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SARDAR PATEL UNIVERSITY
F Y BBA (ITM) (I Sem.) Examination
22ND November-2013
02.30 pm - 04.30 pm
UM01CBB107 - Business Mathematics-I

Total Marks: 60

Note: Figures to the right indicate marks

- Q.1 A) 1. State & verify De-Morgan's law by Venn diagram. [05]
 2. Express $0.0272727\ldots$ in a quotient form. [02]
- B) 1. If $U = \text{set of letters of the word 'W H E A T'}$ [05]
 $A = \text{set of letters of the word 'W H A T'}$
 $B = \text{set of letters of the word 'H E A T'}$
 $C = \text{set of letters of the word 'E A T'}$
 Then find (i) $(A \cap B) \times (B \cap C)$
 (ii) $(A - B)' \cap C'$
 (iii) $(A \cap B \cap C)'$
2. Express the following inequalities in a modulus form: [03]
 $-7 < x < 8.$

OR

- Q.1 A) 1. State the distributive laws for three sets A, B, C and verify [05]
 them by taking $A = \{1, 2, 5, 6, 8\}$, $B = \{2, 4, 6, 10, 11\}$ & [02]
 $C = \{1, 2, 3, 5, 6, 11, 12\}.$
2. Define the following terms:
 (i) complement of set
 (ii) power set
- B) 1. (i) Prove that $\sqrt{2}$ is an irrational number. [05]
 (ii) Express the following in the form of an interval:
 $|x - 5| < 7.$ [03]
2. If $A = \{x : -1 < x < 1, x \in \mathbb{Z}\}$, then find power set of A.

- Q.2 A) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then prove that $A^2 - 4A = 5I$ and use this [07]
 to find $A^{-1}.$
- B) 1. Solve the following equations by Cramer's rule: [04]
 $2x + 5y = 4$
 $3x - 2y = 7.$
2. If $A = \begin{bmatrix} -5 & 2 \\ -6 & 3 \end{bmatrix}$ & $B = \begin{bmatrix} 4 & -3 \\ 3 & -1 \end{bmatrix}$ then [04]
 (i) Verify that $(A+B)^T = A^T + B^T$
 (ii) Find $|A|$ and $|B|.$

OR

Q.2 A) If $A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$ & $C = \begin{bmatrix} 0 & -1 \\ 1 & 2 \end{bmatrix}$ then find a matrix X [05]
such that $2(X+A) = 3[X + \frac{1}{2}(A+B)] + C$.

B) 1. P.T. $\begin{vmatrix} x & y & z \\ x^2 & y^2 & z^2 \\ xyz & xyz & xyz \end{vmatrix} = xyz(x-y)(y-z)(z-x)$ [05]

2. Define: Transpose of a matrix.

Show that $A = \frac{1}{3} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & -1 \end{bmatrix}$ is an orthogonal matrix. [05]

Q.3 A) 1. For what values of k, the lines $3x - (3k+2)y + 2 = 0$ and $2x - (k-3)y - 1 = 0$ are (i) parallel? (b) perpendicular? [05]

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

B) 1. If A(-3,2), B(1,-2) and C(5,6) are vertices of ΔABC , then find the area of ΔABC . [03]

2. Obtain the equation of a line having slope m and making intercept C on Y-axis. [04]

OR

Q.3 A) 1. Find the equation of a line passing through the point (5,7) and making intercepts on the axes such that the sum of the intercepts is 24. [05]

2. Find the equation of a line passing through the points (1,0) and (2,-1). [03]

B) 1. Find the equation of a line having slope $\frac{2}{3}$ and the intercept on y-axis as 6. [03]

2. Given A(4,5), B(2a+1, 2a-1), C(7,4) and $\overline{AB} \perp \overline{BC}$, find a. [04]

Q.4 A) Write working rules for limit. [04]

B) Evaluate the following [11]

1. $\lim_{x \rightarrow 2} \frac{13^x - 7^x}{3x}$ 2. $\lim_{x \rightarrow -1} \frac{2x^2 + 3x + 1}{3x^2 + 4x + 1}$ 3. $\lim_{n \rightarrow \infty} \left(\frac{n}{n+4} \right)^{5n+3}$

OR

Q.4 A) Evaluate the following: [11]

1. $\lim_{x \rightarrow 2} \frac{x^3 - 3x^2 + 3x - 2}{2x^3 - 5x^2 - x + 6}$

2. $\lim_{x \rightarrow -1} \left\{ 1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{x}}} \right\}$

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

B) If $f(x) = x^2$, find $\lim_{x \rightarrow -1} \frac{f(x+2) - f(x-2)}{x}$ [04]
