(77)

SARDAR PATEL UNIVERSITY
BBA (ISM) (I Sem.) Examination
22ND November 2013
02.30 pm - 04.30 pm
UM01CBBS07 - Business Mathematics

Total Marks: 60

Note: Figures to the right indicate marks

Q.1 **A)** 1. State and prove De – Morgan's law by taking [05]
U={x / -5≤ x ≤5 ; x∈z} ; A={-1,0,1,2,5}, B={-2,0,2,3,4}
and C={-5,-3,-1,1,2,3}.

2. Define the following terms: [02]
(i) Universal set.
(ii) Disjoint set.

B) 1. If A={-3,-2,2,0} and B={3,2,-2,0} then find (i) A×B (ii) AΔB. [03]
2. Express the following in the form of an interval: $|x-4| \leq 5$ [02]
and $x \leq 0$.
3. Express 0.0232323………… into a quotient form. [03]

OR

Q.1 **A)** 1. 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)

2. Find power set of A={ a, b, c }. [02]

B) 1. If U={ p, q. r, s }, A={ p, q, r } and B={ q, r, s}, then [03]
verify that (AUB)-B= A∩B'.

2. Express the following inequalities in a modulas form: [05]
(i) -7< x < 8
(ii) -3 < x < 8.

Q.2 **A)** 1. Solve the following equations by Cramer's rule; [05]
$$\begin{vmatrix} x+2 & 3 \\ y+1 & 5 \end{vmatrix} = 8 \quad , \quad \begin{vmatrix} x-1 & y-1 \\ 1 & 6 \end{vmatrix} = 4$$

2. Explain the term: symmetric matrix. [02]

B) 1. 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 find [05]
a 2×2 matrix X such that
$$2(X+A) = 3\left[X + \tfrac{1}{2}(A+B)\right] + C$$

2. If $A = \begin{bmatrix} 3 & 4 \\ 5 & 2 \end{bmatrix}$, then find $A^2 - 5A - 14I$. [03]

OR

Q.2 **A)** If $A = \begin{bmatrix} 4 & 1 & 3 \\ 2 & 0 & 5 \\ 1 & 3 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 & 0 \\ 0 & 4 & 3 \\ 2 & 1 & 5 \end{bmatrix}$ [05]
then verify that
(i) (AB)' = B'. A'

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

B)

(1) Prove that $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$ [05]

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

Q.3 A) 1. Find the equation of the line [5]
(i) parallel to the line 2x-3y-5=0 and passing through the point (4,5).
(ii) perpendicular to the line 2x+3y+4=0 and passing through the point (3,-2).
2. (ii) Find x, if d{(x,-4) , (-8,2)} = 10 [02]

B) 1. Find the equation of a line whose slope is 2 and which [05]
passes through the point of intersection of the lines
x – 4y+18=0 and x+y-12=0.
2. Show that the points (2,3) , (6,5) and (12,8) are collinear. [03]

OR

Q.3 A) Find the equation of a line which passes through the points (1,-2) [05]
& makes the intercepts on the axes equal in magnitude
& opposite in signs.

B) (1) For what values of k ,the lines 3x-(3k+2)y+2=0 and [05]
2x-(k-3)y-1=0 are (i) parallel ? (ii) perpendicular ?
(2) Show the equation of a line making intercepts a and b on [05]
the axes.

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

1. $\lim_{x \to 3} \dfrac{3-x}{\sqrt{3+x}-\sqrt{6}}$

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

3. $\lim_{x \to 2} \dfrac{x^3 - 3x^2 + 3x - 2}{2x^3 - 5x^2 - x + 6}$

B) Evaluate: [03]

$$\lim_{x \to 1} \left[\log x + \frac{1-x}{1-\sqrt{x}} \right]$$

OR

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

1. $\lim_{x \to -1} \dfrac{x^{24}-1}{x^{21}+1}$

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

3. If $f(x) = x^2$ find $\lim_{x \to 0} \dfrac{f(x+2) - f(x-2)}{x}$

B) Write working rules for limit. [03]

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