

Note:- Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.

NO. of printed pages: 03

[78]

SARDAR PATEL UNIVERSITY
F.Y.B.B.A. (GEN) EXAMINATION
SEMESTER - I (CBCS)
Saturday, 20th November 2010
UM01CBBA05: BUSINESS MATHEMATICS - I

Time: - 2.30 p.m. to 4.30 p.m.

Total Marks: - 60

Note: Figure to the right indicate marks.

Q.1

- (a) Let $A = \{x / -1 < x < 5, x \in Z\}$, $B = \{2, 4, 5\}$ and $C = \{1\}$ then [05]
(1) Compute $A \cap B$, $A \cap C$, $B \times C$
(2) Verify that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.
- (b) Define following terms: [05]
1. Union of two sets
2. Intersection of two sets
3. Subset
4. Singleton set
5. Null set
- (c) i) Express the following in the form of an interval: $|x - 5| < 7$ [05]
ii) Express the following inequalities in a Modulus form: $-7 < x < 8$

OR

Q.1

- (a) If $A = \{1, 2, 5, 6, 9\}$, $B = \{2, 4, 6, 8\}$ and $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ then [05]
State and verify De Morgan's laws.
- (b) If $A =$ set of the letters of the word 'HUMAN' [05]
 $B =$ set of the letters of the word 'WOMAN'
 $C =$ set of the letters of the word 'MAN'
Then verify that 1) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.
2) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.
- (c) i) Express 0.0232323... into quotient form. [05]
ii) Find power set of $A = \{1, 2, 3\}$.

Q.2

- (a) Let $A = \begin{bmatrix} 1 & 3 & 2 \\ 3 & 1 & 2 \\ 2 & 4 & 1 \end{bmatrix}$. If exists, find A^{-1} . [04]
- (b) i) Solve the following equations by Inverse of matrix: [04]
 $2x + 3y = 10,$
 $x + 6y = 4$
- ii) Explain the term: Transpose Matrix. [02]

(c) Prove that
$$\begin{vmatrix} x & y & z \\ x^2 & y^2 & z^2 \\ xyz & xyz & xyz \end{vmatrix} = xyz(x-y)(y-z)(z-x).$$
 [05]

OR

Q.2

(a) Solve the following equations by Cramer's rule: [04]
 $2x - y = 1,$
 $7x - 2y = -7$

(b) If $A = \begin{bmatrix} -5 & 2 \\ -6 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & -3 \\ 3 & -1 \end{bmatrix}$, then [05]
 1. Verify that $(A + B)^T = A^T + B^T$.
 2. Find $|A|$ and $|B|$.

(c) i) If $A = \begin{bmatrix} 3 & 4 \\ 5 & 2 \end{bmatrix}$ Then find $A^2 - 5A - 14I$ [04]

ii) Explain the term: Symmetric Matrix. [02]

Q.3

(a) Show that the equation of the line passing through (x_1, y_1) with slope m is [04]
 $y - y_1 = m(x - x_1).$

(b) Find the equation of a line passing through the point $(2, 5)$ and making equal intercepts on the co-ordinate axes. [04]

(c) i) Find the equation of line passing through the points $(1, 0)$ and $(2, -1)$. Also find its slope and intercepts on the axes. [04]

ii) Show that the three lines $x + y - 5 = 0$, $x + 6y = 0$ and $x - y - 7 = 0$ are concurrent. Also find the point of concurrence. [03]

OR

Q.3

(a) Find the equation of a line passes through the intersection of $x - y + 2 = 0$ and $2x + 3y - 6 = 0$ and parallel to $x - 2y + 5 = 0$. [05]

(b) Find the equation of line having slope $\frac{1}{5}$ and which passes through the point of intersection of the lines $x - 4y + 18 = 0$ and $x + y - 12 = 0$ [04]

(c) i) Explain the term: Slope of a line. Find the slope of the line joining the points $A(3, 4)$ and $B(5, 8)$. [03]

ii) Find a if the distance between $(-3, -2)$ and $(a, 1)$ is $3\sqrt{10}$. [03]

Q.4

(a) Evaluate following:

[11]

1. $\lim_{x \rightarrow 2} \frac{x^3 - x - 6}{x^2 - 4}$

2. $\lim_{x \rightarrow 3} \frac{3 - x}{\sqrt{3 + x} - \sqrt{6}}$

3. $\lim_{x \rightarrow 0} \frac{49^x - 27^x}{4x}$

(b) Write working rules for Limit.

[04]

OR

Q.4

(a) Evaluate following:

[11]

1. $\lim_{x \rightarrow 1} \left[\frac{1}{x-1} - \frac{2}{x^2-1} \right]$

2. $\lim_{x \rightarrow 0} \left\{ 1 + \frac{2}{3 + \frac{4}{x}} \right\}$

3. $\lim_{x \rightarrow 3} \frac{x^3 - 27}{x^2 - 9}$

(b) If $f(x) = x^2$, evaluate $\lim_{x \rightarrow 0} \frac{f(x+4) - f(x-4)}{x}$

[04]
