**18MAB302T-Discrete Mathematics**

**Unit-IV**

**Group Theory**

1. If G is a group of order n then, order of identity element is

i) **1** ii) > 1 iii) < 1 iv) n

2. If G is a group , then for all a,b G



i) (ab)-1=a-1b-1 ii) **(ab)-1=b-1a-1** iii) (ab)-1=ab iv) (ab)-1=ba

3. In a group G,for each element a G, there is



i)No inverse ii) **Unique inverse** iii) Two inverses iv) Many inverses

4. The identity permutation is

i) **Even permutation** ii) odd permutation iii) Neither even nor odd iv) None of these

5. The inverse of an odd permutation is

It i) **Odd** ii) Even iii) Even or odd iv) Neither even nor odd

6. The product of (1 2 4 5)(3 2 1 5 4) is

i)**(2 3)** ii)(1 5) iii)(3 4 1) iv)(1 5 3 1)

7. If G is a group and a G such that a2=a then a is



i) **Identity** ii) Inverse iii)Zero element iv) non identity

8. If G is a group of even order for all a e if a2=e then G is



i)**Abelian**  ii)Subgroup iii)Normal group iv)Quotient group

9. Every group of prime order is

i) **Cyclic**  ii) Abelian iii)Subgroup iv)Normal group

10. The number of elements in a group is

i) Identity ii) **Order of group** iii) Inverse iv)order of an element

11. In a group G for all a in G is

i)**(a-1)-1 =a** ii) (a-1)-1 =a2 iii) (a-1)-1 =1/a iv) (a-1)-1 =-a

12. If G is a finite group of order n, then for every a in G ,we have

i) an=a-1 ii) an=a iii) **an=e** iv) an=-a

13.If a, a-1 in G, a group and order of a and a-1 are m and n respectively then

i)m>n ii) **m=n** iii)m<n iv) mn



14.If G={1,-1,-i, i} is a group,then order of i is

i) 1 ii) 2 iii) 3 iv) **4**

15.The permutation is



i) **(1 5 )(1 3)(2 4)** ii) (1)(2)(3) iii) (1 3 5)(5 6 ) iv) (1 4 2)(3 5)

16. A: All cyclic groups are abelian B: Order of cyclic group is same as the order of its generator

i) A and B are false ii) **A and B are true** iii) A is true iv) B is False

17. A ring R is an integral domain if

i) R is commutative ring

ii) R is commutative ring with zero divisors

iii) **R is commutative ring with non-zero divisors**

iv) R is a ring with zero divisors

18.The non zero elements a ,b of a ring R are called zero divisors if

i) **a.b=0** ii) a.b=1 iii) a.b 0 iv) a.b1



19.HK is a subgroup of G iff

i) **HK=KH** ii) HKKH iii) HK KH iv) HK KH



20.If H and K are two right cosets of subgroup G then

i) **HK= or H=K** ii) HK= iii) HK= iv) HK and HK



21. If x = 1011, y = 0101, then H(x,y) is

i) **3** ii) 2 iii) 4 iv) 1

22. A device is used to improve the efficiency of the communication channel is

i) Channel ii) **Encoder**  iii) Decoder iv) Noise

23. The intersection of two subgroups of a group G is also

i) Homomorphism ii) **Subgroup** iii) Half Multiplier iv) Normal subgroup

24. A code can correct all combinations of k errors or fewer errors if and if the minimum distance between any two code is

i) atmost (2k + 1) ii) **atleast (2k + 1)** iii) exactly (k + 1) iv) exactly (2k + 1)

25. A code can detect atmost k errors if and if the minimum distance

between any two code is

i) atmost (k + 1) ii) **atleast (k + 1)** iii) exactly (k + 1) iv) atmost (2k + 1)

26. If G={1,-1,-i, i} is a group,then order of -1 is

i) 1 ii) **2**  iii) 3 iv) 4

27. A semigroup (G,\*) with identity is called as

i) Quasi ii) **Monoid** iii) group iv) cyclic group

28. (N,+) where N is a set of all natural numbers , is

i) Quasi ii) Monoid iii) group iv) **semi group**

**29.** In the set G={1,-1,i,-i} under multiplication is a group ,an inverse element of -1 of G is

i) 1 ii) **-1**  iii) i iv) –i

30. (R,\*) is defined as x\*y=x+y+2xy for all x,y in R , an identity element is

i) 1 ii) **0**  iii) 2 iv) –1

31. Let {1,3,7,9} is an abelian group under multiplication modulo 10.Then Inverse element of 9 is

i) 1 ii) 3 iii) 7 iv) **9**

32. The necessary and sufficient condition that a nonempty subset H of a group G to be a subgroup is

i) a\*b H ii) **a\*b-1 H** iii) a\*b H iv) a\*b-1 H



33. If f : G G’ is a homomorphism then ker f={e} iff f is



i) onto ii) **1-1** iii) into iv) many to one

34. Any two left cosets of H in G are

i) disjoint ii) identical iii) disjoint and identical iv) **either** **disjoint or identical**

35.The order of any element of a finite group G divides

i) order of a subgroup ii) **order of a group** iii) order of an another element

iv) None of these

36. Let H and K be two subgroups of a group G.Then HUK is a subgroup iff

i) only H K ii) only K H iii) H=K iv) **either H K or K H**



**Answers**

1. (i) 11. (i) 21.(i) 31.(iv)

2. (ii) 12. (iii) 22.(ii) 32.(ii)

3. (ii) 13. (ii) 23.(ii) 33.(ii)

4. (i) 14. (iv) 24.(ii) 34.(iv)

5. (i) 15. (i) 25.(ii) 35.(ii)

6. (i) 16. (ii) 26.(ii) 36.(iv)

7. (i) 17. (iii) 27.(ii)

8. (i) 18. (i) 28.(iv)

9. (i) 19. (i) 29.(ii)

10.(ii) 20. (i) 30.(ii)