

SARDAR PATEL UNIVERSITY
B. B. A. (ISM) (I Semester) Examination
Wednesday, 23rd November 2016
10.00 a. m. – 12.00 p. m.
UM01CBBS07 : BUSINESS MATHEMATICS

Total Marks : 60

Note: Figure to the right indicate marks.

Q. 1

- (A) Define following terms with illustration: (04)
 (i) Subset (ii) Union of two sets
- (B) If $A = \{1, 3\}$; $B = \{5, 6\}$; $C = \{6, 9\}$ then prove that (05)
 (i) $A \times (B \cap C) = (A \times B) \cap (A \times C)$
 (ii) $A \times (B - C) = (A \times B) - (A \times C)$
- (C) If $A = \{1, 2, 3, 4\}$; $B = \{3, 4, 5\}$; $C = \{1, 3, 5\}$ verify that (06)
 (i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
 (ii) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

OR

Q. 1

- (A) Verify $(A \cup B)' = A' \cap B'$ with the help of Venn diagram. (04)
- (B) If $U = \{x/x \in \mathbb{N}, x \leq 10\}$; $A = \{x/x \in \mathbb{N}, x^2 < 10\}$; $B = \{2, 4, 6\}$; $C = \{x/x^3 - 3x^2 - 4x = 0\}$ (05)
 verify that $A \cap (B - C) = (A \cap B) - (A \cap C)$.
- (C) If $U = \{1, 2, 3, 4, 5, 6\}$; $A = \{1, 2, 3, 4\}$; $B = \{4, 5, 6\}$ find (06)
 (i) $A \cup B$ (ii) $A \cap B$ (iii) A'
 (iv) $A - B$ (v) $A \Delta B$ (vi) $(A \Delta B)'$

Q. 2

- (A) Explain the properties of determinant. (04)
- (B) Solve the following linear equations by Cramer's method. (05)
 $2x + 5y = 16$
 $3x + y = 11$
- (C) If $\begin{vmatrix} 2 & 6 & k \\ 6 & 7 & 4 \\ 1 & 2 & 1 \end{vmatrix} = 11$, find value of k. (06)

OR

Q. 2

- (A) Define following terms: (04)
 (i) Identity matrix (ii) Symmetric matrix
- (B) If $A = \begin{bmatrix} 3 & 4 & -1 \\ 2 & 1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 & 2 \\ 1 & 0 & 3 \end{bmatrix}$ find (05)
 (i) $2A + 3B$ (ii) $5A - 2B$
- (C) Find the inverse of the following matrix: (06)

$$A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & 5 & 6 \\ 1 & 1 & 2 \end{bmatrix}$$

- Q. 3
- (A) Derive the equation of a straight line passing through two points A (x_1, y_1) and B (x_2, y_2) . (04)
- (B) If the distance between $(a, -5)$ and $(2, a)$ is 13 find the value of a . (05)
- (C) Find the equation of a line parallel to $x - 2y + 3 = 0$ and passing from $(2, -3)$. (06)

OR

- Q. 3
- (A) Derive the equation of a line passing through (x_1, y_1) with slope m . (04)
- (B) The x -intercept of a line is 3 times its y -intercept and it passes through the point $(3, 5)$, find its equation. (05)
- (C) Find the equation of a straight line which passes through the point of intersection of $5x + y + 4 = 0$ and $2x + 3y - 1 = 0$ and perpendicular to $2x - y - 9 = 0$. (06)

- Q. 4
- (A) Explain the rules of limit. (06)
- (B) Find the limit of the following: (09)

(i) $\lim_{x \rightarrow 4} \frac{x^2 - 3x - 4}{x^2 - 2x - 8}$

(ii) $\lim_{x \rightarrow 3} \frac{\sqrt{x+5} - \sqrt{8}}{x-3}$

(iii) $\lim_{n \rightarrow \infty} \frac{1+2+3+\dots+n}{2n^2}$

OR

- Q. 4
- (A) If $f(x) = x^2$, find $\lim_{x \rightarrow 0} \frac{f(x+2) - f(x-2)}{x}$. (06)
- (B) Find the limit of the following: (09)

(i) $\lim_{x \rightarrow 5} \frac{x^5 - 32}{x^3 - 8}$

(ii) $\lim_{n \rightarrow \infty} \left(1 + \frac{2}{3n}\right)^n$

(iii) $\lim_{x \rightarrow 0} \frac{2^x + 3^x - 2}{x}$

