Name: Ansa Imran Class: 1st year Roll No. 240401
Subject: Math Test No. Date:

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	●	○	○	6	○	○	○	○	11	○	○	○	○	16	○	○	○	○
2	○	●	○	○	7	○	○	○	○	12	○	○	○	○	17	○	○	○	○
3	○	○	○	●	8	○	○	○	○	13	○	○	○	○	18	○	○	○	○
4	●	○	○	○	9	○	○	○	○	14	○	○	○	○	19	○	○	○	○
5	○	○	○	○	10	○	○	○	○	15	○	○	○	○	20	○	○	○	○

Marks Obtained

(Assignment)

SUBJECTIVE TYPE

Q no 2

Short Questions

(i)

Semi group: A non-empty set S is semi group. A semi group is a set S together with a binary operation. (that is a function $: S \times S \to S$) that specifies associative property.

(ii)

table of multiplication:

$\times$	0	1	2	3	4
0	0	0	0	0	0
1	0	1	2	3	4
2	0	2	4	1	3
3	0	3	1	4	2
4	0	4	3	2	1

(iii)

$A = \begin{bmatrix} i & 0 \\ 1 & -i \end{bmatrix}$, Show that $A^4 = I_2$

$$A^2 = \begin{bmatrix} i & 0 \\ 1 & -i \end{bmatrix}\begin{bmatrix} i & 0 \\ 1 & -i \end{bmatrix}$$

$$= \begin{bmatrix} i^2+0 & 0+0 \\ i-i & 0+i^2 \end{bmatrix}$$

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

Now:

$$A^2 \cdot A^2 = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$$

$$= \begin{bmatrix} 1+0 & 0+0 \\ 0+0 & 0+1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$A^4 = I_2$$

Question no 3

Attempt Long Question

Prove that all 2×2 non-singular matrices

Student Name: Sheet #

Solution:

$$G = \left\{ \begin{bmatrix} a & b \\ c & d \end{bmatrix} \middle| \begin{bmatrix} a & b \\ c & d \end{bmatrix} \neq 0 ; a, b, c, d \in \mathbb{R} \right\}$$

1- closure:

$\forall \; A, B \in G$

$(A \; B) \in G$

$2 \times 2 \quad 2 \times 2$

So G is closed w.r.t "x"

2- Associative:

$\forall \; A, B, C \in G$

$A(BC) = (AB)C$

Always hold in matrices.

3- Identity:

$$I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$IA = AI = A$$

So identity property is hold.

4- Inverse

let

$A_{2\times2} \in G \; \exists \; A^{-1} \in G$

Such that

$$AA^{-1} = I = A^{-1}A$$

So, inverse is hold.

5- Commutative property:

$\forall \; A, B \in G$

$AB \neq BA$ (In General)

Hence G is a non Abelian Group.