$

(c) The price of a commodity X increases from ₹ 3 to ₹ 3.5 and its supply increases from 1200 kg to 1500 kg. Calculate the elasticity of supply. 5

OR

Find AR and MR for $R(x) = 250x + 7x + (10x^2)/2$.

Find AR and MR when $x = 5$ units.

2. (a) If $y = x^5 \cdot e^x$, then find $\frac{d^2y}{dx^2}$ 4

OR

If $y = \frac{(2x - 1)}{(x - 3)}$, then find $\frac{d^2y}{dx^2}$

(b) Find maximum and minimum value of function $y = x^3 + x^2 - 8x + 50$ 5

OR

If function of production cost $C(x) = (5x^2/30) - 3x + 50$, then find out MC for 60 units. How many units are required for becomes zero ?

(c) If $z = x^3 + 3x^2y + xy^2 + 4x + 7y^2$, then find 5

(i) $\delta^2 z/\delta x^2$

(ii) $\delta^2 z/\delta y^2$

OR

If $f(x, y) = 3x^2 - 5xy + 5y^2 + 10x - 20y$, then prove that

$\delta^2 f/\delta x \cdot \delta y = \delta^2 f / \delta y \cdot \delta x$

3. (a) If $A = \begin{bmatrix} 2 & 7 \\ 4 & -3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 \\ 0 & 5 \end{bmatrix}$

Then, verify that $(AB)^T = B^T \cdot A^T$ 4

OR

If $A = \begin{bmatrix} 1 & 3 & 2 \\ 5 & -1 & 4 \\ 2 & 0 & 1 \end{bmatrix}$, find A^2

(b) If $A = \begin{bmatrix} 3 & -5 & 7 \\ 1 & 2 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 7 & 0 \\ 3 & 5 & 2 \\ 6 & 4 & -1 \end{bmatrix}$, then find AB and BA if possible. 5

OR

Discuss the following :

(a) Symmetric Matrix

(b) Scalar Matrix

(c) Transpose of a matrix

(c) Solve the following equations and find the values of X, Y and Z. 5

$2X + 5Y + Z = 5$

$X + 3Y + 2Z = 8$

$3X + 2Y - 3Z = 7$

OR

Give the difference between matrix and determinant.

4. (a) Find simple interest and amount for ₹ 30,000 for 5 years at 12% rate of interest per annum. 4

OR

In what time ₹30,000 amount to ₹ 45,000 at 5% rate of simple interest ?

(b) Find compound interest on ₹ 40,000 at 7% rate of interest at the end of 3 years, if it is calculated : 5

(1) Half yearly

(2) Quarterly

(3) Monthly

OR

Urvi has deposited ₹ 55,000 in SBI at 7% rate of interest for 3 years, then find

(1) Simple interest gained by her

(2) Compound interest gained by her and conclude her benefit.

(c) Pratima has purchased Honda XUV by paying down payment of ₹ 7,50,000. She has to pay ₹ 30,000 annually for next 5 years at the 8% rate of interest to complete the reaming amount. What is the current price of XUV ? 5

OR

Kamal would like to have ₹ 1,00,000,00 in his bank account in 2032. How much he has to save annually at 10% rate of interest to achieve his wish till 2032 ?

5. Do the following : 14

(1) Value of determinant cannot be zero. (true/false)

(2) If $y = 3x^{20}$ then $dy/dx =$ _____

(3) When the installment is being paid at the beginning of the term, the annuity is called Ordinary Annuity. (true/false)

(4) Give an example of scalar matrix.

(5) Define Transpose of a Matrix.

(6) The formula of annuity in case of Sinking fund is _____.

(7) State any one stationary condition to get maximum and minimum value of a given function.

(8) Give an example of matrix of order 4 * 5.

(9) State division rule of derivative.

(10) At the end of 1st year simple interest and compound interest are same. (true/false)

(11) If $y = e^{-x}$, then find $\frac{d^2y}{dx^2}$

(12) Define Perpetuity.

(13) Give formula of AR and MR.

(14) Give adjective of $A = \begin{bmatrix} -2 & 3 \\ 5 & 1 \end{bmatrix}$
