Seat No.:_____

[7 ₹ A-6]

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SARDAR PATEL UNIVERSITY
FYBBA (ITM) (I Sem.) Examination
Wednesday, 23rd November, 2016
10.00 am - 12.00 pm
UM01CBBI07 - Business Mathematics

Note: Figures to the right indicate marks — **Total Marks: 60**

Q.1 A. If U=set of letters of the word 'W H E A T' [05]
A= set of letters of the word 'W H A T'
B= set of letters of the word 'H E A T'
C= set of letters of the word 'E A T '
Then find (i) $(A \cap B) X (B \cap C)$
(ii) $(A \cap B \cap C)'$
(iii) $A \cap (B-C)$

B. Let A = {1, 2, 5, 7, 9}, B = {2, 3, 6, 8, 10} and C = {3, 4, 5, 8, 11, 12}, then [05]
(i) verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ (ii) find $A \cap (B - C)$ and $(A - B)$.

C. (i) Express the following inequalities in a modulus form: $-7 < x < 8$ [05]
(ii) Express 0.0272727..... in a quotient form.

OR

Q.1 A. State the De Morgan's laws for A and B and verify them by taking [05]
$U = \{x / 0 < x < 11, x \in N\}$, A = {1, 3, 4, 6, 8} and B = {2, 3, 6, 7, 9}.

B. (i) Express the following in the form of an interval: $|x - 5| < 7$. [05]
(ii) Find power set of A={ a, b, c }.

C. Define the following terms: [05]
(i) Intersection of two sets (ii) Symmetric difference set (iii) Disjoint set
(iv) Power set (v) Null set.

Q.2 A. Prove that $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$ [05]

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

C. Solve the following equations using inverse of a matrix: [05]
2x+y=4
5x+3y=9.

OR

Q.2 A. Solve the following equations by Cramer's rule: [05]
$2(x - 1) + 3(y + 1) = 15$
$2(y + 3) - 2(x - 2) = 6$

[P T O]

B. If $A=\begin{bmatrix}4 & 1 & 3\\ 2 & 0 & 5\\ 1 & 3 & 0\end{bmatrix}$ and $B=\begin{bmatrix}2 & -1 & 0\\ 0 & 4 & 3\\ 2 & 1 & 5\end{bmatrix}$ then verify that [05]

(i) $(AB)' = B'.A'$

(ii) $(A+B)' = A'+B'$.

C. Define Transpose of a matrix. [05]

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

Q.3 A. Find the equation of a line passing through the intersection of the lines $x - y + 2 = 0$ and $2x + 3y - 6 = 0$ and parallel to $x - 2y + 5 = 0$. [05]

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

C. Find the equation of a line which passes through the points (1,-2) & makes the intercepts on the axes equal in magnitude & opposite in signs. [05]

OR

Q.3 A. Obtain the equation of a line passing through the points (-1, 2) and (5, -3). Find its slope and intercepts on the axes. [05]

B. (i) If A(-3,2) ,B (1,-2) and C (5,6) are vertices of ΔABC, then find the area of ΔABC. [05]
(ii) Find a, if the distance between A(-3,-2) and B(a,1) is $3\sqrt{10}$.

C. Show the equation of a line making intercepts a and b on the axes. [05]

Q.4 A. Evaluate the following: [12]

(i) $\lim_{x\to -2} \frac{x^3 + 6x^2 + 11x + 6}{5x^2 + 10x}$

(ii) $\lim_{x\to 0} \frac{2(5)^x + 3(2)^x - 5}{x}$

(iii) $\lim_{n\to \infty} \left(\sqrt{n^2 + n + 1} - \sqrt{n^2 + 1}\right)$

B. State working rules for limit. [03]

OR

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

(i) $\lim_{x\to -1} \frac{x^{-3} - a^{-3}}{x^{-2} - a^{-2}}$

(ii) $\lim_{x\to -1} \frac{2x^2 + 3x + 1}{3x^2 + 4x + 1}$

(iii) $\lim_{x\to 2} \frac{\sqrt{x^2 + x - 3} - \sqrt{x + 1}}{x - 2}$

B. If $f(x) = x^2$ find $\lim_{x\to 0} \frac{f(x + 2) - f(x - 2)}{x}$ [04]

X=X=X