**Department of Mathematics**

M.Sc. (I Year /I Sem ) Question Bank

**Paper – I** (101), Subject: **Algebra**

**U n i t – I**

**I. Choose the correct answer and write the appropriate letter in the brackets:-**

1. Let G be a group, define a\*x=ax∀ a,x ∈G. Then the set G is a \_\_\_\_ [ ]

a) G – set

b) Action

c) Conjugation

d) One – One

e) Onto

2. Let G be a group acting on a set X, then Gx={g∈G/gx=x} is called a \_\_\_ [ ]

a) Orbit

b) stabilizer

c) Onto

d) One-One

e) None of these

3. Every group of order P2 (P is prime) is \_\_\_\_\_\_ [ ]

a) Cyclic

b) Normal

c) Abelian

d) Onto

e) All of these

4. Let G = {1, -1, i, -i} then G is a \_\_\_ [ ] a) Normal Series

b) Composition Series

c) Normal Series and Composition series

d) Orbit

e) None of these

5. An abelian group G has composition series ⇔ G is \_\_\_\_\_\_\_ [ ]

a) Infinite

b) Finite

c) Onto

d) Cyclic

e) None of these

6. If G (K) = {e}, for some +ve integer K. Then G is said to be [ ]

a) Solvable

b) Nilpotent

c) Normal

d) G – Set

e) Conjugation

7. A group of order Pn (P is prime) is \_\_\_\_\_\_\_\_\_\_\_ [ ]

a) Solvable

b) Normal

c) Nilpotent

d) Orbit

e) All of these

8. Every Nilpotent group is \_\_\_\_\_\_\_\_\_\_\_ [ ]

a) Abelian

b) Solvable

c) Normal

d) G-Set

e) None of these

9. A permutation of order ‘2’ is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [ ]

a) Cyclic

b) Transposition

c) Abelian

d) Normal

e) All of these

10. If g2=e ∀ g∈G, then G is \_\_\_\_\_\_\_\_\_\_\_\_ [ ]

a) Cyclic

b) Abelian

c) Normal

d) Solvable

e) Nilpotent

11. Let G be a group acting on a set X, then Gx={ax/a∈G} is called \_\_\_\_\_ [ ]

a) Orbit

b) Stabilizer

c) Onto

d) One-One

e) All of these

12. Transpositions of (1,2,3,4,5) is \_\_\_\_\_\_\_\_\_\_ [ ]

a) (1 2) (1 3)

b) (1 5) (1 4)

c) (1 2) (1 4)

d) (1 2) (1 2) (1 4)

e) (1 5) (1 4) (1 3) (1 2)

13. Any two compositions series of a finite group are \_\_\_\_\_\_ [ ]

a) Disjoint

b) Equivalent

c) Cyclic

d) Normal

e) None of these

14. If G is solvable, then every homomorphic image of G are \_\_\_\_\_\_\_\_\_\_ [ ]

a) Solvable

b) Nilpotent

c) Normal

d) Cyclic

e) None of these

15. If Zm(G), for some m, then G is said to be \_\_\_\_\_\_ [ ]

a) Solvable

b) Normal

c) Nilpotent

d) All of these

e) None of these

16. Every abelian group is [ ]

a) Solvable

b) Nilpotent

c) Solvable & Nilpotent

d) Cyclic

e) None of these

17. Cayley’s theorem states that a group G isomorphic into the \_\_\_\_\_ [ ]

a) P – group

b) Octic group

c) Symmetric group

d) All of these

e) None of these

18. If σ = (1 5 3), then σ-1 value is \_\_\_\_\_\_ [ ]

a) (1 5 3)

b) (1 3 5)

c) (3 5 1)

d) (5 1 3)

e) None of these

19. Let G be a group, an isomorphism from G onto it self is called an \_\_\_\_ [ ]

a) Automorphism

b) Inner automorphism

c) 1-1

d) Onto

e) All of these

20. If G is nilpotent, then every homomorphic image of G is \_\_\_\_\_ [ ]

a) Normal

b) Simple

c) Nilpotent

d) Solvable

e) None of these

21. Every subgroup of solvable group is \_\_\_\_\_\_ [ ] a) Nilpotent

b) Solvable

c) Simple

d) Normal

e) Octic

22. Relation ‘~’ is an equivalence relation, if it is [ ]

a) Reflexsive

b) Transitive

c) Symmetric

d) Reflexsive, Symmetric & Transitive

e) None of these

23. If a cyclic group has exactly one composition series then it is a \_\_\_\_\_\_\_ [ ]

a) P – group

b) Octic group

c) Siple group

d) Nilpotent

e) All of these

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**Paper – I** (101), Subject: **Algebra**

**U n i t – II**

1. If each element ≠e of a finite group G of order 2, then \_\_\_\_\_ [ ]

a)

b) n-1

c) n

d) n-2

e)

2. The number of non-isomorphic abelian group of order 360 is \_\_\_\_ [ ] a) 6

b) 8

c) 7

d) 5

e) 9

3. The order of every element in G some power of P then a finite group G is called [ ]

a) Group

b) P-group

c) P-sub group

d) Octic group

e) None of these

4. If a group of order 63, Then it is a \_\_\_\_\_\_ [ ]

a) Simple

b) Not - Simple

c) P-group

d) Not P-group

e) None of these

5. The number of non-abelian groups of order ‘8’ is \_\_\_\_ [ ]

a) 3 b) 2

c) 4 d) 5

e) 9

6. A finite group ‘G’ order is a power of P ⇔ Then G is a \_\_\_\_\_\_ [ ]

a) Group

b) p-group

c) Octic group

d) Sub group

e) All of these

7. Let G be a finite group, and let P be a prime. Then all sylow-P

Subgroups of G are \_\_\_\_ [ ]

1. Disjoint
2. Isomorphic
3. Conjugate
4. Normal
5. None of these

8. A sylow P-subgroup of finite group G is unique. Then G is [ ]

a) Abelian

b) Cyclic

c) Conjugate

d) Normal

e) None of these

9. The group is a direct sum of K = { } and H = \_\_\_\_ [ ]

a) { }

b) { }

c) { }

d) {}

e) { }

10. Any group of order 15 is \_\_\_\_\_ [ ]

a) Cyclic

b) Abelian

c) P-group

d) Octic

e) None of these

11. A direct product of cyctic group is \_\_\_\_\_ [ ]

a) Cyclic

b) Abelian

c) Group

d) Normal

e) None of these

12. The group cannot be written as the \_\_\_of two subgroups of order 2. [ ]

a) Product

b) Direct product

c) Sum

d) Direct sum

e) None of these

13. Let G be a group then \_\_\_\_\_\_ [ ]

a) 11 b) 22

c) 33 d) 77

e) 55

14. The value of = \_\_\_\_\_\_\_ [ ]

a) 3 b) 4

c) 5 d) 2

e) 1

15. If the order of a finite group G is divisible by a prime number P, then G has an element of order \_\_\_\_\_ [ ]

a) P2 b) P3

c) P d) Pn

e) P n-1

16. If G is a cyclic group of order mn, where (m,n)=1, then \_\_\_\_, where =m and =n [ ]

a) HxK G



b) G HxK



c) GHxK



d) HK



e) HG



17. A finite group G is P-group ⇔ its order is a \_\_\_\_\_\_\_ [ ] a) Power of P

b) P

c) P2

d) Power of P2

e) All of these

18. The Lagrange’s theorem is =\_\_\_\_\_ [ ]

a)

b)

c)

d)

e)

19. Let G = {1, -1} then G is \_\_\_\_ [ ]

a) P2 group

b) P-group

c) Octic group

d) None of these

20. If a group of order 56, then it is a \_\_\_\_\_\_\_\_ [ ]

a) Simple

b) Not Simple

c) P-Group

d) All of these

e) None of these

21. How many abelian groups exist in a group of order P2 [ ]

a) 2 b) 3

c) 4 d) 5 e) 1

22. A sylow P-subgroup of a finite group G is Normal ⇔ it is \_\_\_\_ [ ]

a) Normal

b) Subgroup

c) Unique

d) Abelian

e) None of these

23. The value of = \_\_\_\_\_ [ ]

a) 2 b) 3

c) 4 d) 5 e) 6

24. In a group of order pq (q>p). Exist only a groups are [ ]

a) Cyclic, non-abelian

b) Abelian

c) Cyclic, Normal

d) Not cyclic, abelian

e) abelian, Not cyclic

25. Let G be a finite abelian group and let P be a Prime If P divides , then G has an element of \_\_\_\_\_\_\_ [ ]

a)

b)

c)

d)

e)

26. If a group of order Pn contains exactly one subgroup each of orders P, P2 ------, Pn-1 then it is \_\_\_\_\_\_\_ [ ]

a) Cyclic

b) Abelian

c) Group

d) P-group

e) Octic

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**UNIT – I**

**Answer Key**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | a | G – Set |  | 14 | a | Solvable |
| 2 | b | Stabilizer | 15 | c | Nilpotent |
| 3 | c | Abelian | 16 | c | Solvable and Nilpotent |
| 4 | c | Normal series & Composition series | 17 | c | Symeetric group |
| 5 | b | Finite | 18 | c | (3 5 1) |
| 6 | a | Solvable | 19 | a | Automorphism |
| 7 | c | Nilpotent | 20 | c | Nilpotent |
| 8 | b | Solvable | 21 | b | Solvable |
| 9 | b | Transposition | 22 | d | Reflexive, Symmetric &Transitive |
| 10 | b | Abelian | 23 | a | P-group |
| 11 | a | Orbit |  |  |  |
| 12 | e | (1 5) (1 4) (1 3) (1 2) |  |  |  |
| 13 | b | Equivalent |  | | |

**UNIT – II**

**Answer Key**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | c | n |  | 14 | d | 2 |
| 2 | a | 6 | 15 | c | P |
| 3 | b | P-group | 16 | b | G HxK |
| 4 | b | Not – simple | 17 | a | Power of P |
| 5 | b | 2 | 18 | a |  |
| 6 | b | P-group | 19 | b | P-group |
| 7 | c | Conjugate | 20 | b | Not-simple |
| 8 | d | Normal | 21 | a | 2 |
| 9 | a | { } | 22 | c | Unique |
| 10 | a | Cyclic | 23 | b | 3 |
| 11 | b | Abelian | 24 | a | Cyclic, non-abelian |
| 12 | c | Sum | 25 | a |  |
| 13 | d | 77 | 26 | a | Cyclic |