

Sardar Kaurey Khan Public Higher Secondary School Muzaffargarh

MATHEMATICS

1st Quarter Test

INTER PART-I

Time Allowed: 15 minutes

(Objective Type)

Max. Marks: 10

Q.1

- (i) \sqrt{n} is an irrational number if n is:
- (A) Real number (B) Prime number
(C) Not a perfect square (D) A perfect square
- (ii) The simplified form of i^{101} is:
- (A) 1 (B) -1
(C) $-i$ (D) i
- (iii) Tabular form of the set $\{x / x \in \mathbb{Q} \wedge x^2 = 2\}$ is:
- (A) $\{\sqrt{2}, -\sqrt{2}\}$ (B) $\{\sqrt{2}\}$
(C) $\{-\sqrt{2}\}$ (D) $\{ \}$
- (iv) The set of first elements of ordered pairs in a relation is called its:
- (A) Domain (B) Range
(C) Co-domain (D) None of these
- (v) Which of the following is unary operation?
- (A) Addition (B) Square root
(C) Multiplication (D) Division
- (vi) If A and B are non-singular matrices then $(AB)^{-1}$ equals:
- (A) $A^{-1}B^{-1}$ (B) $A^{-1}B$
(C) $B^{-1}A$ (D) $B^{-1}A^{-1}$
- (vii) The trivial solution of the system of the homogeneous linear equations is:
- (A) (0, 0, 0) (B) (1, 0, 0)
(C) (0, 1, 0) (D) (0, 0, 1)
- (viii) A square matrix A is called Hermitian if $(\bar{A})^t$ equal:
- (A) $-A$ (B) A
(C) \bar{A} (D) $-\bar{A}$
- (ix) If $\begin{vmatrix} x & 4 \\ 5 & 10 \end{vmatrix} = 0$ then x equals:
- (A) 2 (B) 4
(C) 6 (D) 8
- (x) If $G = \{1, -1, i, -i\}$ is group under multiplication the inverse of $-i$ is:
- (A) 1 (B) -1
(C) i (D) $-i$

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MATHEMATICS

1st Quarter Test

INTER PART-I

Time Allowed: 1:15 hours

(Subjective Type)

Max. Marks: 40

SECTION-I

Q.2 Write short answers to any TEN (10) questions.

(10 × 2 = 20)

- (i) Find modulus of complex number $1 - \sqrt{3}i$.
- (ii) Simplify $(2, 6) \div (3, 7)$.
- (iii) Simplify $\frac{4 + 16x}{4}$ by justifying each step.
- (iv) Does the set $\{0, -1\}$ possess closure property w.r.t. multiplication?
- (v) Define proper and improper subset of a set.
- (vi) From suitable properties of union and intersection, prove that:
$$A \cap (A \cup B) = A \cup (A \cap B)$$
- (vii) Construct the truth table of $[(p \rightarrow q) \wedge p] \rightarrow q$.
- (viii) If $A = \{1, 2, 3, 4\}$ then find the relation $\{(x, y) / x + y > 5\}$ in A.
- (ix) For a set $S = \{1, \omega, \omega^2\}$, set up its multiplication table.
- (x) Find the matrix A if $\begin{bmatrix} 5 & 2 \\ -2 & 1 \end{bmatrix} A = \begin{bmatrix} 2 & 1 \\ 5 & 10 \end{bmatrix}$.
- (xi) If A and B are square matrices of the same order, then explain why in general $(A + B)(A - B) \neq A^2 - B^2$.
- (xii) If all the entries of a row (or a column) of a square matrix A are zero then show that $|A| = 0$.
- (xiii) Find value of λ if $A = \begin{bmatrix} 4 & \lambda & 3 \\ 7 & 3 & 6 \\ 2 & 3 & 1 \end{bmatrix}$ is singular.
- (xiv) If $A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & 2 & -1 \\ -1 & 3 & 2 \end{bmatrix}$, show that $A + A^t$ is symmetric.
- (xv) Define a scalar matrix.

SECTION-II

Note: Attempt any TWO (02) questions.

(10 × 2 = 20)

- Q.3** (a) Show that $\begin{vmatrix} a+l & a & a \\ a & a+l & a \\ a & a & a+l \end{vmatrix} = l^2(3a+l)$. (5)
- (b) Convert $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ to logical form and prove it by constructing truth table. (5)
- Q.4** (a) Find A^{-1} if $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 1 & -1 & 1 \end{bmatrix}$. (5)
- (b) If $A = \begin{bmatrix} 1 \\ 1+i \\ i \end{bmatrix}$, find $A(\bar{A})^t$. (5)
- Q.5** (a) Show that the set consisting of elements of the form $a + \sqrt{3}b$ (a, b being rational), is an abelian group w.r.t. addition. (5)
- (b) Find rank of matrix $\begin{bmatrix} 1 & -1 & 2 & -3 \\ 2 & 0 & 7 & -7 \\ 3 & 1 & 12 & -11 \end{bmatrix}$. (5)