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 $\frac{3\frac{2}{5}}{5\frac{3}{6}}$.

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 $a \cup b = b \cup a$.

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

i) Define Transpose and Scalar matrices

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

SECTION-B

2. a) Expand $(1 - \sqrt{2})(3 - \sqrt{2})$.

   b) Simplify $3\sqrt{12}.3\sqrt{6} - \frac{4 - \sqrt{3}}{5\sqrt{3}}$.

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 ∩ Y.

4. a) Show that $(A \cup B)c = Ac \cap Bc$.

   b) Which of the following sets are equal ?

   A = {x : x2 – 4x + 3 = 0}, B = {x : x ∈N, x < 3}, C = {x : x ∈ N, x is odd < 5}

5. a) Show that (A ∪ B) – (A ∩ B) = (A – B) ∪ (B – A).

   b) Determine which of the following statement is true or false.

   i) A ∈ P (A) = A

   ii) A – P (A) = A

   iii) A ⊆ P (A) = A

   iv) {A} ⊆ P (A) = A

SECTION-C

6. a) Show that ~ (p ∧ q) and ~ p ∨ ~ q are equivalent.

   b) Use truth table to prove ~ (p ∧ q) ∨ (~p ∨ ~q).

7. a) Show that (p ∧ q) ∨ r and (p ∨ r) ∧ (q ∨ r) are not equivalent.

   b) Determine whether (~ q ∧ (p ∨ q)) → ~ p is a tautology.

8. a) If $A = \begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$ $\begin{bmatrix} 9 & 1 \\ 7 & 8 \end{bmatrix}$, 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 and mxn matrices.

9. a) Find value of x such that $[1 \quad x \quad 1] \begin{bmatrix} 1 & 3 & 2 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix} = 0$

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.