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No. of printed pages: 2

**SARDAR PATEL UNIVERSITY**  
**B B A (I Semester) Examination**  
**28 April 2015 (Tuesday)**  
**2.30 - 4.30 pm**  
**UM01CBBI07 – Business Mathematics**

**Total Marks : 60**

- Q1 [1] Define the terms with illustration: [4]  
 (1) Null Set  
 (2) Compliment of a set A  
 (3) Union of two sets  
 (4) Intersection of two sets
- [2] If  $A = \{1,3\}$ ,  $B = \{5,6\}$  and  $C = \{6,9\}$ , then [5]  
 (1) Prove that  $A \times (B \cap C) = (A \times B) \cap (A \times C)$   
 (2) Find  $A \Delta B$ ,  $B - C$ .
- [3] Express the following in the form of interval. [6]  
 (1)  $|x - 3| < 2$  and (2)  $|x + 5| < 1$
- OR
- Q1 [1] Express  $-7 < x < 8$  in modulus form. [4]  
 [2] Express 0.0232323... into quotient form. [5]  
 [3] If  $U = \{1, 2, 3, 4\}$ ,  $A = \{1, 2\}$  &  $B = \{2, 3\}$  than prove De-Morgan's laws. [6]
- Q2 [1] Using Cramer's rule, solve the following equation. [4]  
 $2x + 3y = 4$   
 $3x - 2y = 7$
- [2] If  $A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$  and  $C = \begin{bmatrix} 0 & -1 \\ 1 & 2 \end{bmatrix}$  [5]  
 then find a  $2 \times 2$  matrix X such that  $2(X+A) = 3[X + \frac{1}{2}(A+B)] + C$ .
- [3] Solve the following system of equations using inverse of matrix. [6]  
 $x + y + z = 3$   
 $x + 2y + 3z = 6$   
 $3x + y + 2z = 6$

OR

Q2 [1] Write the properties of determinants. [4]

[2] If  $A = \begin{bmatrix} 3 & 2 \\ 5 & 3 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & 2 \\ 2 & 1 \end{bmatrix}$ , find  $AB + B^{-1} A^{-1}$ . [5]

[3] Show that A is an orthogonal matrix if  $A = \frac{1}{3} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & -1 \end{bmatrix}$  [6]

Q3 [1] Find the distance between the points  $(-2, 3)$  and  $(-9, -2)$ . [4]

[2] Find k if the points  $(2, 3/2)$ ,  $(-3, -7/2)$  and  $(k, 9/2)$  are collinear. [5]

[3] Find the equation of the line which passes through the point of intersection of the lines  $x + 2y - 1 = 0$  and  $2x + 3y - 4 = 0$  and makes equal intercept on both axis. [6]

OR

Q3 [1] Show that the three lines  $x + y - 5 = 0$ ,  $x + 6y = 0$  and  $x - y - 7 = 0$  are concurrent. [4]

[2] Find the equation of the line whose slope is 2 and which passes through the point of intersection of the lines  $x - 4y + 18 = 0$  and  $x + y - 12 = 0$ . [5]

[3] Find the equation of line passing through the point of intersection of the lines  $5x + y + 4 = 0$  &  $2x + 3y - 1 = 0$  & is perpendicular to  $2x - y - 8 = 0$ . [6]

Q4 [1] Evaluate :  $\lim_{x \rightarrow 3} \frac{x^2 + 2x - 15}{x^2 - 9}$  [4]

[2] Evaluate :  $\lim_{x \rightarrow a} \frac{x^{16} - a^{16}}{x^8 - a^8}$  [5]

[3] Evaluate:  $\lim_{n \rightarrow \infty} \left( \frac{n}{n+4} \right)^{5n+3}$  [6]

OR

Q4 [1] Write the rules of limits. [4]

[2] Evaluate :  $\lim_{x \rightarrow 3} \frac{\sqrt{x+2} - \sqrt{5}}{x - 3}$  [5]

[3] Evaluate :  $\lim_{n \rightarrow \infty} \frac{1^2 + 2^2 + \dots + n^2}{2n^3}$  [6]