

1st HALF BOOK
CHAPTER NO. 1 - 6

Mathematics (New Scheme)	Inter Part I	Group- I / II
Time : 20 Min.	Objective Type	Marks:30

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.

- Equation $x+4=2$ has no solution in set of
 (A) real number (B) complex number (C) integer (D) natural number
- $\left(\begin{smallmatrix} -1 \\ -21 \\ 2 \end{smallmatrix} \right) =$
 (A) i (B) -i (C) 1 (D) -1
- $\forall a, b \in R$ 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
- $x^2 + x - 6 = 0$ is
 (A) Conditional equation (B) Identity (C) Proper fraction (D) Improper fraction
- $\frac{x^4}{1-x^4}$ is a
 (A) proper fraction (B) Improper fraction (C) Equation (D) Both a and b
- G.P is.
 $\frac{1}{3}, \frac{1}{8}, \dots$ (A) 1,3,5 (B) 1,3,9..... (C) 1 (D) 1, $\frac{1}{3}, \frac{1}{5}, \dots$
- $\sum_{k=1}^n$ is equal to :
 (A) $\frac{n}{2}$ (B) $\frac{n+1}{2}$ (C) $\frac{n(n-1)}{2}$ (D) $\frac{n(n+3)}{2}$
- If $S = \{1, w, w^2\}$ then it is a group w.r.t
 (A) $\times$ (B) $+$ (C) $-$ (D) none
- If A and B are disjoint sets then
 (A) $A = B$ (B) $A \cap B = \emptyset$ (C) $A \cap B \neq \emptyset$ (D) none
- Which of the following is not monoid w.r.t '+'
 (A) Z (B) W (C) N (D) R
- $\sum_{k=1}^n k^3 =$

(A). $\frac{n^3(n+1)}{2}$
 $(\frac{n^2(n+1)^2}{4})$

(B). $\frac{n(n+1)}{2} i^3$

(C). $\frac{n(n+1)}{4} i^2$

(D).

12. A.M between $\sqrt{2}$ and $3\sqrt{2}$ is

(A). $\sqrt{2}$

(B). $2\sqrt{2}$

(C). 6

(D). 3

13. The rational fraction $\frac{x^2-1}{x^3-2}$ is

(A) Proper fraction

(B) Improper fraction

(C) Both

(D) None

14. $x + 2y = 5$, $-3 - 6y = 15$ has

(A) One sol.

(B) no sol.

(C) Infinite sol.

(D) Two

solutions.

15. Harmonic mean between a and b is

(A). $\frac{ab}{a+b}$

(B). $\frac{a+b}{b}$

(C). $\frac{2ab}{a+b}$

(D).

$\frac{a-b}{ab}$

16. $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = i$

(A) abc

(B) $4abc$

(C) 1

(D) 0

17. $(AB)^{-1} = i$

(A) $A^{-1}B^{-1}$

(B) $B^{-1}A^{-1}$

(C) AB

(D) both (a)

and (b)

18. If $S_n = 1+2+3+i \dots +n$

(A). $n(n+1)$

(B). $n(n+2)$

(C). $\frac{n(n+2)}{2}$

(D).

$\frac{n(n+1)}{2}$

19. First four term of the sequence $a_n = (-1)^n \cdot n^2$

(A). 1, 2, 3, 4

(B) -1, 4, -9, 16

(C). 1, -4, -9, -16

(D). 1, -2, 3, -4

20. The quadratic formula is.

$$(A) \quad x = \frac{-b \pm \sqrt{b^2 - 4abc}}{2a}$$

$$(C) \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$(B) \quad x = \frac{-b \pm \sqrt{b^2 - 4a}}{2a}$$

$$(D) \quad x = \frac{-b \pm \sqrt{b^2 - 4abc}}{2ab}$$

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Mathematics (New Scheme)	Inter Part I	Group- I / II
Time : 2:30 hours.	Subjective Type	Marks:80

SECTION - I

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

16

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

$$\frac{26}{5}$$

v. Sum of positive number and its reciprocal is $\frac{26}{5}$. Find number.

$$\frac{1}{x^2-1}$$

vi. Resolve into partial fraction.

vii. Solve by quadratic formula $15x^2 + 2ax - a^2 = 0$

$$\frac{(7x+25)}{(x+3)(x+4)}$$

viii. Resolve into partial fraction

$$\frac{1}{\alpha}, \frac{1}{\beta}, \frac{1}{c}$$

ix. If $\frac{1}{\alpha}, \frac{1}{\beta}$ and $\frac{1}{c}$ are in G.P, show that common ratio is $\pm \sqrt{\frac{a}{c}}$

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

x. Without expansion

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

xi. Simplify

$$\begin{bmatrix} 1 & 1+i \\ 1 & -i \end{bmatrix}$$

xii. Define a Semi-group

$$\text{Find } (\bar{A})^1$$

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

16

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

- ii. Find the inverse if $\begin{bmatrix} 2 & 1 \\ 6 & 3 \end{bmatrix}$
- iii. Separate $\frac{2-7i}{4+5i}$ into real and imaginary parts.
- iv. Write the converse, inverse of the conditional : $p \rightarrow q$.

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

- vi. Convert into partial fraction $\frac{3x^2+1}{x^2-1}$
- vii. Show that $(x-1)$ is a factor of $x^2 + 4x - 5$

- viii. Resolve into partial fraction $\frac{3x}{(x-1)(x+2)}$
- ix. Show that roots of $(p+q)x^2 - px - q = 0$
- x. Find two G. Ms between 1 and 8

- xi. Write formulas for $\sum_{k=1}^n k$ and $\sum_{k=1}^n k^2$
- xii. Find geometric mean between two numbers a and b .

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

18

- i. Resolve $\frac{2x+1}{(x+2)(x+3)}$
- ii. Solve the system of equation $2x^2=6+3y^2$, $3x^2-5y^2=7$
- iii. Write the partial fraction form of $\frac{2x^4-3x^2-4x}{(x^2+2)^2(x+1)^2}$
- iv. Evaluate $(1+w-w^2)^8$
- v. Write in partial fraction $\frac{9x-7}{(x^2+1)(x+3)}$
- 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. Find the 5th term of 3,6,12.....

x. If the numbers $\frac{1}{k}, \frac{1}{2k+1}, \frac{1}{4k-1}$ are in harmonic sequence, Find K.

xi. If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in A.P show that $b = \frac{2ac}{a+c}$

xii. Find the 12th term of harmonic sequence $\frac{1}{2}, \frac{1}{5}, \frac{1}{8}, \dots$

xiii. If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in A.P show that common difference is $\frac{a-c}{2ac}$

SECTION – II

Note: Attempt any THREE (3) questions:

(3 x 10 = 30)

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) Given nth terms of the series, find the sum of 2n terms $n^3 + 2n + 3$

(b) Find n so that $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ may be H.M between a and b.

5

8. (a) Prove that $\frac{x^2}{a^2} + \frac{(mx+c)^2}{b^2} = 1$ will have equal roots if $c^2 = a^2 m^2 + b^2$

5

here $a \neq 0, b \neq 0$

(b) Resolve into partial fraction $\frac{1}{(x-1)^2(x^2+2)}$

5

9. (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

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