**Department of Mathematics**

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

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

**Unit – III**

1. A non-empty subset S of a ring R is called an ideal of R. If

a, b ∈ S and r ∈ R then \_\_\_\_\_ [ ]

A) a – b ∈ S

B) ar ∈ S

C) ra ∈ S

D) a – b ∈ S & both ra, ar ∈ S

E) None of these

2. If f : R → S is one-one ⇔ kerf = \_\_\_\_\_\_\_ [ ]

A) {1}

B) {0}

C) {2}

D) R

E) S

3. Intersection of two ideals is \_\_\_\_\_\_\_\_\_\_\_\_ [ ]

A) Ideal

B) Not an Ideal

C) Principal Ideal

D) Null Ideal

E) None of these

4. Let f be a homomorphism of a ring ‘R’ into a ring ‘S’ with

Kernal N. then [ ]

A)

B)

C)

D) R

E) R

5. In the ring of integers Z, every sub ring is an \_\_\_\_\_ [ ]

A) Ideal

B) Kernal

C) Maximal Ideal

D) Not an Ideal

E) None of these

6. Let f : R is called a homomorphism, If a, b ∈R \_\_\_ [ ]

A) f (a+b) = f (a) + f (b)

B) f (ab) = f (a). f (b)

C) f (a+b)= f(a) + f(b) and f(ab) = f(a) . f(b)

D) f(a+b)f(a)+f(b)

E) f(ab) f(a) . f(b)

7. Two ideals A, B in any ring R are called co-maximal . if\_\_\_ [ ]

A) A+BR

B) A – B = R

C) A + B = R

D) A – B R

E) A+BR and A – B R

8. If where , i=1, 2 ……. n then = \_\_\_\_\_ [ ]

A) 1

B) 2

C) 0

D)

E) 4

9. In a non-zero commutative ring with unity, an ideal M is

Maximal ⇔ is a \_\_\_\_\_\_ [ ]

A) Maximal

B) Field

C) Co-maximal

D) Simple

E) None of these

10. If for all x, y ∈ R, (i) f(x+y)=f(x)+f(y) and (ii) f(xy)=f(y).f(x) then the

Mapping f:R→S is an \_\_\_\_\_\_ [ ]

A) Homomorphism

B) Anti Homomorphism

C) Isomorphism

D) Homomorphism and Anti Homomorphism

E) Anti-Isomorphism

11. If R is a ring with unity then the each maximal ideal is \_\_\_\_\_ [ ]

A) Rational

B) Maximal

C) Prime

D) Natural

E) Field

12. An ideal A is maximal ⇔ the pair {X, A} ideals X A, is \_\_\_\_\_ [ ]

A) Field

B) Maximal

C) Co-maximal

D) Simple

E) All of these

13. If R is a commutative ring, then an ideal P in R is prime ⇔ ab∈P

(a,b∈R) implies \_\_\_\_\_\_ [ ]

A) a∈P (or) b∈P

B) aP (or) b∈P

C) a∈P (or) bP

D) aP (or) bP

E) None of these

14. If I = R, then is the \_\_\_\_\_\_ [ ]

A) Homomorphism

B) Ideal

C) Onto

D) Zero ring

E) None of these

15. An ideal M in the ring of integers Z is a \_\_\_\_\_ ideal ⇔ M(p),

p is some prime [ ]

A) Co-maximal

B) Maximal

C) Simple

D) ring

E) None of these

16. A right (left) ideal A in a ring R is called \_\_\_\_\_ if An=(0) for some

+ve integer n [ ]

A) Nilpotent

B) Solvable

C) Normal

D) Simple

E) None of these

17. Let R be a Boolean ring. Then each prime ideal P ≠ R is \_\_\_\_ [ ]

A) Co-maximal

B) Normal

C) Maximal

D) Principal E) None of these

18. Every zero ideal in a ring R must be \_\_\_\_\_\_ ideal [ ]

A) Nilpotent

B) Simple

C) Maximal

D) Field

E) Prime

19. A chain ‘C’ in a poset (A, ≤) in which any two elements are [ ]

A) Separable

B) Comparable

C) disjoint

D) Separable and Comparable

E) Maximal

20. An element u∈R is said to be unit in R. if there exist ∈R→\_\_\_\_ [ ]

A) u = 1

B) u =1

C) =1

D) u ≠1

E) u≠1

21. Every Prime element is an \_\_\_\_\_\_\_\_ element [ ]

A) Reducible

B) irreducible

C) Prime

D) Not Simple

E) Not Prime

22. Every PID is a \_\_\_\_\_\_\_\_ [ ]

A) PID

B) PIR

C) ED

D) UFD

E) All of these

23. The product of two primitive polynomials is \_\_\_\_\_\_ [ ]

A) Normal

B) Premitive

C) Maximal

D) Prime

E) None of these

24. Every ESuclidean domain is a \_\_\_\_\_\_ [ ]

A) ED

B) UFD

C) PIR

D) DR

E) None of these

25. Two elements a, b ∈ R are called \_\_\_\_ if there exists a unit

u∈R→a=bu [ ]

A) Unit

B) Norm

C) Associates

D) Module

E) None of these

26. If a, b ∈ E\* = E-{0} and b/a, then \_\_\_\_\_\_ [ ]

A)

B)

C)

D)

E) All of these

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**Unit – iii answers**

|  |  |  |
| --- | --- | --- |
| 1 | d | All of these |
| 2 | b | {0} |
| 3 | a | Ideal |
| 4 | a |  |
| 5 | a | Ideal |
| 6 | c | f (a+b)= f(a) + f(b) and f(ab) = f(a) . f(b) |
| 7 | c | A+B=R |
| 8 | b | 2 |
| 9 | c | Co-maximal |
| 10 | b | Anti homomorphism |
| 11 | c | Prime |
| 12 | c | Co-maximal |
| 13 | a | a∈P (or) b∈P |
| 14 | d | Zero ring |
| 15 | b | Maximal |
| 16 | a | Nilpotent |
| 17 | c | Maximal |
| 18 | a | Nilpotent |
| 19 | b | Comparable |
| 20 | b | uv=1 |
| 21 | b | Irreducible |
| 22 | d | PID |
| 23 | b | Premitive |
| 24 | b | UFD |
| 25 | c | Associates |
| 26 | c |  |

**UNIT – IV**

1. If R is an integral domain, then S=R-{0} is a \_\_\_\_ [ ]

A) Regular

B) Regular multiplicate set

C) One – One

D) Primitive

E) All of these

2. If S1, S2 ∈S then S1 S2 ∈ S then a non-empty subset S of a ring

R is called a \_\_\_\_\_\_ set [ ]

A) Primitive

B) Regular

C) Prime

D) Multiplicative

E) None of these

3. Let R = {0, 1, 2, 3}+4, x4, then the regular elements are \_\_\_\_ [ ]

A) {1, 2}

B) {1, 3}

C) {0}

D) {3}

E) {2, 3}

4. (RS, +, .) is a \_\_\_\_\_\_ with unity [ ]

A) Ring

B) Regular

C) Prime

D) One – One

E) All of these

5. If f : R→ RS is a monomorphism ⇔ xa=0 then [ ]

A) a ≠ 0

B) a > 0

C) a < 0

D) a = 0

E) None of these

6. Any commutative integral domain R can be \_\_\_\_\_ in a field Rs [ ]

A) Ideal

B) Ring

C) embedding

D) Homomorphism

E) All of these

7. A ring R with unity is called a \_\_\_\_\_ If it has a unique maximal

right ideal [ ]

A) Primitive

B) Ideal

C) Local Ring

D) Primitive, ideal and Local Ring

E) Primitive and Ideal

8. The field of fractions of R is Rs satisfies [ ]

A) Reflexive

B) Symmetric

C) Transitive

D) Reflexive, Symmetric and Transitive

E) None of these

9. Let R = {0, 1, 2, 3, 4, 5}+6, x6, then the zero divisors in R are [ ]

A) {0, 1, 2}

B) {2, 3,}

C) {0, 1, 4}

D) {0, 5}

E) {1, 5}

10. Let ,b is a regular element of R} then Q is [ ]

A) Local Ring

B) Quotient Ring

C) Simple

D) All of these

E) None of these

11. The set of all regular elements is a \_\_\_\_\_\_\_ set [ ]

A) Regular

B) Multiplicative

C) Regular Multiplicative

D) One – One

E) All of these

12. Let M be an R-module. Then 0.m = \_\_\_\_\_\_\_, m∈M [ ]

A) m

B) 0

C) 1

D) 2

E) m or 0

13. A nonempty subset N of an R-module M is called an \_\_\_\_ of M

if [ ]

A) Module

B) Primitive

C) Regular

D) Sub module

E) Ideal

14. Intersection of R – Sub modules are \_\_\_\_ [ ]

A) Module

B) R-Sub module

C) Regular

D) Primitive

E) All of these

15. Let f : M→N such that (i) (ii) x, y ∈ M

and r∈R, then f is called \_\_\_\_\_\_\_\_\_ [ ]

A) Homomorphism

B) R-homomorphism

C) Module

D) All of these

E) None of these

16. A mapping I : X → X an R – homomorphism of M onto M. This

homomorphism is called the \_\_\_\_ endomorphism of M onto M [ ]

A) Zero

B) Identity

C) Unique

D) Onto

E) All of these

17. Let f be an R-homomorphism of an R-module M into an R- module N

then [ ]

A)

B)

C)

D)

E)

18. Let M be an R-module. Then HomR (M, M) is a \_\_\_\_ of Hom (M, M) [ ]

A) Ring B) Sub ring

C) Module D) Sub module

E) All of these

19. Let A and B are R-sub modules of R-modules M and N respectively

Then \_\_\_\_\_ [ ]

A)

B)

C)

D)

E)

20. Let (Ni)i∈Λ be a family of R-Sub modules of an R-module M. then

Ni \_\_\_\_\_, i∈Λ [ ]

A) 0 B) 1

C) 2 D)

E) {4}

21. Let M be a simple R-module. Then HomR (M, M) is a \_\_\_\_ [ ]

A) ring

B) Sub ring

C) Division ring

D) Module

E) None of these

22. Let M be a free R-module with {e1, e2, …… en}, then [ ]

A)

B)

C)

D)

E) =M

23. Let R be a ring with unity. An R-Module M is \_\_\_\_ ⇔ M for some

left ideal I of R. [ ]

A) Cyclic

B) abelian

C) Solvable

D) Nilpotent

E) Module

24. Let M be an R-Module. Then a.0=\_\_\_\_, 0∈R [ ]

A) 0 B) a

C) m D)

E) None of these

25. If M is an R-module and x∈M, then the set Rx={rx/x∈R} is

an \_\_\_\_\_ of M [ ]

A) Module

B) R-Sub Module

C) Primitive

D) regular

E) None of these

26. If R is a division Ring. Then a left R-module & called a left \_\_\_ over R [ ]

A) Basis

B) Vector Space

C) Regular

D) L.D.

E) L.I.

27. Let O=implies =\_\_\_\_\_\_\_\_ [ ]

A) 0

B) 1

C)

D) 2

E) None of these

28. An R-module M is called a free module. If M admits a [ ]

A) Linear Dependent

B) Span

C) Basis

D) Module

E) None of these

29. An R-module M is called simple. If \_\_\_\_\_\_\_\_ [ ]

A) RM = (o)

B) RM (o)

C) M = (o)

D) R = (o)

E) All of these

30. Let f : M→N an R-homomorphism. Then f is called a group

homomorphism then [ ]

A) f(0) = 0

B) f(-x) = -f (x)

C) f(x-y) = f(x) – f(y)

D) All of these

E) None of these

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**Unit – iv answers**

|  |  |  |
| --- | --- | --- |
| 1 | b | Regular multiplicate set |
| 2 | d | Multiplicative |
| 3 | b | {1, 3} |
| 4 | a | Ring |
| 5 | d | a = 0 |
| 6 | c | embedding |
| 7 | c | Local Ring |
| 8 | d | Reflexive, Symmetric and Transitive |
| 9 | b | {2, 3} |
| 10 | b | Quotient Ring |
| 11 | c | Regular Multiplicative |
| 12 | b | 0 |
| 13 | d | Sub module |
| 14 | b | R-Sub module |
| 15 | b | R-homomorphism |
| 16 | b | Identity |
| 17 | c |  |
| 18 | b | Sub ring |
| 19 | c |  |
| 20 | a | 0 |
| 21 | c | Division ring |
| 22 | b |  |
| 23 | a | Cyclic |
| 24 | a | 0 |
| 25 | b | R-Sub Module |
| 26 | b | Vector Space |
| 27 | a | 0 |
| 28 | c | Basis |
| 29 | b | RM (o) |
| 30 | d | All of these |