

FBQ1: Let $G = \{1, -1, i, -i\}$. Then G is a group under usual multiplication of complex numbers, in this group, the order of i is _____.

Answer: 4

FBQ2:

Answer: (4,1)

FBQ3:

Answer: N

FBQ4: The order of (12) in S_3 is _____.

Answer: 2

FBQ5: In a permutation, any cycle of length two is called _____.

Answer: Transposition

FBQ6: A field K is called _____ of F if F is a subfield of K , thus Q is a subfield of R and R is a field extension of Q

Answer: Field extension

FBQ7:

Answer: Proper subfield

FBQ8:

Answer: Primitive

FBQ9: We call an integral domain R a _____ if every non zero element of R which is not a unit in R can be uniquely expressed as a product of a finite number of irreducible elements of R

Answer: Unique factorization domain

FBQ10:

Answer: Greatest Common divisor

FBQ11: Given two elements a and b in a ring R , we say that c is a _____ of a and b if $c|a$ and $c|b$.

Answer: Common divisor

FBQ12: We call an integral domain R a _____ if every ideal in R is a principal ideal.

Answer: Principal ideal

FBQ13: _____.

Answer: 2

FBQ14: Let R be an integral domain, an element $a \in R$ is called a unit or an _____ in R if we can find $b \in R$ such that $ab = 1$ i.e if a has a multiplicative inverse

Answer: Invertible element

FBQ15: A domain on which we can define a Euclidean valuation is called _____.
Answer: Euclidean domain

FBQ16:
Answer: Euclidean Evaluation

FBQ17:
Answer: Root of multiplicity m

FBQ18: Let F be a field and $f(x) \in F[x]$ we say that an element $a \in F$ is a _____ (or zero) of $f(x)$ if $f(a) = 0$
Answer: Factor

FBQ19: If S is set, an object $x \in S$ in the collection S is called an _____ of S
Answer: Element

FBQ20: A set with _____ element in S is called an empty set
Answer: No

FBQ21: _____ method is sometimes used to list the element of a large set
Answer: Roster

FBQ22: The set of rational numbers and the set of real numbers are respectively represented by the symbol _____ and _____.
Answer: Q and R

FBQ23: The symbol $\exists$ denotes _____.
Answer: There exist

FBQ24: If A and B are two subsets of a set S , we can collect the element that are common to both A and B , we call this set the _____ of A and B .
Answer: Intersection

FBQ25: A relation R defined on a set S is said to be _____ if we have
Answer: Reflexive

FBQ26: A relation R defined on a set S is said to be _____ if
Answer: Symmetric

FBQ27: A relation R defined on a set S is said to be _____ if $a R b$ and
Answer: Transitive

FBQ28: A relation R defined on a set S that is reflexive, symmetric and transitive is called _____ relation
Answer: Equivalence

FBQ29: A _____ f from a non-empty set A to a non-empty set B

empty set B is a rule which associates with every element of A exactly one element of B
Answer: Function

FBQ30: A function is called _____ if it associates different elements of A with different elements of B
Answer: Injective

FBQ31: A function is called _____ if the range of f is B.
Answer: Onto

FBQ32:
Answer: Projection

FBQ33: A function that is both one to one and onto is called _____
Answer: Bijective

FBQ34: _____ set.
Answer: Finite

FBQ35: A set that is not _____ is called infinite set
Answer: Finite

FBQ36: _____,
Answer: Bijective

FBQ37: 1 and p
Answer: Prime

FBQ38: _____ number
Answer: Composite

FBQ39: _____ on A,
Answer: Identity function

FBQ40: _____ on S,
Answer: Binary operation

FBQ41:
Answer: Closed

FBQ42:
Answer: Associative

FBQ43:
Answer: Commutative

FBQ44: _____,
Answer: Distributive over

FBQ45:

Answer: Identity element

FBQ46: The Cayley table is named after the famous mathematician

Answer: Arthur Cayley

FBQ47: _____ system consists of a set with a binary operation which satisfies certain properties is called a group

Answer: Algebraic

FBQ48:

Answer: The integral power

FBQ49: is an equivalence relation, and hence partition Z into disjoint equivalence classes called _____ modulo n .

Answer: Congruence class

FBQ50: If the set X is finite, say $X = \{1, 2, 3, \dots, n\}$ then we denote $S(x)$ by and each of is called a _____ on n symbols

Answer: Permutation

MCQ1: In a principle ideal Domain an element is prime if and only if it is

Answer: Reducible

MCQ2:

Answer: I only

MCQ3:

Answer: $3x+1$

MCQ4:

Answer: II only

MCQ5:

Answer: II only

MCQ6:

Answer:

MCQ7:

Answer: 1

MCQ8:

Answer: $f(a) = 1$

MCQ9: Express $x^4 + x^3 + 5x^2 - x$, as $(x^2 + x + 1) + rx$ in $Q[x]$

Answer: None of the options

MCQ10: Let F be a field. Let $f(x)$ and $g(x)$ be two polynomials in $F[x]$ with $g(x) \neq 0$.

Then I There exist two polynomial $q(x)$ and $r(x)$ in $F[x]$ such that $f(x) = q(x)g(x) + r(x)$, where $\deg(r(x)) < \deg(g(x))$. II The polynomial $q(x)$ and $r(x)$ are unique, which of the following is a properties of Division Algorithm?

Answer: I only

MCQ11: Which of the following polynomial ring is free from zero divisor

Answer: $\mathbb{Z}_6[x]$,

MCQ12: . Let R be a ring and $f(x)$ and $g(x)$ be two non zero element of $R[x]$. Then $\deg(f(x)g(x)) = \deg(f(x)) + \deg(g(x))$ with equality if

Answer: R does not have a zero divisor

MCQ13: If $p(x), q(x) \in \mathbb{Z}[x]$ then the $\deg(p(x).q(x))$ is

Answer: $\max(\deg p(x), \deg q(x))$

MCQ14: If $f(x) = a_0 + a_1x + \dots + a_nx^n$ and $g(x) = b_0 + b_1x + \dots + b_mx^m$ are two polynomial in $R[x]$, we define their product $f(x).g(x) = c_0 + c_1x + \dots + c_{m+n}x^{m+n}$ where c_i is

Answer: $a_i b_j$, $i + j = i$, $i = 0, 1, \dots, m+n$

MCQ15: Consider the two polynomials $p(x), q(x)$ in $\mathbb{Z}[x]$ by $p(x) = 1+2x+3x^2$, $q(x) = 4+5x+7x^3$. Then $p(x) + q(x)$ is

Answer: $5+7x+3x^2+7x^3$

MCQ16: Determine the degree and the leading coefficient of the polynomial $1+x^3+x^4+0.x^5$ is

Answer: (3,1)

MCQ17: The Degree of a polynomial written in this form $\deg(\sum_{i=0}^n a_i x^i)$ if $a_n \neq 0$ is

Answer: 0

MCQ18: Let R be a domain and $x \in R$ be nilpotent then $x^n = 0$ for some $n \in \mathbb{N}$. Since R has no zero divisors this implies that

Answer: $x = 0$

MCQ19: An ideal m of $\mathbb{Z}$ is maximal if and only if m is

Answer: An even number

MCQ20: Every maximal ideal of a ring with identity is

Answer: A field

MCQ21: Let R be a ring with identity. An ideal M in R is Maximal if and only if R/M is

Answer: A field

MCQ22: An ideal p of a ring R with identity is a prime ideal of R if and only if the quotient ring is

Answer: An integral domain

MCQ23: $\tilde{A}$, The characteristics of a field is either

Answer: None of the options

MCQ24: Z_n is a field if and only if

Answer: n is an even number

MCQ25: $\tilde{A}$, Which of the following is an axioms of a field

Answer: Is commutative

MCQ26: $\tilde{A}$, Let R be a ring, the least positive integer n such that $nx = 0 \nexists x \in R, x \neq 0$, $\nexists x \in R$ is called

Answer: The order of R

MCQ27: Which of the following is not a property of an integral domain

Answer: Is a commutative ring

MCQ28: A non $\tilde{a} \in R$, $\tilde{a} \neq 0$ zero element in a ring R is called zero divisor in R if there exist a non $\tilde{b} \in R$, $\tilde{b} \neq 0$ zero element b in R such that

Answer: $ab = 0$

MCQ29: If H is a subgroup of a group G and $a, b \in G$ then which of the following statement is true

Answer: $Ha = H$ iff $a \in H$

MCQ30: Let G be a group and $a \in G$ such that $O(a) = t$, then $a^n = a^m$, if and only if

Answer: None of the options

MCQ31: Which of these does not hold for $\tilde{A}, \tilde{B} \subseteq \tilde{C}$ distributive over $\cap$, and $\cup$

Answer: $\tilde{A} \cap (\tilde{B} \cup \tilde{C}) = (\tilde{A} \cap \tilde{B}) \cup (\tilde{A} \cap \tilde{C})$

MCQ32: The symmetric difference of two given sets A and B , denoted by $A \oplus B$ is defined by

Answer: $A \oplus B = (A \setminus B) \cup (B \setminus A)$

MCQ33: The (relative) complement (or difference) of a set A with respect to a set B denoted by $B \setminus A$ (or $B \setminus A$) is the set

Answer: $B \setminus A = \{x \in B : x \notin A\}$

MCQ34: Which of the following is of the operations and

Answer: Associative $A(BC) = (AB)C$ and $A(BC) = (AB)C$ for three sets A, B, C

MCQ35: The intersection of two sets A and B written as AB is

Answer: The set $AB = \{x : x \in A \text{ and } x \in B\}$

MCQ36: A set X of n elements has

Answer: 2^n subsets

MCQ37: If G is a finite group such that $O(G)$ is neither 1 nor a prime, then G has
 Answer: Non-trivial proper subgroup

MCQ38: Which of the following is not the definition of Euler Phi-function
 MCQ39: Every group of prime order is
 Answer: Non-abelian

MCQ40: An element is of infinite order if and only if all its powers are
 Answer: Real

MCQ41: Consider the following set of 8×2 matrices over $\mathbb{C}$. $Q_8 = \{I, \pm A, \pm B, \pm C\}$ where $I = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, $A = \begin{pmatrix} i & 0 \\ 0 & -i \end{pmatrix}$, $B = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$, $C = \begin{pmatrix} 0 & i \\ 1 & 0 \end{pmatrix}$ and $i = \sqrt{-1}$. If $H = \langle A \rangle$ is a subgroup, how many distinct right cosets does it have in Q_8 ?
 Answer: 8

MCQ42: Let $H = 4\mathbb{Z}$. How many distinct cosets of H in $\mathbb{Z}$ do we have?
 Answer: 2

MCQ43: A function $f : A \rightarrow B$ is called one-to-one if and only if different elements of A map to different elements of B .
 Answer: Bijective

MCQ44: Let G be a group, $g \in G$ and $m, n \in \mathbb{Z}$. Which of the following does not hold?
 Answer: $(gm)^n = gmn$

MCQ45: Let G be a group. If there exist $g \in G$ such that G has the form $\langle g \rangle$ for some $n \in \mathbb{Z}$ then G is
 Answer: A cyclic group

MCQ46: Let $H = \{I, (1, 2)\}$ be a subgroup of S_3 . The distinct left cosets of H in S_3 are
 Answer: $H, (123)H, (12)H$

MCQ47: The order of (123) in S_3 is
 Answer: 3

MCQ48: The order of (12) in S_3 is
 Answer: 2

MCQ49: A group generated by g is given by $\langle g \rangle = \{e, g, g^2, \dots, g^{n-1}\}$ where n is the order of g .
 Answer: 0

MCQ50: Let H be a subgroup of a finite group G . We call the number of distinct cosets of H in G the index of H in G .
 Answer: index