SUBJECT: FOUNDATIONS OF ALGEBRAIC STRUCTURES AND NUMBER THEORY

SEMESTER / YEAR   : III Semester / II year

UNIT I - GROUPS AND RINGS

Groups : Definition - Properties - Homomorphism - Isomorphism - Cyclic groups - Cosets - Lagrange's theorem. Rings: Definition - Sub rings - Integral domain - Field - Integer modulo n - Ring homomorphism

PART-A

Q.No.	Question	Bloom's Taxonomy Level	Domain
1.	Define group and State any two properties of a group.	BTL -1	Remembering
2.	Prove that identity element in a group is unique.	BTL -4	Analyzing
3.	Find the idempotent elements of $G = \{1, -1, i, -i\}$ under the binary operation multiplication	BTL -2	Understanding
5.	Prove that if G is abelian group, then for all $a, b \in G, (a * b)^2 = a^2 * b^2$	BTL -4	Analyzing
6.	Show that every cyclic group is abelian.	BTL -2	Understanding
7.	If a is a generator of a cyclic group G, then show that a^{-1} is also a generator of G.	BTL -6	Creating
8.	Show that $(Z_5, +_5)$ is a cyclic group.	BTL -6	Creating
9.	Find the left cosets of $\{[0], [3]\}$ in the addition modulo group $(Z_6, +_6)$.	BTL -3	Applying
10.	State Lagrange's theorem.	BTL -1	Remembering
11.	Prove that the order of an element a of a group G is the same as that of its inverse (a^{-1})	BTL -1	Remembering
12.	Define a ring and give an example	BTL -1	Remembering
13.	Define ring homomorphism and Ring Isomorphism	BTL -1	Remembering
14.	Define sub ring with example	BTL -1	Remembering
15.	Define ideal with example	BTL -1	Remembering
16	Find x such that $25x \equiv 3(mod 72)$.	BTL -2	Understanding
17	Define integral domain and give an example.	BTL -4	Analyzing