

PARUL UNIVERSITY
FACULTY OF IT & COMPUTER SCIENCE
BCA/IMCA 2018 – 19 Examination

Semester: 1

Subject Code: 05191101/ 05391101

Subject Name: Basic Mathematics

Date:03/05/2019

Time:02:00pm to 04:30pm

Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Answer the followings.**A. Write short notes.****(05)**

1. Define Null set
2. Define Square matrix
3. Define Identity matrix
4. A set containing n element has how many elements in its power set?
5. In how many different ways can the letters of the word 'PUNCTUAL' be arranged without repetition?

B. Multiple choice type questions / Give the sentence true or false**(10)**

1. 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
2. If matrix A is of order 2x3, and matrix B is of order 3x2, then what is the order of matrix AB?
a) 2x2 b) 3x3 c) 2x3 d) 3x2
3. 60° is equal to _____radian.
a) $\frac{\pi}{4}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{3}$ d) none of these
4. In how many ways can 6 men sit at a round table?
a) 24 b) 120 c) 720 d) none of these
5. $n(A) + n(B) - n(A \cap B) =$ _____
a) $n(A)$ b) $n(B)$ c) $n(A \cup B)$ d) none of these
6. $\frac{3\pi}{4}$ radians is equal to 135° degree. T/F
7. ϕ is the subset of every set. T/F
8. $\sin^2 \theta - \cos^2 \theta = 1$ T/F
9. Distance between the points (7, 8) and (6, -2) is 101. T/F
10. If set A has n elements and set B has m elements, then $A \times B$ has mn elements. T/F

Q.2 Answer the following (Any five)**(15)**

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

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

3. Find out 20th term of the sequence $-25, -20, -15, -10, \dots$

4. If $A = \{1, 4\}$, $B = \{2, 3\}$ prove that $A \times B \neq B \times A$

5. Prove that $\frac{\sin \theta}{1 - \cos \theta} = \frac{1 + \cos \theta}{\sin \theta}$

6. Show that the points (1, 4), (3, -2) & (-3, 16) are co-linear.

Q.3 Answer the following. (Any three)**(15)**

1. If $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 1 & -1 \\ -3 & 2 \end{bmatrix}$ Prove that $AB \neq BA$.

2. The 5th term of A.P. is 21 and 8th term is 33. Find the first term.

3. In how many different ways can the letters of the word ADJUST be arranged so that the vowels never come together?
4. Find the equation of line passing through the points (1, 5) and (3, -2). Also find the slope of line.

Q.4 Answer the following.

A. If $\tan^2 45^\circ - \cos^2 60^\circ = x \cdot \sin 45^\circ \cdot \tan 60^\circ$, then find value of x . (05)

B. 1. Solve following system of linear equation using Cramer's rule (05)

$$x + 2y - z = 5, 3x - y + 2z = 9, 5x + 3y + 4z = 15$$

2. If the distance between the points (5, 7) and (-3, m) is 10, then find value of m. (05)

OR

B. 1. Prove that $4(\sin^4 30^\circ + \cos^4 60^\circ) - 3(\cos^2 45^\circ - \sin^2 90^\circ) - 2 = 0$ (05)

2. Compute the inverse of following matrix (05)

$$\begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$$