MBJ-161100010203 Seat No. _____

B.B.A. (Sem. II) (CBCS) (W.E.F.-2016) Examination

March / April - 2018

Advance Techniques of Business Mathematics

[New Course]

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

Instructions : (i) Attempt all five questions.
(ii) Each question carries equal marks.
(iii) Marks are indicated on right side.

1 (a) Prove that : **7**

$$\begin{vmatrix} (a-1)^2 & a^2+1 & a \\ (b-1)^2 & b^2+1 & b \\ (c-1)^2 & c^2+1 & c \end{vmatrix} = 0.$$

(b) Solve : **7**

$$\begin{vmatrix} x & 5 & 5 \\ 5 & x & 5 \\ 5 & 5 & x \end{vmatrix} = 0.$$

OR

1 (a) State the properties of determinant. **7**

(b) Solve the following equations by using Cramer's rule. **7**

$$\frac{2}{x}+\frac{3}{y}=2,\ \frac{4}{x}+\frac{9}{y}=5.$$

2 (a) Define : **7**

Column matrix, Zero matrix, Square matrix, Unit matrix, Diagonal matrix, Transpose of a matrix, Skew symetric matrix.

(b) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ 2 & -3 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix}$ **7**

prove that $A(B + C) = AB + AC$.

OR

2 Solve following equations using matrix inverse method. **14**

$x + y + z = 6,\ 2x + y + z = 7,\ 3x + 2y + z = 10$

3 Find the following limits : (any four) **14**

(1) $\lim\limits_{x \to 2} \dfrac{x^3 - 6x^2 + 11x - 6}{x^2 - 6x + 8}$

(2) $\lim\limits_{x \to 2} \dfrac{x^{10} - 1024}{x^5 - 32}$

(3) $\lim\limits_{x \to 5} \dfrac{1 - \sqrt{x - 4}}{x - 5}$

(4) $\lim\limits_{x \to 0} \dfrac{5^x - 3^x}{x}$

(5) $\lim\limits_{n \to \infty} \dfrac{(3n - 1)(4n - 2)}{(n + 8)(n - 1)}$

(6) $\lim\limits_{n \to \infty} \left(1 - \dfrac{5}{2n}\right)^n$

4 Find $\frac{dy}{dx}$: (any four) **14**

(1) $y = \left(x^2 + 6\right)\left(5x^2 - 3x + 2\right)$

(2) $y = \left(\frac{x-1}{x+1}\right)^2$

(3) $y = \left(x - \frac{1}{x}\right)\left(x + \frac{1}{x}\right)\left(x^2 + \frac{1}{x^2}\right)$

(4) $y = x^2 \log x \; e^x$

(5) $x = \frac{2-y}{y+1}$

(6) $y = \log\left(\frac{1+x^2}{1-x^2}\right)$

5 (a) Explain : **7**

Sinking fund, Present value of an Annuity.

(b) Nirav borrows Rs. 5,00,000 to buy a house of he pays equal instalments for 20 years and 10% interest on outstanding balance, what will be the equal annual instalment ? **7**

OR

5 (a) Explain : **7**

Simple interest, compound interest, effective rate of interest.

(b) Find the compound amount of Rs. 50,000 for 4 years at 6% converted

(i) annually

(ii) quarterly

(iii) semi annually

(iv) monthly
