# SARDAR PATEL UNIVERSITY
## BCom (I Semester) Examination
### 2016
### Saturday, 16$^{th}$ April
### 2.30 pm - 4.30 pm
### UB01CCOM05 - Business Mathematics I

**Total Marks: 60**

**Q.1**

(a) Solve the following by Cramer's rule.                                  (05)
$3x - 4y = 1$
$-2x + 5y = -3$

(b) If A = {1, 2, 5, 6, 9} B = {2, 4, 6, 8}, C = {2, 5, 10} then state and      (06)
verify Distributive laws.

(c) Write the rules of determinant.                                        (04)

**OR**

**Q.1**

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

(b) If A = {5, 6, 7}, B = {5, 8} and C = {6, 8} then verify                 (06)
1)   A x (B–C) = (AxB) – (AxC)
2)   A x (B∩C) = (AxB) ∩ (AxC)

(c) Define the terms with example.                                         (04)
1)   Subset
2)   Complement of a set.

**Q.2**

(a) If A = $\begin{bmatrix} 3 & 4 \\ 5 & 2 \end{bmatrix}$ then find $A^2 - 5A - 14I$                    (05)

(b) Solve the system of equations using matrix method.                     (06)
$3x - 2y + z = 2$
$x + 3y - 2z = 2$
$2x - y + z = 2$

(c) Prove that                                                             (04)
$A = \dfrac{1}{3}\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & 1 \end{bmatrix}$ is an Orthogonal matrix.

**OR**

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

(b)  If A = {5, 6, 7}, B = {5, 8} and C = {6, 8} then verify                   (06)
1)  $A \times (B-C) = (A \times B) - (A \times C)$
2)  $A \times (B \cap C) = (A \times B) \cap (A \times C)$

(c)  Define the terms with example.                                          (04)
1)  Subset
2)  Complement of a set.

Q.2

(a)  If $A = \begin{bmatrix} 3 & 4 \\ 5 & 2 \end{bmatrix}$ then find $A^2 - 5A - 14I$      (05)

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**OR**

Q.2

(a) Define the terms: (05)
    (1) Row matrix    (2) Square matrix
    (3) Null matrix    (4) Identity matrix
    (5) Diagonal matrix

(b) If $A = \begin{bmatrix} 3 & 5 \\ 1 & 2 \end{bmatrix}$ & $B = \begin{bmatrix} 4 & 5 \\ 3 & 4 \end{bmatrix}$ (06)

then verify,
    (1) $(AB)^T = B^T A^T$   (2) $(A+B)^T = A^T + B^T$

(c) If $A = \begin{bmatrix} 2 & 3 \\ 5 & 4 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 2 & 1 \\ 2 & 2 \end{bmatrix}$ (04)

then find (1) A−B   (2) 2A − 3B


Q.3

(a) Evaluate the following:

(1) $\displaystyle \lim_{x \to -1} \frac{2x^2 + x - 1}{6x^2 + 5x - 1}$ (04)

(2) $\displaystyle \lim_{x \to 0} \frac{13^x - 7^x}{3x}$ (04)

(3) $\displaystyle \lim_{x \to 2} \frac{x^2 - 4}{x^3 - 8}$ (03)


(b) Write the rules for limit. (04)


**OR**


Q.3

(a) If $f(x) = x^2$ then evaluate (05)
$$\lim_{x \to 0} \frac{f(x+4) - f(x-4)}{x}$$

(b) Evaluate the following:

(1) $\displaystyle \lim_{x \to 2} \frac{\sqrt{x+3} - \sqrt{5}}{\sqrt{x+5} - \sqrt{7}}$ (05)

(2) $\displaystyle \lim_{x \to a} \frac{x^8 - a^8}{x^7 - a^7}$ (05)


Q.4

(a) Rekha Chemicals fixes a target of producing 50000 tons at the end of 7 years. (05)
If the production grows at a rate of 5% per annum. Find the present day
production of the company.

(b) The population of a city is 49949 at present. Before 7 years the population of (05)
a city was 35498. Find the rate of growth of population of the city.

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(c) A company purchases a machine on 1-1-2001 for Rs. 200000. The expected (05) life of which is 12 years. When a new machine will have to be purchased it would cost double the price then previous. In order to purchase a new machine, what amount should be invested on 31st December every year for 12 years at 15% of interest ?

**OR**

Q.4
(a) If the rate of interest is 12%, what sum should Mr. Gautam deposit in his (05) recurring account in bank in the beginning of every year, so that his 5 year old son can receive Rs. 150000 when he is 25 years old ?

(b) What is an aggregate amount for Rs. 4000 at 12% rate of compound interest (05) which is compounded.
(1) Annually (2) Semi annually

(c) Mr. X borrows Rs. 32000 at the rate of 16% of simple interest and invests it (05) on the same day at the rate 14% of compound interest. At the end of 4 years, how much profit or loss will he have ?

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