

# NADAR SARSWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch: BE/CSE	Year / Semester : III/V	Format No.	NAC/TLP-07a.13
Subject Code :MA8551	Subject Name :ALGEBRA AND NUMBER THEORY	Rev. No.	02
Unit No : I	Unit Name: GROUPS AND RINGS	Date	30-09-2020

## OBJECTIVE TYPE QUESTION BANK

S. No.	Objective Questions (MCQ /True or False / Fill up with Choices )	BTL
1	A trivial subgroup consists of _____ a) <b>Identity element</b> b) Coset    c) Inverse element    d) Ring	L1
2	Minimum subgroup of a group is called _____ a) a commutative subgroup    b) a lattice c) <b>a trivial group</b> d) a monoid	L1
3	_____ is not necessarily a property of a Group. a) <b>Commutativity</b> b) Existence of inverse for every element c) Existence of Identity    d) Associativity	L1
4	If $P_1 = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 2 & 5 & 1 & 4 & 6 \end{pmatrix}$ then $P_1^{-1}$ is a) $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 2 & 3 & 5 & 1 & 6 & 4 \end{pmatrix}$ b) $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 4 & 2 & 1 & 5 & 3 & 6 \end{pmatrix}$ c) $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 3 & 2 & 5 & 1 & 4 & 6 \end{pmatrix}$ d) $\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 6 & 2 & 4 & 1 & 5 & 3 \end{pmatrix}$	L4
5	A group of rational numbers is an example of _____ a) a subgroup of a group of integers b) <b>a subgroup of a group of real numbers</b> c) a subgroup of a group of irrational numbers d) a subgroup of a group of complex numbers	L2
6	Intersection of subgroups is a _____ a) group    b) <b>subgroup</b> c) semi group    d) cyclic group	L2
7	The group of matrices with determinant _____ is a subgroup of the group of invertible matrices under multiplication. a) 2    b) 3    c) <b>1</b> d) 4	L2
8	A normal subgroup is _____ a) a subgroup under multiplication by the elements of the group b) an invariant under closure by the elements of that group c) a monoid with same number of elements of the original group	L2

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	d) an invariant equipped with conjugation by the elements of original group	
9	Two groups are isomorphic if and only if _____ is existed between them. a) homomorphism    b) endomorphism <b>c) isomorphism</b> d) association	L2
10	An algebraic structure _____ is called a semi group. <b>a) (P, *)</b> b) (Q, +, *)    c) (P, +)    d) (+, *)	L2
11	Condition for monoid is _____ a) $(a+e) = a$ b) $(a*e) = (a+e)$ c) $a=(a*(a+e))$ <b>d) <math>(a*e)=(e*a)=a</math></b>	L2
12	Matrix multiplication is a/an _____ property. a) Commutative <b>b) Associative</b> c) Additive    d) Disjunctive	L1
13	A cyclic group can be generated by a/an _____ element. <b>a) singular</b> b) non-singular    c) inverse    d) multiplicative	L1
14	A cyclic group is always _____ <b>a) abelian group</b> b) monoid    c) semigroup    d) subgroup	L2
15	{1, i, -i, -1} is _____ a) semigroup    b) subgroup <b>c) cyclic group</b> d) abelian group	L2
16	A subgroup has the properties of _____ a) Closure, associative b) Commutative, associative, closure c) Inverse, identity, associative <b>d) Closure, associative, Identity, Inverse</b>	L1
17	If $a * b = a$ such that $a * (b * c) = a * b = a$ and $(a * b) * c = a * b = a$ then _____ <b>a) * is associative</b> b) * is commutative    c) * is closure    d) * is abelian	L1
18	The set of rational numbers form an abelian group under _____ a) Association    b) Closure <b>c) Multiplication</b> d) Addition	L2
19	A function defined by $f(x)=2*x$ such that $f(x+y)=2x+y$ under the group of real numbers, then _____ a) Isomorphism exists <b>b) Homomorphism exists</b>	L1

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	c) Heteromorphic exists      d) Association exists	
20	If $x * y = x + y + xy$ then $(G, *)$ is _____ a) Monoid                              b) Abelian group <b>c) Commutative semigroup</b> d) Cyclic group	L1
21	$a * H = H * a$ relation holds if _____ a) H is semigroup of an abelian group      b) H is monoid of a group c) H is a cyclic group <b>d) H is subgroup of an abelian group</b>	L2
22	Lagrange's theorem specifies _____ a) the order of semi group is finite <b>b) the order of the subgroup divides the order of the finite group</b> c) the order of an abelian group is infinite d) the order of the semigroup is added to the order of the group	L1
23	An isomorphism of a group onto itself is called _____ a) homomorphism                              b) heteromorphism c) epimorphism <b>d) automorphism</b>	L1
24	How many different non-isomorphic Abelian groups of order 8 are there? a) 5    b) 4 <b>c) 2</b> d) 3	L3
25	A commutative ring $(R, +, \cdot)$ with identity and without zero-divisors is called _____ a) Ideal <b>b) Integral domain</b> c) field    d) Boolean	L1
26	$Z_n$ is a field if and only if n is _____ a) odd    b) even <b>c) a prime</b> d) composite	L1
27	In $Z_n$ , [a] is a unit if and only if $\text{g.c.d}(a, n) =$ _____ a) a    b) n <b>c) 1</b> d) an	L4
28	If the set of integer Z with the binary operation $\oplus$ and $\ominus$ defined by $a \oplus b = a + b - 1$ and $a \ominus b = a + b - ab \quad \forall a, b \in Z$ is a commutative ring with identity, then the inverse of $\oplus$ is _____ a) 1    b) $1 - a$ <b>c) <math>2 - a</math></b> d) $2 + a$	L3

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29	$[100]^{-1}$ in ring $Z_{1000}$ is _____ a) [100] <b>b) [111]</b> c) [101]   d) [222]	L5
30	The set $Z_4 = \{0, 1, 2, 3\}$ is a commutative ring with respect to the binary operation $+_4$ and $x_4$ the identity element 3 in $+_4$ is _____ a) 0 <b>b) 1</b> c) 2   d) 3	L3

