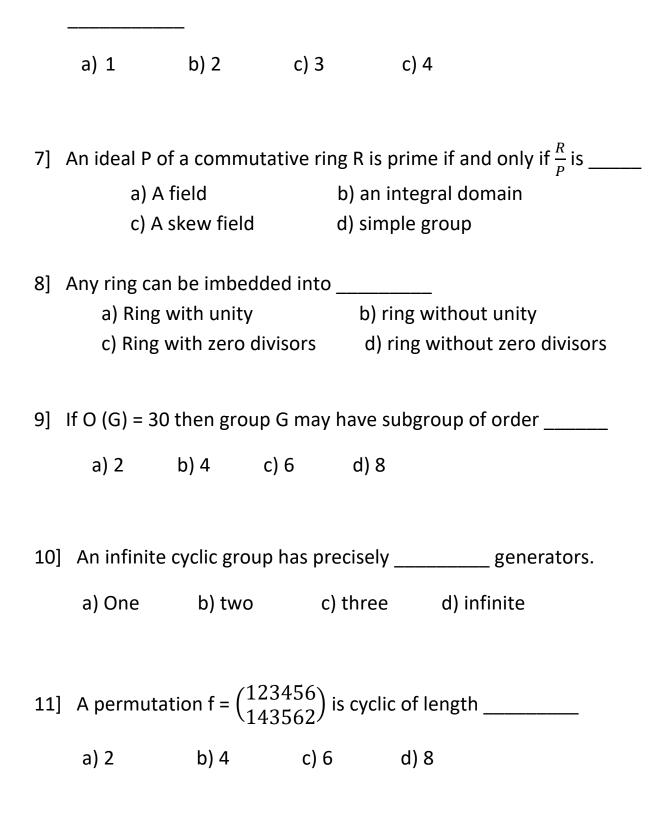Padmabhushan Dr. Vasantraodada Patil Mahavidyala, Tasgaon,
Department of Mathematics
Sub: Modern Algebra [Paper – X] (MCQ)

Practice Questions Paper

1] For Euler's φ function φ (10) = _____

 a) 4 b) 5 c) 9 d) 10

2] If 0(G) =20, then group G may have subgroup of order _____

 a) 3 b) 5 c) 7 d) 9

3] The identity permutation is always _____ permutation.

 a) Transposition b) disjoint c) odd d) even

4] A quotient group of a cyclic group is _____ group.

 a) Symmetric b) not symmetric c) cyclic d) not cyclic

5] A homomorphism from a group G to itself is called _____ of G.

 a) Epimorphism   b) monomorphism

 c) Endomorphism   d) automorphism

6] If < Z, +,. > is a ring of integers modulo 3, then characteristic of Z_3 is

_____

    a) 1   b) 2   c) 3   c) 4

7] An ideal P of a commutative ring R is prime if and only if $\frac{R}{P}$ is _____
    a) A field   b) an integral domain
    c) A skew field   d) simple group

8] Any ring can be imbedded into _____
    a) Ring with unity   b) ring without unity
    c) Ring with zero divisors   d) ring without zero divisors

9] If O (G) = 30 then group G may have subgroup of order _____

    a) 2   b) 4   c) 6   d) 8

10] An infinite cyclic group has precisely _____ generators.

    a) One   b) two   c) three   d) infinite

11] A permutation f = $\begin{pmatrix} 123456 \\ 143562 \end{pmatrix}$ is cyclic of length _____

    a) 2   b) 4   c) 6   d) 8

12] If G is finite group and N is normal subgroup of G, then $O\left(\frac{G}{N}\right) = $ ____

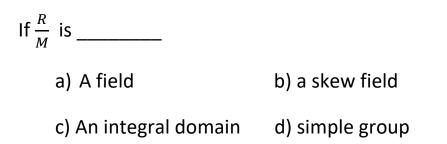a) O (G)   b) O (G).O (N)   c) $\frac{O(N)}{O(G)}$ d) $\frac{O(G)}{O(N)}$

13] An onto homomorphism is called _____

a) Automorphism   b) monomorphism

c) Epimorphism   d) endomorphism

14] An element X in a ring R is called nilpotent if _____ for some

Positive integer n.

a) $X^n = X$ b) $X^n = 0$ c) $X^n = e$ d) $X^n = 1$

15] An ideal M of commutative ring R with unity is maximal if and only

If $\frac{R}{M}$ is _____

a) A field   b) a skew field

c) An integral domain   d) simple group

16] If G is a group of order 20 then it cannot have a subgroup of order

_____

a) 2   b) 5   c) 3   d) 4

17] Every quotient group of a cyclic is _____

       a) Cyclic   b) non-cyclic

       c) non-abelian   d) symmetric

18] If H and K be two normal subgroup of group G, such that H $\subseteq$ K

then _____

    a) $\frac{G}{K} \cong \frac{G/K}{H/K}$ b) $\frac{G}{H} \cong \frac{G/K}{H/K}$

    c) $\frac{G}{H} \cong \frac{G/H}{K/H}$ d) $\frac{G}{K} \cong \frac{G/H}{K/H}$

19] A commutative division ring is called _____

       a) A filed   b) semi-prime ring

       c) simple ring   d) an integral domain

20] An element X of a ring R is said to be a nilpotent if _____

       a) $X^2 = 0$ b) $X^2 = e$

       c) $X^n = 0$ for some positive integer   d) $X^n = e$

21] Let R be a commutative ring with unity an ideal M of R is maximal

ideal of R and only if R/M is _____

    a) Integral domain   b) division ring

    c) Simple ring   d) field

22] A cyclic of length two is called _____

    a) An even permutation   b) disjoint permutation

    c) A transposition   d) an idempotent

23] If G is a finite group and H is a subgroup of G then number of

Distinct right cosets of H in G is equal to _____

    a) $\frac{O(H)}{O(G)}$ b) $\frac{O(G)}{O(H)}$ c) O (G)   d) O (H)

24] For the Euler's function, $\varphi(26) =$ ____

    a) 12   b) 4   c) 25   d) None of these

25] For the Euler's function, $\varphi(11) =$ ____

a) 3   b) 5   c) 7   d) 10

26] A one-one homomorphism is called _____

     a) Endomorphism   b) epimorphism

     c) Automorphism   d) monomorphism

27] An element e in a ring R such that $e^2 = e$ is known as _____

element.

     a) Identity   b) nilpotent

     c) Idempotent   d) unity

28] If P is a proper ideal of a ring R such that $ab \in P$ implies $a \in P$ or

$b \in P$ then P is called _____ ideal of R.

     a) A maximal   b) a prime

     c) A semi-prime   d) none of these

29] For the ring (Z,+,.) the mapping f: Z→Z defined by f (n) = 2n,

$\forall n \epsilon Z$ is _____

     a) Not a homomorphism   b) epimorphism

c) Endomorphism   d) monomorphism

30] For the ring of integer modulo 5, (Z,+,.), where Z_5 = {0,1,2,3,4}

Characteristics of Z_5 is _____

a) 1   b) 3   c) 4   d) 5

31] If $p = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 1 & 4 & 6 & 3 & 5 & 8 & 7 & 2 \end{pmatrix}$ be a cyclic permutation, then length of

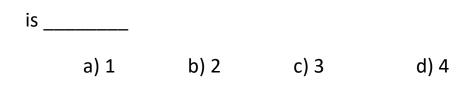permutation P is _____

a) 5   b) 6   c) 7   d) 8

32] Subtraction is not a binary operation on the set of _____

      a) Real number   b) rational numbers

      c) Integer   d) natural numbers

33] If H is a subgroup of G such that Ha = aH for all a ∈ G, then H is a

_____ Subgroup of G.

      a) Normal   b) not normal

      c) Quotient   d) not quotient

34] If (Z_4,+,.) is a ring of integer modulo 4, then characteristic of Z_4

is _____

      a) 1   b) 2   c) 3   d) 4

35] If A, B are two ideals of a ring R, then

    a) $\dfrac{A+B}{A} \cong \dfrac{B}{A \cap B}$ b) $\dfrac{A}{A+B} \cong \dfrac{B}{A \cap B}$

    c) $\dfrac{A \cap B}{A+B} \cong \dfrac{A}{B}$ d) $\dfrac{A+B}{B} \cong \dfrac{A \cap B}{A}$

36] If G is cyclic group of order 13, then the number of generators of

G is _____

      a) 2   b) 12   c) 13   d) 14

37] The union of all distinct right cosets of H in G is _____

      a) Equal to H   b) not equal to H

      c) Equal to G   d) not equal to G

38] A group G having no nontrivial normal subgroup, then group G is

_____ group.

a) Alternating   b) conjugate

c) Simple   d) symmetric

39] Let R be a ring, an element $0 \neq a \in R$ is called zero divisor if there

is $0 \neq b \in R$ such that _____

    a) ab = a   b) ab = b

    c) ab = 0   d) ab ≠ 0

40] Let B $\underline{C}$ A be two ideals of a ring R, then _____

    a) $\dfrac{A}{R} \cong \dfrac{R/B}{A/B}$ b) $\dfrac{R}{A} \cong \dfrac{R/B}{A/B}$

    c) $\dfrac{R}{A} \cong \dfrac{A/B}{R/B}$ d) $\dfrac{A}{B} \cong \dfrac{R/B}{A/B}$

41] If G is a group then the subgroup $\{ x \in G \mid xa = ax$ for all $a \in G \}$ is

called _____

    a) Centre of group   b) normalizer of a

    c) Right coset   d) left coset

42] Number of generators of a finite cyclic group of order n is _____

a) n   b) n + 1   c) n!   d) φ (n)

43] A subjective homomorphism is called _____

   a) Endomorphism   b) epimorphm

   c) Automorphism   d) monomorphism

44] one-one mapping is also called as _____

   a) Subjective   b) injective

   c) Objective   d) projective

45) Onto mapping is also called as _____

   a) objective   b) subjective

   c) Injective   d) ejective

46] one-one and onto mapping is called as _____

   a) Injective   b) bijetive

   c) Subjective   d) projective

47] An integer _____ is called as prime number.

a) P > 1   b) p < 1   c) p = 1   d) p = 0

48] If b is a positive integer and a is any integer then their exit q and r

Such that, _____

   a) a = qa   b) a = qb

   c) a = qb+r   d) a = qb-r

49] Let G be any non-empty set and * be a binary composition then,

   a , b ∈ G ⟹ a * b ∈ G is called as _____

      a) Associative property   b) closure property

      c) Identity property   d) inverse property

50] Let G be any non-empty set and * be a binary composition then,
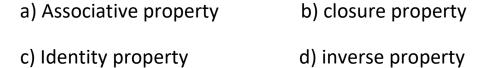
   a * (b * c) = (a * b) * c is called as _____

      a) Associative property   b) closure property

      c) Identity property   d) inverse property

51] Let G be any non-empty set and * be a binary composition then,

   a * e = a = e * a is called as _____

a) Associative property   b) closure property

c) Identity property   d) inverse property

52] Let G be any non-empty set and * be a binary composition then,

a * a^{-1} = e = a^{-1} * a is called as _____

a) Associative property   b) closure property

c) Identity property   d) inverse property

53] Let < G , * > be a group then, a * b = b * a for all a,b $\in$ G is called as

_____

a) Finite group   b) commutative group

c) Semi group   d) order of group

54] A non-empty subset H of group G is sub group of G iff a,b $\in$ H $\Rightarrow$

_____

a) ab $\in$ H   b) ab $\in$ G   c) ab^{-1} $\in$ H   d) ab^{-1} $\in$ G

55] If G be a group then z(G) = { x $\in$ G / xg = gx for all g $\in$ G } is called as

_____

a) centre of group   b) normalize of a

c) Right coset   d) left coset

56] Let H be the subgroup of G and a Є G any element then,

aH = {ah / h Є H} is called _____

      a) Right coset   b) left coset

      c) coset   d) none of these

57] Let H be the subgroup of G and a Є G any element then,

Ha = {ha / h Є H} is called _____

      a) Right coset   b) left coset

      c) coset   d) none of these

58] Let H be the subgroup of G such that right coset of H in G is equal

to the left coset of H in G is called as _____

      a) Right coset   b) left coset

      c) coset   d) none of these

59] Let H be subgroup of group G Ha = H iff _____

a) a ∈ H   b) a ∈ G   c) h ∈ H   d) h ∈ G

60] Let H is subgroup of G then, Ha = Hb iff _____

a) ab ∈ G   b) ab ∈ H   c) ab⁻¹ ∈ H   d) ab⁻¹ ∈ G

61] A cyclic group is _____

a) Semi group   b) cyclic group
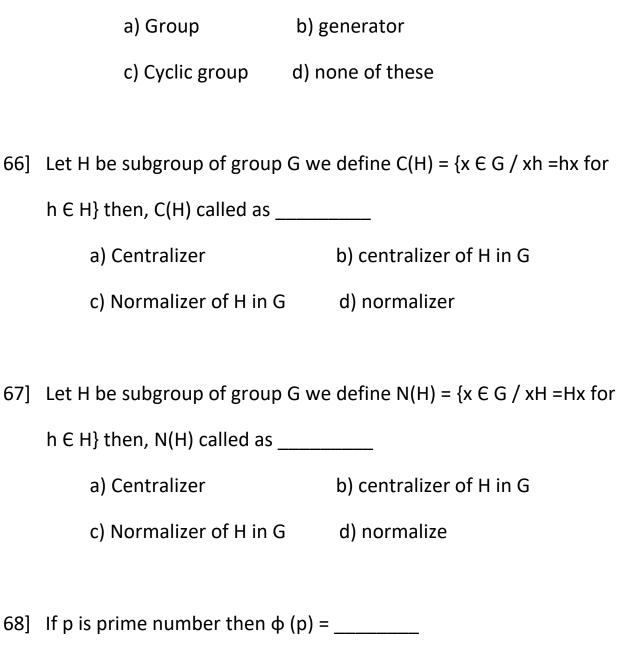
c) Abelian   d) none of these

62] A subgroup of cyclic group is _____

a) Semi group   b) cyclic group

c) Abelian   d) none of these

63] Let, 0(a) = 1 ↔ _____

a) a = e   b) a ≠ e   c) aⁿ = e   d) aⁿ ≠ e

64] Let 0(a) = n ↔ _____

a) a = e   b) a ≠ e   c) aⁿ = e   d) aⁿ ≠ e

65] Order of cyclic group is equal to the order of its _____

      a) Group   b) generator

      c) Cyclic group   d) none of these

66] Let H be subgroup of group G we define C(H) = {x ∈ G / xh =hx for

    h ∈ H} then, C(H) called as _____

      a) Centralizer   b) centralizer of H in G

      c) Normalizer of H in G   d) normalizer

67] Let H be subgroup of group G we define N(H) = {x ∈ G / xH =Hx for

    h ∈ H} then, N(H) called as _____

      a) Centralizer   b) centralizer of H in G

      c) Normalizer of H in G   d) normalize

68] If p is prime number then ϕ (p) = _____

      a) p   b) p-1   c) p+1   d) 0

69] Let a , n any two integer such that gcd(a , n) = 1 then _____

      a) $a^{\phi(n)} \equiv modn$ b) $a^{\phi(n)} \equiv 1(modn)$

c) $a^{\phi(n)} \equiv n$ d) $a^{\phi(n)} \equiv 1$

70] The group G ≠ {e} is called as _____

     a) Group   b) semi group

     c) Normal group   d) simple group

71] A mapping f : G → G' then, f (a * b) = f(a).f(b) for all a,b ∈ G is called

as _____

     a) Isomorphism   b) monomorphism

     c) Homomorphism   d) endomorphism

72] A mapping f : G → G' then f is one-one, onto, homomorphism then

it is called as _____

     a) Isomorphism   b) monomorphism

     c) Homomorphism   d) endomorphism

73] If f : G → G' is homomorphism then, $f'(x^{-1})$ = _____

     a) f(x)   b) $[f(x)]^{-1}$ c) $f(x)^{-1}$ d) x

74] If f : G → G' is homomorphism then, f (x^n) = _____

a) f(x)   b) f(n)   c) $[f(x)]^n$ d) $[f(x)]^{-1}$

75] Let f : G → G' be a homomorphism then, Ker f = {x ∈ G / f(x) = e'}

is called as _____

a) Homomorphism   b) kernel of homomorphism

c) Kernel of f   d) none of these

76] Let f : G → G' be the homomorphism then Ker f is _____

a) Kernel f   b) homomorphism

c) Normal subgroup of G   d) subgroup of G

77] A homomorphism f : G → G' is one-one iff _____

a) Ker f = e   b) Ker f ≠ e

c) Ker f ≠ {e}   d) Ker f = {e}

78] If f : G → G' is onto homomorphism with K = Ker f then _____

a) $\dfrac{K}{G} = G^I$ b) $\dfrac{G}{k} = G^I$ c) $\dfrac{G}{K} \cong G$ d) $\dfrac{G}{k} \cong G^I$

79] Let H and K be two subgroup of G where H is normal in G then

_____

a) $\dfrac{HK}{H} \approx \dfrac{K}{H \cap K}$

b) $\dfrac{H}{HK} \cong \dfrac{K}{H \cap K}$

c) $\dfrac{HK}{H} \cong \dfrac{K}{H \cap K}$

d) $\dfrac{HK}{H} \cong \dfrac{K}{H \cup K}$

80] Let S be any non-empty set any one-one, onto mapping f : S → S' is

called as _____

a) Permutation

b) homomorphism

c) Permutation of S

d) none of these

81] Every group G is isomorphic to _____

a) Permutation

b) isomorphic group

c) Isomorphic

d) permutation group

82] Let < R , + > is an abelian group then, a,b ∈ R ⟹ a + b ∈ R is

called as _____

a) Associative property

b) closure property

c) Distributive property

d) commutative property

83] Let < R , + > is an abelian group then, a+(b+c) = (a+b)+c ∀ a,b,c ∈ R

is called as _____

       a) Associative property   b) closure property

       c) Distributive property   d) commutative property

84] Let < R , + > is an abelian group then, a+b = b+a   ∀ a,b ∈ R is

called as _____

       a) Associative property   b) closure property

       c) Distributive property   d) commutative property

85] Let < R , + > is an abelian group then, a.(b+c) = a.b + a.c

(a+b).c = a.c + b.c   ∀ a,b,c ∈ R   is called as _____

       a) Associative property   b) closure property

       c) Distributive property   d) commutative property

86] A ring R such that, ab = ba ∀ a,b ∈ R is called as _____

       a) Ring with unity   b) commutative ring

       c) Ring   d) none of these

87] A ring R such that, a.e = a = e.a   ∀ a ∈ R is called as _____

      a) Ring with unity   b) commutative ring

      c) Ring   d) none of these

88] A ring R such that, $x^2 = x$ ∀ x ∈ R is called as _____

      a) Ring   b) Boolean group

      c) Boolean ring   d) commutative ring

89] A Boolean ring is _____

      a) Ring   b) Boolean group

      c) Boolean ring   d) commutative ring

90] A commutative ring is called as _____

      a) Field   b) integral domain

      c) Skew field   d) simple group

91] A field is an _____

      a) Integral domain   b) division ring

c) Simple ring   d) field

92] A non-zero finite integral domain is a _____

     a) Integral domain   b) division ring

     c) Simple ring   d) field

93] Let R be a ring if their exist positive number n such that,

Ch R = n $\Longleftrightarrow$ na = 0 ∀ a ∈ R is called as _____

     a) Ring   b) characteristics of ring

     c) Simple ring   d) integral domain

94] Let R_1 and R_2 be two ring then, R = {(a,b) / a ∈ R_1 , b ∈ R_2} is called

as _____

     a) Nilpotent   b) ring

     c) Product of ring   d) ideal

95] A non-empty subset I of ring R then, a ∈ I , r ∈ R $\Longrightarrow$ ra ∈ I is called

as _____

     a) Left ideal   b) right ideal

c) Ideal   d) none of these

96] A non-empty subset I of ring R then, , a ∈ I , r ∈ R$\Longrightarrow$ ar ∈ I is called

as _____

        a) Left ideal   b) right ideal

        c) Ideal   d) none of these

97] A ring R ≠ {0} is called as _____

        a) Field   b) ring

        c) Division ring   d) simple ring

98] A division ring is a _____

        a) Simple ring   b) integral domain

        c) Ring   d) commutative ring

99] Let f : R → R' is homomorphism then, f(0) = _____

      a) 0   b) 0'   c) e   d) e'

100] Let f : R → R' is homomorphism then, f(-a) = _____

a) f(a)　　　　b) f(0)　　　　c) –f(0)　　　　d) –f(a)

101] Let f : R → R' is homomorphism Ker f = {0} iff f is _____

　　　a) one-one　　　　　　　　b) onto

　　　c) Homomorphism　　　　　d) none of these

102] If f : R → R' is an onto homomorphism with K = Ker f then _____

　　　a) $\dfrac{R}{K} = R^{I}$　　　　　　　b) $\dfrac{R}{K} \approx R^{I}$

　　　c) $\dfrac{R}{K} \neq R^{I}$　　　　　　　d) $\dfrac{R}{K} \cong R^{I}$

103] If f : R → R' is onto homomorphism then homomorphic image R'

　　is isomorphic to _____

　　　a) Quotient ring of R　　　　　　b) Ker f

　　　c) Image R　　　　　　　　　　d) none of these

104] an ideal P ≠ R of ring R is called as _____

　　　a) Maximal ideal　　　　　b) prime ideal

　　　c) Ideal　　　　　　　　　d) ring

105] Let R be a ring and ideal M ≠ R is called as _____

      a) Maximal ideal   b) prime ideal

      c) Ideal   d) ring

106] let R be commutative ring with unity an ideal P and R is prime

Ideal if and only if $\frac{R}{P}$ is an _____

      a) Field   b) integral domain

      c) Skew field   d) none of these

107] every quotient group of cyclic group is _____

      a) Finite group   b) semi group

      c) Cyclic group   d) commutative group

108] every subgroup of an abelian group is _____

      a) Normal   b) cyclic group

      c) Normal subgroup   d) semi group

109] find the reminder of 8^{103} is divisible by 13.

a) 4   b) 5   c) 6   d) 7

110]   find the reminder of 3^{47} is divisible by 23.

a) 1   b) 2   c) 3   d) 4

_____ _Thank you_ _____