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SARDAR PATEL UNIVERSITY
B B A (I Semester) Examination
28 April 2015 (Tuesday)
2.30 - 4.30 pm
UM01CBBS07 – Business Mathematics

Total Marks : 60

Q1 **[1]** Define the terms with illustration: [4]

    (1) universal set

    (2) Compliment of a set A

    (3) Union of two sets

    (4) Symmetric difference of two sets

[2] Find $A \times B$, $A \Delta B$, $A \cap B$, $A - B$, $A \cup B$, if $A = \{ -3, -2, 2, 0\}$ and [5]

$B = \{ 3, 2, -2, 0\}$.

[3] If $U = \{1, 2, 3, 4\}$, $A = \{1, 2\}$ & $B = \{2, 3\}$ than prove De-Morgan's laws. [6]

OR

Q1 **[1]** Express $- 3 < x < 8$ in modulus form. [4]

[2] Express $0.0272727\ldots$ into quotient form. [5]

[3] Express the following in the form of interval. [6]

    (1) $| x - 3 | < 2$ and   (2) $| x + 5 | < 1$.

Q2 **[1]** Using Cramer's rule, solve the following equation. [4]
$$2x + 3y = 4$$
$$3x - 2y = 7$$

[2] If $A = \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}$, find $A + A^T + A^{-1}$ [5]

[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 $A = \begin{bmatrix} 3 & 4 \\ 5 & 2 \end{bmatrix}$, than show that $A^2 - 5A - 14\,I = O$. [5]

[3] If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then prove that $A^2 - 4A = 5I$ and use it to find A^{-1}. [6]

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

<p style="text-align:center">OR</p>

Q3 [1] Show that the three lines $x + y - 5 = 0$, $x + 6y = 0$ and $x - y - 7 = 0$ are concurrent. [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 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 : $\lim\limits_{x \to 3} \dfrac{x^2 + 2x - 15}{x^2 - 9}$ [4]

[2] Evaluate: $\lim\limits_{x \to 3} \dfrac{\sqrt{x + 5} - 2\sqrt{2}}{\sqrt{x - 1} - \sqrt{2}}$ [5]

[3] Evaluate: $\lim\limits_{n \to \infty} \left(\dfrac{n}{n + 4} \right)^{5n + 3}$ [6]

<p style="text-align:center">OR</p>

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

[2] Evaluate : $\lim\limits_{x \to a} \dfrac{x^{16} - a^{16}}{x^8 - a^8}$ [5]

[3] Evaluate : $\lim\limits_{n \to \infty} \dfrac{1^2 + 2^2 + \ldots + n^2}{2n^3}$ [6]

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