Seat No.:_____

[7 ¢ A-6]

No. of printed pages: 02

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∩B)X(B∩C)
(ii) (A∩B∩C)'
(iii) A∩(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 ∪ (B ∩ C) = (A ∪ B) ∩ (A ∪C)(ii) find A∩ (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 ∈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   [05]
that $2(X + A) = 3\left[X + \frac{1}{2}(A + B)\right]$ +C

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

① [P TO]

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

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

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 [05]
intercepts on the axes equal in magnitude & opposite in signs.

<center>OR</center>

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

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) $\lim\limits_{x \to -2} \dfrac{x^3 + 6x^2 + 11x + 6}{5x^2 + 10x}$

(ii) $\lim\limits_{x \to 0} \dfrac{2(5)^x + 3(2)^x - 5}{x}$

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

B. State working rules for limit. [03]

<center>OR</center>

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

(i) $\lim\limits_{x \to -1} \dfrac{x^{-3} - a^{-3}}{x^{-2} - a^{-2}}$

(ii) $\lim\limits_{x \to -1} \dfrac{2x^2 + 3x + 1}{3x^2 + 4x + 1}$

(iii) $\lim\limits_{x \to 2} \dfrac{\sqrt{x^2 + x - 3} - \sqrt{x + 1}}{x - 2}$

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

<center>X=X=X</center>

<center>②</center>