SC-1

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SARDAR PATEL UNIVERSITY
F Y BBA (ITM) (I Sem.) Examination (NC)
Friday, 22ND April-2016
02.30 pm - 04.30 pm
UM01CBBI07 - Business Mathematics

Total Marks: 60

Note: Figures to the right indicate marks

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. (i) Express the following in the form of an interval: $|x-4| \leq 5$ and $x \leq 0$. **[05]**
(ii) Express 0.0232323…… into a quotient form.

C. (i) If U={ p, q. r, s }, A={ p, q, r } and B={ q, r, s}, then verify that (AUB)-B= A∩B'. **[05]**
(ii) If A={-3,-2,2,0} and B={3,2,-2,0} then find (i) A×B (ii) AΔB.

OR

Q.1 A. State & verify De-Morgan's law by Venn diagram. **[05]**

B. State and prove De – Morgan's law by taking U={x / $-5 \leq x \leq 5$; $x \in z$} ; A={-1,0,1,2,5}, B={-2,0,2,3,4}. **[05]**

C. (i) Express the following inequalities in a modulas form: $-7 < x < 8$. **[05]**
(ii) If A={ x: $-1 < x < 1$, $x \in z$}, then find power set of A.

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 $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then prove that $A^2 - 4A = 5I$ and use this to find A^{-1}. **[05]**

C. 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]**

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'.

(P.T.O.)

B. Solve the following equations by Cramer's rule; **[05]**

$$\begin{vmatrix} x+2 & 3 \\ y+1 & 5 \end{vmatrix} = 8 \quad , \quad \begin{vmatrix} x-1 & y-1 \\ 1 & 6 \end{vmatrix} = 4$$

C. Solve the following equations using inverse of a matrix: **[05]**

$2x+y=4$

$5x+3y=9.$

Q.3 A. Show the equation of a line making intercepts a and b on the axes. **[04]**

B. Find the equation of a line whose slope is 2 and which passes through the point of intersection of the lines $x - 4y+18=0$ and $x+y-12=0$. **[05]**

C. (i) Find a, if the distance between A(-3,-2) and B(a,1) is $3\sqrt{10}$. **[06]**

(ii) Find the equation of a line having slope $\frac{2}{3}$ and the intercept on y-axis as 6.

OR

Q.3 A. 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]**

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

C. (i) Show that the points (2,3) , (6,5) and (12,8) are collinear. **[05]**

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

Q.4 A. Write working rules for limit. **[03]**

B. Evaluate the following: **[12]**

1. $\lim\limits_{x \to 2} \frac{x^3-3x^2+3x-2}{2x^3-5x^2-x+6}$

2. $\lim_{n\to\infty} \left(\frac{n}{n+4}\right)^{5n+3}$

3. $\lim\limits_{x \to -1} \frac{x^{-3}-a^{-3}}{x^{-2}-a^{-2}}$

OR

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

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

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

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

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

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