

[48E]

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**SARDAR PATEL UNIVERSITY**  
**BCom (I Semester) Examination**  
**2016**  
**Saturday, 16<sup>th</sup> 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 verify Distributive laws. (06)
- (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)  $A \times (B - C) = (A \times B) - (A \times C)$   
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)
- (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)

$$A = \frac{1}{3} \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ -2 & 2 & 1 \end{bmatrix} \text{ is an Orthogonal matrix.}$$

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

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

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

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

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

OR

Q.3

(a) If  $f(x) = x^2$  then evaluate (05)

$\lim_{x \rightarrow 0} \frac{f(x+4) - f(x-4)}{x}$

(b) Evaluate the following:

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

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

Q.4

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

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

- (c) A company purchases a machine on 1-1-2001 for Rs. 200000. The expected 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 ? (05)

OR

Q.4

- (a) If the rate of interest is 12%, what sum should Mr. Gautam deposit in his 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 ? (05)
- (b) What is an aggregate amount for Rs. 4000 at 12% rate of compound interest which is compounded. (05)
- (1) Annually (2) Semi annually
- (c) Mr. X borrows Rs. 32000 at the rate of 16% of simple interest and invests it 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 ? (05)

