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 $\in$ G

i) $(ab)^{-1}=a^{-1}b^{-1}$ ii) **$(ab)^{-1}=b^{-1}a^{-1}$** iii) $(ab)^{-1}=ab$ iv) $(ab)^{-1}=ba$

3. In a group G,for each element a $\in$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 $\in$ G such that $a^2=a$ 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 $\neq$ e if $a^2=e$ 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)$\mathbf{(a^{-1})^{-1} = a}$ ii) $(a^{-1})^{-1} = a^2$ 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) $a^n=a^{-1}$ ii) $a^n=a$ iii) $\mathbf{a^n=e}$ iv) $a^n=-a$

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) $m \neq n$

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 $\begin{pmatrix} 1 & 2 & 5 & 3 & 4 \\ 3 & 4 & 1 & 5 & 2 \end{pmatrix}$ 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) $a.b \neq 0$ iv) $a.b \neq 1$

19.HK is a subgroup of G iff

i) **HK=KH** ii) HK $\subset$ KH iii) HK $\supset$ KH iv) HK $\neq$ KH

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

i) **H $\cap$ K= ϕ or H=K** ii) H $\cap$ K= ϕ iii) H $\cup$ K= ϕ iv) H $\neq$ K and H $\cap$ K $\neq$ ϕ

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) $a*b \in H$ ii) **$a*b^{-1} \in H$** iii) $a*b \notin H$ iv) $a*b^{-1} \notin H$

33. If $f : G \rightarrow G'$ 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 $H \subseteq K$ ii) only $K \subseteq H$ iii) H=K iv) **either $H \subseteq K$ or $K \subseteq H$**

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)	