United College of Engineering and Research, Allahabad

Department of Computer Science & Engineering

B.Tech CSE- III Semester

Set-2

Course Name: Discrete Structure and Theory of Logic **AKTU Course Code:**KCS-303

Time: 45 Minutes **Max. Marks: 30**

- **All Questions are compulsory.**
- **All Questions carry one mark.**

Q. No.	Questions	CO
1	A cyclic group is always _____ A) abelian group B) monoid C) semigroup D) subgroup	CO2
2	A function f:(M,∗)→(N,×) is a homomorphism if _____ A) f(a*b) = a * b B) f(a*b) = a / b C) f(a*b) = f(a) + f(b) D) f(a*b) = f(a) x f(a)	CO2
3	This is an abelian group { –3 n : n ∈ Z } under? A. division B. subtraction C. addition D. multiplication	CO2
4	What is the inverse of – i If G = { 1, -1, i, – i } is group under multiplication? A. −1 B. i C. 1 D. None of Above	CO2
5	The monoid is a …. A. a non-abelian group B. groupoid C. A group	CO2

	D. a commutative group	
6	$(ba)^{-1}$ =_____ If a, b are elements of a group G? A. b^{-1} a B. a^{-1} b C. b^{-1} a^{-1} D. a^{-1} b^{-1}	**CO2**
7	What is the value of $(a^{-1}\ b)^{-1}$ is in the group (G, .)? A. $b^{-1}a$ B. ab^{-1} C. ba^{-1} D. $a^{-1}b$	**CO2**
8	What is the inverse of a , if (Z,*) is a group with a*b = a+b+1 ∀ a, b ∈Z? A. -2 B. 0 C. -a-2 D. a-2	**CO2**
9	What is the identity element in the group G = {2, 4, 6, 8) under multiplication modulo 10? A. 5 B. 9 C. 6 D. 12	**CO2**
10	Which statement is false? A. The set of rational integers is an abelian group under addition B. The set of rational numbers form an abelian group under multiplication C. The set of rational numbers is an abelian group under addition D. None of these	**CO2**
11	Let G be a group of order 6, and H be a subgroup of G such that 1<|H|<6. Which one of the following options is correct? (A) Both G and H are always cyclic (B) G may not be cyclic, but H is always cyclic (C) G is always cyclic, but H may not be cyclic (D) Both G and H may not be cyclic	
12	A binary operation on a set of integers is defined as x y = $x^2 + y^2$. Which one of the following statements is TRUE about ?	

	(A) Commutative but not associative (B) Both commutative and associative (C) Associative but not commutative (D) Neither commutative nor associative	
13	Consider the set S = {1, ω, ω2}, where ω and w^2 are cube roots of unity. If * denotes the multiplication operation, the structure (S, *) forms (A) A group (B) A ring (C) An integral domain (D) A field	
14	Which one of the following is NOT necessarily a property of a Group? (A) Commutativity (B) Associativity (C) Existence of inverse for every element (D) Existence of identity	
15	For the composition table of a cyclic group shown below * a b c d a a b c d b b a d c c c d b a d d c a b Which one of the following choices is correct? (A) a, b are generators (B) b, c are generators	

	(C) c, d are generators (D) d, a are generators	
16	Let A = { 1,2,3,4,…….∞ } and a binary operation '+' is defined by a + b = ab ∀ a,b ∈ A. Which of the following is true ? (A) (A, +) is a semi group but not monoid (B) (A, +) is a monoid but not group (C) (A, +) is a group (D) (A, +) is not a semi group	
17	The set {1, 2, 3, 5, 7, 8, 9} under multiplication modulo 10 is not a group. Given below are four plausible reasons. Which one of them is false? (A) It is not closed (B) 2 does not have an inverse (C) 3 does not have an inverse (D) 8 does not have an inverse	
18	Let G be a group with 15 elements. Let L be a subgroup of G. It is known that L != G and that the size of L is at least 4. The size of L is _____. (A) 3 (B) 5 (C) 7 (D) 9	
19	The set {1, 2, 4, 7, 8, 11, 13, 14} is a group under multiplication modulo 15. The inverses of 4 and 7 are respectively (A) 3 and 13 (B) 2 and 11 (C) 4 and 13 (D) 8 and 14	

20	Consider the set ∑* of all strings over the alphabet ∑ = {0, 1}. ∑* with the concatenation operator for strings (A) does not form a group (B) forms a non-commutative group (C) does not have a right identity element (D) forms a group if the empty string is removed from ∑*	
21	Which of the following is true? (A) The set of all rational negative numbers forms a group under multiplication. (B) The set of all non-singular matrices forms a group under multiplication. (C) The set of all matrices forms a group under multiplication. (D) Both (2) and (3) are true.	
22	The binary operator ≠ is defined by the following truth g table Which one of the following is true about the binary operator ≠? **p** **q** **p ≠ q** 0 0 0 0 1 1 1 0 1 1 1 0 (A) Both commutative and associative (B) Commutative but not associative (C) Not commutative but associative (D) Neither commutative nor associative	
23	Let *(Z, *)* be an algebraic structure where Z is the set of integers and the operation ∗ is defined by $n * m = max(n . m)$. Which of the following	

	statements is true for *(Z, *)* ? (A) (Z, *) is a monoid (B) (Z, *) is an Abelian group (C) (Z, *) is a group (D) None of the above	
24	Which of the following statement is false? (A) The set of rational numbers is an abelian group under addition (B) The set of integers in an abelian group under addition (C) The set of rational numbers form an abelian group under multiplication (D) The set of real numbers excluding zero is an abelian group under multiplication	
25	Which one of the following is false? (A) The set of all bijective functions on a finite set forms a group under function composition. (B) The set {1, 2, ..., p-1} forms a group under multiplication mod p where p is a prime number (C) The set of all strings over a finite alphabet ∑ forms a group under concatenation (D) A subset S≠∅ of G is a subgroup of the group if and only if for any pair of element a, b ∈ S, a∗b^−1 ∈ S	
26	Every cyclic group is a/an _____ a) infinite subgroup b) abelian group c) monoid	

	d) commutative semigroup	
27	The number of generators of cyclic group of order 219 is _____ a) 144 b) 124 c) 56 d) 218	
28	Let K be a group with 8 elements. Let H be a subgroup of K and H<K. It is known that the size of H is at least 3. The size of H is _____ a) 8 b) 2 c) 3 d) 4	
29	Intersection of subgroups is a _____ a) group b) subgroup c) semigroup d) cyclic group	
30	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 d) an invariant equipped with conjugation by the elements of original group	

Answer

1-A	2-D	3-C	4-B	5-A	6-D	7- A	8-C	9-C	10-B
11-B	12-A	13-A	14-A	15-C	16-B	17-C	18-B	19-C	20-A
21-B	22-A	23-D	24-C	25-C	26-B	27-A	28-D	29-B	30-D