

**PARUL UNIVERSITY**  
**PARUL INSTITUTE OF COMPUTER APPLICATION**  
**BCA DEPARTMENT**  
**Mid Term Examination – October, 2016**

Subject Code: 05101102/05301102  
Subject Title: Basic Mathematics  
Course: BCA / IMCA Semester: 1/2

Date: 22/10/2016  
Time: (2 hours)  
Total Marks: 50

(10)

**Q-1) Do as Directed (Attempt any 10 from 13)**

- 1) A set containing only one element is called \_\_\_\_\_  
a) empty set      b) Singleton set      c) Finite set      d) None of these
- 2) IF matrix A is of order  $2 \times 3$ , and matrix B is of order  $3 \times 2$ , then what is the order of matrix AB?  
a)  $2 \times 2$       b)  $3 \times 3$       c)  $2 \times 3$       d)  $3 \times 2$
- 3)  $A.I =$  \_\_\_\_\_  
a) I      b) A      c) 0      d) None of these
- 4) If number of elements of one set is equal to number of elements of another set Then sets are called \_\_\_\_\_  
a) Equal sets      b) Equivalent sets      c) Subset      d) universal set
- 5) 5 students are to be seated on 5 seats. In how many different ways can they be seated?  
a) 120      b) 20      c) 60      d) 72
- 6) If set p has 3 elements, set Q has 4 elements and set R has 2 elements, then How many elements does the Cartesian product set  $P \times Q \times R$  will have..?  
a) 12      b) 24      c) 20      d) 8
- 7)  $n(A) + n(B) - n(A \cap B) =$  \_\_\_\_\_  
a)  $n(A)$       b)  $n(B)$       c)  $n(A \cup B)$       d) none of these
- 8) In how many ways can 6 men sit at a round table..?  
a) 24      b) 120      c) 720      d) none of these
- 9) Two matrix can be added/subtracted only when order of both matrix is \_\_\_\_\_  
a) different      b) same      c) not depend on order      d) none of these
- 10) How many 3 digit number can be formed using the digits 1,3,6,8 when the digits may Be repeated any no of times ?  
a) 64      b) 32      c) 24      d) None of these
- 11) If any row or column of a determinant is zero, then value of determinant is \_\_\_\_\_  
a) 0      b) 1      c) -1      d) none of these
- 12) A diagonal matrix having all diagonal elements are 1, called \_\_\_\_\_  
a) Unit matrix      b) Diagonal matrix      c) Scalar matrix      d) None of these
- 13) How many lines can be drawn through 21 points on a circle.  
a) 220      b) 210      c) 230      d) 441

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**Q-2) Solve the following (Attempt any 10 from 13)**

**(10)**

1) If  $A = \begin{bmatrix} 2 & 0 & 4 \\ 6 & 2 & 8 \\ 2 & 4 & 6 \end{bmatrix}$        $B = \begin{bmatrix} 8 & 4 & -2 \\ 0 & -2 & 0 \\ 2 & 2 & 6 \end{bmatrix}$ , then compute  $A + B$ .

2) In how many ways can 4 Indians and 4 Pakistanis be seated at a round table so that no two Indians may be together...?

3) Let  $A = \{0,1,2,3,4\}$ ,  $B = \{2,4,5\}$ ,  $C = \{0\}$  and  $D = \emptyset$ , compute  $A \cap B$ ,  $B \cap C$ ,  $A \cap C$ ,  $C \cap D$ .

4) There are 6 candidates for 3 posts. In how many ways can the post be filled..?

5) if  $A = \{2,3\}$  and  $B = \{3,4\}$

Find i)  $A \times A$       ii)  $B \times B$

6) if  $A = \begin{bmatrix} 2 & 3 & 0 \\ 6 & -9 & 3 \\ 3 & 3 & -3 \end{bmatrix}$ , find transpose of A.

7) Compute the value of following determinant

$$\begin{vmatrix} 2 & 3 & -4 \\ 0 & -4 & 2 \\ 1 & -1 & 5 \end{vmatrix}$$

8) In how many ways 6 men can sit at a round table so that all shall not have the same neighbour in any two arrangement..?

9) Find the value of following determinants

$$\begin{vmatrix} 2x & 4y \\ x & 3y \end{vmatrix}$$

10) In how many ways can a team of 11 player be chosen from 15 players if team Captain is always included ?

11) ) If  $A = \begin{bmatrix} 4 & -3 \\ 8 & -2 \\ -1 & 0 \end{bmatrix}$        $B = \begin{bmatrix} 12 & -9 \\ 24 & -6 \\ -3 & 0 \end{bmatrix}$  Find  $2A + 3B$ .

12) ) Find the value of following determinants

$$\begin{vmatrix} x & x+1 \\ x+2 & x+3 \end{vmatrix}$$

13) If  $A = \begin{bmatrix} 4 & -3 \\ 8 & -2 \\ -1 & 0 \end{bmatrix}$        $B = \begin{bmatrix} 12 & -9 \\ 24 & -6 \\ -3 & 0 \end{bmatrix}$  Find  $3A - 2B$ .

**Q-3) Answer the following questions (Attempt any 5 from 8)**

**(15)**

1) Prove following statements of De' morgans law for complement.

i)  $(A \cup B)' = A' \cap B'$

ii)  $(A \cap B)' = A' \cup B'$

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2) Solve the following System of linear equation by cramer's rule.

$$2x + y - z = 3$$

$$x + y + z = 1$$

$$x - 2y - 3z = 4$$

3) Out of 17 consonants and 5 vowels, how many different words can be formed each Consisting of 3 consonants and 2 vowels.

4) In how many different ways can the letters of the word ADJUST be arranged so that the vowels never come together?

5) In a group of 60 people, 27 like cold drinks, 42 like hot drinks and each person like atleast one Of the two drink. How many like both drinks?

6) If  $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$ , then Find  $A + 3I$ .

Where  $I = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

7) If  $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$ , Find  $A^2$ .

8) if  $A = \begin{bmatrix} 3 & -3 & 0 \\ 6 & 3 & 9 \\ 12 & 3 & 24 \end{bmatrix}$   $B = \begin{bmatrix} 2 & 3 & 0 \\ 6 & -9 & 3 \\ 3 & 3 & -3 \end{bmatrix}$

Verify that  $(AB)' = B'A'$

**Q-4) Answer the following questions (Attempt any 3 from 5)**

**(15)**

1) Prove that  $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$  using venn diagram

2)  $A = \begin{bmatrix} 9 & 1 \\ 4 & 3 \end{bmatrix}$   $B = \begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$  Find the matrix X such that  $3A + 5B + 2X = 0$

3) If  $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$  show that  $A^3 - 3A^2 - A + 9I = 0$

4) Show that  $\begin{vmatrix} 1 & x & y+z \\ 1 & y & z+x \\ 1 & z & x+y \end{vmatrix} = 0$

5) find inverse of the following matrix

$$\begin{bmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{bmatrix}$$

\*\*\* All the Best \*\*\*