MBL-010-001207-800-3

MBL-010-001207 **Seat No. _____**

B. B. A. (Sem. II) (CBCS) Examination

March / April - 2018

207 : Business Mathematics

[Old Course]

Faculty Code : 010

Subject Code : 001207

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (i) Attempt all questions.

(ii) Each question carries equal marks.

1 (a) Define the following matrices with example : **7**

(1) Equal matrices

(2) Transpose of a matrix

(3) Identity matrix.

(b) If $A = \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 6 & 0 \\ 0 & 1 & 2 \end{bmatrix}$ prove that **7**

$$(AB)^T = B^T A^T.$$

OR

1 (a) Explain Cramer's method for three linear equations. **7**

(b) Solve the following equations by Cramer's method : **7**

$$2x + 3y - z = 5$$
$$3x + 2y + z = 10$$
$$x - 5y + 3z = 0$$

2 Differentiate with respect to x : (any four) **14**

(i) $y = \dfrac{x^2}{(1+x)^2}$

(ii) $y = (3x^2 - 2)(x^2 + 7)$

(iii) $y = \log\left(\dfrac{5x+7}{3x+8}\right)$

(iv) $y = \dfrac{x^2 - 4x + 3}{x^2 - 5x + 6}$

(v) $y = (x^2 + 3x + 1)^4$

(vi) $y = e^{5x^2+3x+2}$.

3 Attempt the following : (any four) **14**

(i) $\int (x^2 - 1)^2 \, dx$

(ii) $\int x (x^2 + 4)^5 \, dx$

(iii) $\int_6^{10} \dfrac{dx}{x+2}$

(iv) $\int (e^{5x} + e^{-3x}) \, dx$

(v) $\int \dfrac{x+2}{x-3} \, dx$

(vi) $\int \dfrac{(\log x)^4}{x} \, dx$

4 (a) Obtain maximum and minimum values of 7

$$y = x^3 + 6x^2 - 15x + 7.$$

(b) If $y = x \log x$ then prove that 7

$$x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + y = 0.$$

OR

4 (a) If $z = x^2 - xy + 2y^2$ then find $\frac{\partial^2 z}{\partial x^2}, \frac{\partial^2 z}{\partial y^2}$. 7

(b) If $f(x, y) = x^3 + 2x^2y + xy^2 - y^3$ then find 7

$$\frac{\partial^2 f}{\partial x \partial y} \text{ and } \frac{\partial^2 f}{\partial y \partial x}.$$

5 (a) Explain the terms : 7

(i) Sinking fund

(ii) Effective rate of interest.

(b) What is the present value of Rs. 8,500 to be received 7

after $4\frac{1}{2}$ years at 12% compounded quarterly ?

[Take $(1.03)^{18} = 1.7$].

OR

5 (a) What is Annuity ? Derive its formula. 7

(b) Find the amount of Annuity if Rs. 4,000 is deposited annually at 12% compound rate of interest for 8 years. 7