

TEST- 6**SYLLABUS: CH NO. 1, 2, 3**

Mathematics (New Scheme)	Inter Part - I	GROUP I / II
Time : 30 Min.	OBJECTIVE TYPE	Marks:20

Note:- You have four choices for each objective type question as A,B,C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero in that question.

- 1.1 Equation $x+4=2$ has no solution in set of
 (A) real number (B) complex number (C) integer (D) natural number
2. $(\frac{-1}{\frac{-21}{2}})^{\frac{1}{2}} =$
 (A) i (B) -i (C) 1 (D) -1
3. $\forall a, b \in R$ either $a=b$ or $a>b$ or $a<b$ name of this property is
 (A) Symmetric property (B) Transitive property
 (C) Trichotomy property (D) Reflexive property
4. π is a/an _____ number
 (A) Rational (B) Irrational (C) complex (D) odd
5. Multiplicative inverse of complex number $(a, 0)$ is:
 (A) $(-a, 0)$ (B) $(0, -a)$ (C) $(\frac{1}{a}, 0)$ (D) $(0, \frac{1}{a})$
6. If $s = \{1, w, w^2\}$ then it is a group w.r.t
 (A) $\times$ (B) $+$ (C) $-$ (D) none
7. If A and B are disjoint sets then
 (A) $A = B$ (B) $A \cap B = \emptyset$ (C) $A \cap B \neq \emptyset$ (D) none
8. Which of the following is not monoid w.r.t '+'
 (A) Z (B) W (C) N (D) R
9. A statement which can be true or false depending upon the truth values of the variable involved
 (A) tautology (B) contradiction (C) contingency (D) obscurity
10. If in a non-empty set 'G' if do sure prop. Hold then G is called
 (A) monoid (B) semi group (C) groupoid (D) group
11. $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} =$
 (A) abc (B) $4abc$ (C) 1 (D) 0
12. $(AB)^{-1} =$
 (A) $A^{-1}B^{-1}$ (B) $B^{-1}A^{-1}$ (C) AB (D) both (a) and (b)
13. A square matrix is skew symmetric if $A^t =$

14. (A) $-A$ (B) A (C) $-A^t$ (D) A^t
 15. (A) $A^t B^t$ (B) $A^t + B^t$ (C) $B^t A^t$ (D) $B^t + A^t$
 15. $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is a _____ matrix

16. (A) diagonal (B) scalar (C) row matrix (D) none of these
 The inverse of a unit matrix is.
 (A) Unit (B) Singular (C) Skew symmetric (D) Rectangular

17. If $A = \begin{bmatrix} 1 & 2 \\ 4 & 1 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 3 \\ 5 & 2 \end{bmatrix}$ then $A + B =$
 (A) $\begin{bmatrix} 0 & 5 \\ 9 & 3 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 5 \\ 6 & 7 \end{bmatrix}$ (C) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 2 & 2 \\ 1 & 1 \end{bmatrix}$
 18. The additive inverse of Matrix A is.
 (A) A (B) $-A$ (C) A^2 (D) A^3
 19. Transpose of a diagonal matrix is.
 (A) Scalar matrix (B) Diagonal matrix (C) Row matrix (D) Null Matrix
 20. A square matrix x is non-singular is.
 (A) $|x| = 0$ (B) $|x| \neq 0$ (C) $|x| = 1$ (D) $|x| = -1$



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TEST-6

SYLLABUS: CH-NO. 1, 2, 3

Mathematics (New Scheme)	Inter Part I	GROUP I / II
Time : 2:10 hours.	Subjective Type	Marks:80

SECTION-I

2. Write short answers to any EIGHT (8) questions.

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i. Does the set $\{1, -1\}$ possess closure property with respect to addition and multiplication?

ii. Write the inverse and contra positive of $q \rightarrow p$.

$$\begin{bmatrix} bc & ca & ab \\ \frac{1}{a} & \frac{1}{b} & \frac{1}{c} \\ a & b & c \end{bmatrix} = 0$$

iii. Without expansion show that

$$\frac{-7}{12} - \frac{5}{18} = \frac{-21-10}{36}$$

iv. Prove that

v. Define an onto function.

$$\begin{bmatrix} 6 & 7 & 8 \\ 3 & 4 & 5 \\ 2 & 3 & 4 \end{bmatrix} = 0$$

vi. Without expansion

$$\left(-\frac{1}{2} - \frac{\sqrt{3}}{2}i \right)^3$$

vii. Simplify

viii. Find the inverse of $\{(x,y)/y = 2x + 3, x \in \mathbb{R}\}$

ix. If $a =$

x. Factorize $3x^2 + 3y^2$

xi. Define a Semi-group $\begin{bmatrix} 1 & 1+i \\ 1 & -i \end{bmatrix}$ Find $(\overline{A})^1$

xii. Find the value of λ if $A = \begin{bmatrix} 4 & \lambda & 3 \\ 7 & 3 & 6 \\ 2 & 3 & 2 \end{bmatrix}$ is singular.

3. Write Short answers to any EIGHT (8) questions.

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i. Show that $\forall z^2 + \overline{z}^2$ is a real number.

ii. If a, b are elements of a group G then show that $(ab)^{-1} = b^{-1} a^{-1}$.

iii. Find the inverse if $\begin{bmatrix} 2 & 1 \\ 6 & 3 \end{bmatrix}$

iv. Separate $\frac{2-7i}{4+5i}$ into real and imaginary parts.

v. Write the converse, inverse of the conditional $p \rightarrow q$.

vi. If $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 0 \\ -2 & -2 & 1 \end{bmatrix}$ then find A_{12} and A_{32}

vii. Prove that $\frac{a}{b} = \frac{c}{d}$ if $ad = bc$

viii. Define proper subset and improper subset.

ix. If $A = \begin{bmatrix} 1 & 2 \\ a & b \end{bmatrix}$ and $A^2 = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ then find a and b .

$$\frac{2}{\sqrt{5+\sqrt{-8}}}$$

- x. Express _____ in the form $a+ib$
 xi. Write down power set of set $(9,11)$

xii. Prove That
$$\begin{vmatrix} 1 & a^2 & \frac{a}{bc} \\ 1 & b^2 & \frac{b}{ca} \\ 1 & c^2 & \frac{c}{ab} \end{vmatrix} = 0$$

4. Write Short answers to any NINE (9) questions.

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- i. Find the multiplicative inverse of $(1,0)$
 ii. What is difference between $\{a,b\}$ and $\{\{a,b\}\}$?
 iii. Find the inverse of the matrix of $A = \begin{vmatrix} 2i & i \\ i & -i \end{vmatrix}$
 iv. Factorize $a^2 + 4b^2$
 v. Write the power set of $\{a, \{b,c\}\}$.
 vi. If A is non-singular matrix then show that $(A^{-1})^{-1} = A$

- vii. Separate $\frac{i}{1+i}$ into real and imaginary parts.
 viii. Show that $\forall Z_1, Z_2 \in \mathbb{C} \quad |Z_1 \cdot Z_2| = |Z_1| |Z_2|$

ix. If $A = \begin{vmatrix} 1 & -1 \\ a & b \end{vmatrix}$ and $A^2 = \begin{vmatrix} 1 & 0 \\ 0 & 1 \end{vmatrix}$ find a and b

- x. Define the inverse of a relation $\{(x,y)/y=2x+3; x \in \mathbb{R}\}$

xi. Let $U = \{1,2,3,\dots,10\}$ $A = \{2,4,6,8,10\}$ $C = \{1,3,5,7,9\}$

List the members of A^c and B^c

- xii. If A is a square matrix order 3 prove that $A+A^t$ and A^t+A is symmetric matrix.

xiii. Simplify $\left(\frac{-1}{2} + \frac{\sqrt{3}}{2}i\right)^3$

SECTION – II

Note: Attempt any THREE (3) questions:

(3 x 8 = 24)

5. (a) Find real and imaginary part of $\left(\frac{1-\sqrt{3}i}{1+\sqrt{3}i}\right)^5$

5

$$\begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 1 & -1 & 1 \end{bmatrix}$$

- (b) Find A^{-1}

5

6. (a) Show that the set $\{1, w, w^2\}$ is a group under multiplication

5

- (b) Prove that $\sqrt{3}$ is irrational.

5

7. (a) Prove that $\begin{vmatrix} b+c & a & a^2 \\ c+a & b & b^2 \\ a+b & c & c^2 \end{vmatrix} = (a+b+c)(a-b)(b-c)(c-a)$

5

- (b) Convert the following theorem into logical form and prove them by constructing

truth table $(A \cup B)' = A' \cap B'$

8. (a) Find A if $\begin{bmatrix} 5 & -1 \\ 0 & 0 \\ 3 & 1 \end{bmatrix} A = \begin{bmatrix} 3 & -7 \\ 0 & 0 \\ 7 & 2 \end{bmatrix}$

5

$$\begin{bmatrix} bc & ca & ab \\ \frac{1}{a} & \frac{1}{b} & \frac{1}{c} \\ a & b & c \end{bmatrix} = 0$$

- (b) . Without expansion show that

5

9. (a) Find the inverse of $\begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 0 \\ -2 & -2 & 2 \end{bmatrix}$ by row operation.

5

- (b) Solve the system of linear equations by Cramer's Rule.

5

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

$$3x - 2y - 2z = 1 \quad 5x + y - 3z = 2$$