

Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

M.Sc.(IT)/MCA/PGDCA (2019 Batch) (Sem.-1)

MATHEMATICS

Subject Code : PGCA-1901

M.Code : 76971

Time : 3 Hrs.

Max. Marks: 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Solve the following :

a) Perform indicated operation $\frac{3-2/3}{5+5/6}$.

b) Solve $\frac{3\sqrt{2}-4\sqrt{3}}{4\sqrt{2}+3\sqrt{3}}$

c) Write the solution set of the equation $2x^2 + 3x - 2 = 0$ in roster form.

d) If R is the set of real numbers and Q is the set of rational numbers, then what is $R - Q$?

e) Write the subsets of the set $\{a, b\}$.

f) Find negation of "At least 10 inches of rain fell today in Mumbai"

g) Show that $a \wedge b = b \wedge a$.

h) Find components of the statement "The number 100 is divisible by 3, 11 and 5".

i) Define Transpose and Scalar matrices

j) Evaluate $\begin{bmatrix} 1 & -3 & 5 \\ 4 & 6 & 0 \\ 8 & -2 & 3 \end{bmatrix} \begin{bmatrix} 1 \\ 3 \\ 0 \end{bmatrix}$.

SECTION-B

2. a) Expand $(1+\sqrt{2})(3-\sqrt{2})$.
- b) Simplify $\sqrt[3]{12} \cdot \sqrt[3]{36} + \frac{4-\sqrt{3}}{5\sqrt{3}}$.
3. a) Define Natural number, Real numbers and Irrational numbers with examples.
- b) If $X = \{a, b, c, d\}$ and $Y = \{f, b, d, g\}$, find (i) $X - Y$, (ii) $Y - X$, (iii) $X \cap Y$.
4. a) Show that $(A \cap B)^c = A^c \cup B^c$.
- b) Which of the following sets are equal ?
- $A = \{x : x^2 - 4x + 3 = 0\}$, $B = \{x : x \in \mathbb{N}, x < 3\}$, $C = \{x : x \in \mathbb{N}, x \text{ is odd } < 5\}$
5. a) Show that $(A \cup B) - (A \cap B) = (A - B) \cup (B - A)$.
- b) Determine which of the following statement is true or false.
- i) $A \cup P(A) = A$
- ii) $A - P(A) = A$
- iii) $A \cap P(A) = A$
- iv) $\{A\} \cap P(A) = A$

SECTION-C

6. a) Show that $\sim(p \vee q)$ and $\sim p \wedge \sim q$ are equivalent.
- b) Use truth table to prove $\sim(p \vee q) \equiv (\sim p \wedge \sim q)$.
7. a) Show that $(p \wedge q) \rightarrow r$ and $(p \rightarrow r) \wedge (q \rightarrow r)$ are not equivalent.
- b) Determine whether $(\sim q \wedge (p \rightarrow q)) \rightarrow \sim p$ is a tautology.

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8. a) If $A = \begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 1 \\ 7 & 8 \end{bmatrix}$, find matrix C such that $3A + 5B + 2C$ is null matrix.
- b) Show that matrix addition is commutative *i.e.* $A + B = B + A$, where A and B are $m \times n$ matrices.
9. a) Find value of x such that $\begin{bmatrix} 1 & x & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 & 2 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix} = 0$.
- b) Show that if $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$, and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find k so that $A^2 = 8A + kI$.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.