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The default category for questions shared in context 'MTH211 Exams'.
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Multiple Choice Questions (MCQs)
MCQ1
In a principle ideal Domain an element is prime if and only if it is

Irreducible

0.0000000
Reducible

1.0000000
Even

0.0000000
odd

0.0000000
MCQ2
Let R be an integral domain. We say that an element x ∈ R is irreducible if

(I) x is not a unit

(II) If x = ab with a,b ∈ R then a is a unit or b is a unit.

Which of the following is the definition of irreducible element

I only

1.0000000
II only

0.0000000
I and II

0.0000000
None of the option

0.0000000
MCQ3
In Qx find the g.c.d of p(x) = x2+3x-10 and q(x) = 6x2-10x-4

x-2

0.0000000

X+5

0.0000000
3x+1

1.0000000
None of the option

0.0000000
MCQ4
An element d ∈ R is a greatest common divisor of a,b ∈ R if

I d/a and d/b

II For any common divisor c of a and b, c/d which of the following is a properties of greatest common divisor

I only

0.0000000
II only

1.0000000
I and II

0.0000000
None of the option

0.0000000
MCQ5
Let R be an integral domain. We say that a function d: R\{0} N ∪ {0} is a Euclidean valuation on R if which of the following conditions are satisfied:

I $d(a) \leq d(ab)\ \forall\ a,b \in R\backslash\{0\}$

II for any $a,b \in R$, $b \neq 0\ \exists\ q, r \in R$ such that $a = bq + r$ where $r = 0$ or $d(r) < d(b)$

I only

0.0000000
I and II

0.0000000
II only

1.0000000
None of the option

0.0000000

MCQ6
Let p be a prime number consider xp-1-T∈ ZP [x]. Use the fact that ZP is a group of order p. show that every non – zero element of ZP is a root of xp-1-T. In particular if p = 3

x3-1-T = (x – T)(x –)

1.0000000
x3-1-T = (x +)(x +)

0.0000000
x3-1-T = (x +)(x +)

0.0000000
None of the option

0.0000000
MCQ7
In the given polynomial f(x) = x-32(x+2), 3 is a root of multiplicity

1

1.0000000
2

0.0000000
0
0.0000000
None of the option

0.0000000
MCQ8
Let F be a field and f(x) ∈ F[x]. We say that an element a∈F is a root of f(x) if

f(a) ≠ 0

0.0000000
f(a) = 1

1.0000000
f(a) = 0

0.0000000
None of the option

0.0000000
MCQ9
Express x4+ x3+5x2-x as (x2 +x+1)+rx in Q[x]

x4+ x3+5x2-x = x2+ x+1x2+ 4-(5x+4)

0.0000000
x4+ x3+5x2-x = x2+ x+1x+ 4-(5x+4)

0.0000000
x4+ x3+5x2-x = x2+ x+1x2- 4-(5x+4)

0.0000000
None of the option

1.0000000
MCQ10
Let F be a field. Let f(x) and g(x) be two polynomials in F[x] with g(x) ≠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 degr(x) < degg(x).

IIThe polynomial q(x) and r(x) are unique, which of the following is a properties of Division Algorithm

I only

1.0000000
II only

0.0000000
I and II

0.0000000
None of the option

0.0000000
MCQ11
Which of the following polynomial ring is free from zero divisor

Z6

1.0000000
Z7

0.0000000
Z4

0.0000000

Z8

0.0000000
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)) ≤ degf(x) + degg(x) with equality if

R has a zero divisor

0.0000000
R is an integral domain

0.0000000
R does not have a zero divisor

1.0000000
None of the option

0.0000000
MCQ13
If p(x), q(x) ∈ Z[x] then the deg(p(x).q(x)) is

Deg p(x) + deg q(x)

0.0000000
Max (deg p(x), deg q(x))

1.0000000
Min (deg p(x), deg q(x))

0.0000000
None of the option

0.0000000
MCQ14
If f(x) = a0+a1x+…+anxn and g(x) = b0+b1x+…+bmxm are two polynomial in R[x], we define their product f(x).g(x) = c0+c1x+…+cm+nxm+1 where ci is

ai bi ∀ i = 0,1, …, m+n

1.0000000
ai b0 ∀ i = 0,1, …, m+n

0.0000000
ai b0+ ai+1 b1+…+a0 bi ∀ i = 0,1, …, m+n

0.0000000

None of the option

0.0000000
MCQ15
Consider the two polynomials p(x), q(x) in Z[x] by p(x) = 1+2x+3x2, q(x) = 4+5x+7x3.
Then p(x) + q(x) is

4+7x+3x2+7x3

0.0000000
5+7x+3x2+7x3

1.0000000
1+7x+3x2+7x3

0.0000000
None of the option

0.0000000
MCQ16
Determine the degree and the leading coefficient of the polynomial 1+x3+x4+0.x5 is

(4,1)

0.0000000
(3,1)

1.0000000
(5,1)

0.0000000
(5,0)

0.0000000
MCQ17
The Degree of a polynomial written in this form deg(∑i=0naixi) if an ≠0 is

0

1.0000000
n

0.0000000
i

0.0000000
None of the option

0.0000000

MCQ18
Let R be a domain and x ∈ R be nilpotent then xn = 0 for some n ∈ N. Since R has no zero divisors this implies that

x = 0

0.0000000
x = 1

1.0000000
x = 2

0.0000000
None of the option

0.0000000
MCQ19
An ideal m Z of Z is maximal if and only if m is

An even number

1.0000000
An odd number

0.0000000
A prime number

0.0000000
None of the option

0.0000000
MCQ20
Every maximal ideal of a ring with identity is

A prime ideal

0.0000000
A field

1.0000000
An integral domain

0.0000000
None of the option

0.0000000
MCQ21
Let R be a ring with identity. An ideal M in R is Maximal if and only if R/M is

An ideal

0.0000000
A field

1.0000000
An integral domain

0.0000000
None of the option

0.0000000
MCQ22
An ideal p of a ring R with identity is a prime ideal of R if and only if the quotient ring

An integral domain

1.0000000
An ideal

0.0000000
Zero ideal

0.0000000
None of the option

0.0000000
MCQ23
The characteristics of a field is either

Zero or even number

0.0000000
Zero or prime number

0.0000000
Zero or odd number

0.0000000
None of the option

1.0000000
MCQ24
Zn is a field if and only if

n is an even number

1.0000000
n is an old number

0.0000000
n is a prime number

0.0000000
None of the option

0.0000000
MCQ25
Which of the following is an axioms of a field

Is commutative

1.0000000
R has identity (which is denoted by I) and I ≠ 0

0.0000000
Every non – zero element x ∈ R has a multiplicative inverse which we denote by x-1

0.0000000
All of the option

0.0000000
MCQ26
Let R be a ring, the least positive integer n such that nx = 0 ∀ x ∈ R is called

Characteristics of R

0.0000000
The order of R

1.0000000
The value of R

0.0000000
None of the option

0.0000000
MCQ27
Which of the following is not a property of an integral domain

Is a commutative ring

1.0000000
Is with unity element

0.0000000
Does not contain a zero divisor

0.0000000
None of the option

0.0000000
MCQ28
A non – zero element in a ring R is called zero divisor in R if there exist a non – zero element b in R such that

ab ≠ 0

0.0000000
ab = 0

1.0000000
ab-1 = 0

0.0000000
None of the option

0.0000000
MCQ29
If H is a subgroup of a group G and a, b ∈ G then which of the following statement is true?

aH = H Iff a∈ H
0.0000000
Ha = H Iff a ∈ H
1.0000000
Ha = Hb Iff a-1a ∈ H

0.0000000
All the option

0.0000000
MCQ30
Let G be a group and a∈G such that O(G) = t, then an= am, if and only if

n ≡ m (mod t)

0.0000000
n ≡ t (mod n)

0.0000000
m ≡ t (mod n)

0.0000000
None of the option

1.0000000

MCQ31
Which of these does not hold for ‘×’ distributive over $\cup$, $\cap$ and ‘ –

A× (B$\cup$C) = A×B $\cup$ A×C

1.0000000
A× (B$\cap$C) = A×B $\cap$ A×C

0.0000000
A× (B – C) = A×B – A×C

0.0000000
None of the above

0.0000000
MCQ32
The symmetric difference of two given sets A and B, denoted by A ∆ B is defined by

A ∆ B = (A – B) $\cap$ (B – A)

0.0000000
A ∆ B = (A – B) $\cup$ (B – A)

0.0000000
A ∆ B = (A – B) or (B – A)

1.0000000
None of the above

0.0000000
MCQ33
The (relative) complement (or difference) of a set A with respect to a set B denoted by B – A (or B\A) is the set

B – A = {x$\in$ B :xA}

0.0000000
B – A = {x B :xA}

0.0000000
B – A = {x B :x$\in$A}

1.0000000
None of the option

0.0000000
MCQ34
Which of the following is of the operations $\cup$and $\cap$

Idempotent : $A \cup A = A = A \cap A$ for every set A

0.0000000
Associative $A \cup (B \cup C) = (A \cup B) \cup C$ and $A \cap (B \cap C) = (A \cap B) \cap C$ for three sets A,B,C

1.0000000
Commutative: $AB = B \cup A$ and $A \cap B = B \cap A$ for any two sets A, B

0.0000000
All the option

0.0000000
MCQ35
The intersection of two sets A and B written as $A \cap B$ is

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

1.0000000
The set $A \cap B = \{x : x \in A \text{ or } x \in B\}$

0.0000000
The set $A \cap B = \{x : x \in A \text{ and } x \notin B\}$

0.0000000
The set $A \cap B = \{x : x \in A \text{ or } x \notin B$

0.0000000
MCQ36
A set X of n elements has

n subsets

0.0000000
2n subsets

1.0000000
2 subsets

0.0000000
All the option

0.0000000
MCQ37
If G is a finite group such that O(G) is neither I nor a prime, then G has

Non – trivial proper subgroup

1.0000000
Trivial proper subgroup

0.0000000
Subgroup of order prime

0.0000000
Non – trivial subgroup of order prime

0.0000000
MCQ38
Which of the following is not the definition of Euler Phi – function ϕ :N ⟶ N

ϕ (i=1(

1.0000000
ϕ x= number of natural numbers less than n and relatively prime to n

0.0000000
ϕ x= number of natural numbers greater than n and relatively prime to n

0.0000000
None of the option

0.0000000
MCQ39
Every group of prime order is

Non – abelian

1.0000000
Cyclic

0.0000000
Distinct

0.0000000
All the option

0.0000000
MCQ40
An element is of infinite order if and only if all its power are

Real

1.0000000
Imaginary

0.0000000
Distinct

0.0000000
None of the above

0.0000000
MCQ41
Consider the following set of 8 2 ´ 2 matrices over ¢. Q8 = {±I, ±A, ±B, ±C}

where I = 1001, A = 01-10, B =0i0-i, C = i00-i and i = -1. If H = <A> is a subgroup, how many distinct right cosets does it have in Q8

2

0.0000000
4

0.0000000
8

1.0000000
6

0.0000000
MCQ42
Let H = 4Z. How many distinct right coset of H in Z do we have?

2

1.0000000
4

0.0000000
6

0.0000000
8

0.0000000
MCQ43
A function f : A →B is called one – one if and only if different element of B. some time is called

Surjective

0.0000000
Injective

0.0000000
Bijective

1.0000000
None of the above

0.0000000
MCQ44
Let G be a group, g ∈ G and m, n ∈ Z. which of the following does not hold

gmg-m = e that is g-m = (gm)-1

0.0000000
(gm)n = gmn

1.0000000
gmgn=gm+n

0.0000000
None of the above

0.0000000
MCQ45
Let G be a group. If there exist g ∈ G has the form x = gn for some n ∈ Z then G is

A cyclic group

1.0000000
A noncyclic group

0.0000000
An infinite group

0.0000000
All the option

0.0000000
MCQ46
Let H = {I, (1, 2)} be a subgroup of S3. The distinct left cosets of H in S3are

H, (13)H, (23)H

0.0000000
H, (123)H, (12)H

1.0000000
H, (132)H

0.0000000
None of the option

0.0000000
MCQ47
The order of 01-10 in Q8 is

0

0.0000000
2

0.0000000
4

1.0000000
6

0.0000000
MCQ48
The order of (12) in S3 is

1

1.0000000
2

0.0000000
3

0.0000000
4

0.0000000
MCQ49
A group generated by g is given by <g> = {e, g, g2, …,gm-1} the order of g is

M

0.0000000
M-1

0.0000000

0

1.0000000
2

0.0000000
MCQ50
Let H be a subgroup of a finite group G. We call the number of distinct of H in G is

Order of subgroup

0.0000000
index

1.0000000
Order of the group

0.0000000
Order of an element

0.0000000
Fill in the Blank (FBQs)
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 _______________.

4
1.0000000

0.0000000
FBQ2
The degree and the leading coefficient of the polynomial 1 + x3+x4+0.x5is ______________________.

(4,1)
1.0000000

0.0000000

0.0000000
FBQ3
The degree of a polynomial written in this form (∑i=0naixi) if an≠0 is______________________.

n
1.0000000

0.0000000
FBQ4

The order of (12) in S3is ____________________.

2
1.0000000

0.0000000
FBQ5
In a permutation, any cycle of length two is called ___________________.

Transposition
1.0000000

0.0000000
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

Field extention
1.0000000

0.0000000
FBQ7
A non – empty subset S of a field F is called a subfield of F if it is a field with respect to the operations on F. if S ≠F, then S is called _____________ of F

Proper subfield
1.0000000

0.0000000
FBQ8
Let f(x) = a0+a1x+…anxn∈Zx. We define the content of fx to be the g.c.d of the integers a0,a1,…,an, we say f(x) is ________________ if the content of f(x) = 1

primitive
1.0000000

0.0000000
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

Unique factorization domain
1.0000000

0.0000000
FBQ10
An element d ∈ R is a _________________ of a, b ∈ R if

d|a and d|b and (i)i for any common divisor c of a and b, c|d

Greatest Common divisor
1.0000000

0.0000000
FBQ11
Given two elements a and b in a ring R, we say that c ∈ R is a _______________ of a and b if c|a and c|b.

Common divisor
1.0000000

0.0000000
FBQ12
We call an integral domain R a _________________ if every ideal in R is a principal ideal.

Principal ideal
1.0000000

0.0000000
FBQ13
The number of unit that can be obtained in R = a+b-5 |a,b ∈Z is _______________

2
1.0000000

0.0000000
FBQ14
Let R be an integral domain, an element a ∈ R is called a unit or an _____________ in R if we can find b∈R such that ab = 1 i.e if a has a multiplicative inverse

Invertible element
1.0000000

0.0000000
FBQ15
A domain on which we can define a Euclidean valuation is called _________.

Euclidean domain
1.0000000
Euclidean
1.0000000
FBQ16
Let R be an integral domain. We say that a function d:R0 → N ∪ 0 is a ___________________ on R if the following conditions are satisfied.

d(a) ≤d ∀ a,b ∈R0 and

for any a,b ∈R, b ≠0 ∃ q,r∈R such that a=bq.r, where r=0 or dr<db.

Euclidean Evaluation
1.0000000

0.0000000
FBQ17
Let F be a field and f(x) ∈ Fx, we say that an element a∈ F is a ____________ (where) m is positive integer of f(x) if (x-a)m|f(x) but (x-a)m+1×f1

Root of multiplicity m
1.0000000

0.0000000
FBQ18
Let F be a field and f(x) ∈ Fx we say that an element a ∈ F is a _____________ (or zero) of f(x) if f(a) = 0

Factor
1.0000000
Divides
1.0000000
FBQ19
If S is set, an object ‘a’ in the collection S is called an__________________ of S

Element
1.0000000

0.0000000
FBQ20
A set with ______________element in S is called an empty set

No
1.0000000

0.0000000
FBQ21
_____________ method is sometimes used to list the element of a large set

Roster
1.0000000

0.0000000
FBQ22
The set of rational numbers and the set of real numbers are respectively represented by the symbol {#1} and {#2}

10434 10435,10436
FBQ22 {100:SHORTANSWER:%100%Q}
Q
1.0000000
FBQ22 {100:SHORTANSWER:%100%R}
R
1.0000000
FBQ23
The symbol ∃ denotes __________________.

There exist
1.0000000

0.0000000
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.

Intersection
1.0000000

0.0000000
FBQ25
A relation R defined on a set S is said to be ________________ if we have aRa ∀ a ∈S.

Reflexive
1.0000000

0.0000000

0.0000000
FBQ26
A relation R defined on a set S is said to be ________________if

a R b ⇒ b R a ∀ a,b ∈ S.

Symmetric
1.0000000

0.0000000
FBQ27
A relation R defined on a set S is said to be ________________ if a R b and b R a ∀ a, b,c∈ S

Transitive

1.0000000

0.0000000
FBQ28
A relation R defined on a set S that is reflexive, symmetric and transitive is called ________________ relation

Equivalence
1.0000000

0.0000000
FBQ29
A ________________ f from a non – empty set A to a non – empty set B is a rule which associates with every element of A exactly on element of B

Function
1.0000000

0.0000000
FBQ30
A function f : A → B is called ______________ if associates different elements of A with different element of B

Injective
1.0000000
One to one
1.0000000
FBQ31
A function f : A → B is called ____________ if the range of f is B.

Onto
1.0000000
Surjective
1.0000000
FBQ32
Consider two non – empty set A and B, we define the function π1a,b=a.π1 is called the __________________ of A×B onto A

Projection
1.0000000

0.0000000
FBQ33
A function that is both one to one and onto is called ________________

Bijective
1.0000000

0.0000000
FBQ34
Any set which is equivalent to the set 1,2,…,n, for some n ∈ N, is called a ___________________ set.

Finite
1.0000000

0.0000000
FBQ35
A set that is not _______________ is called infinite set

Finite
1.0000000

0.0000000
FBQ36
A function f : A → B has an inverse if and only if is ___________________

Bijective
1.0000000

0.0000000
FBQ37
A natural number p(≠1) is called ______________ if its only divisor are 1 and p

Prime
1.0000000

0.0000000
FBQ38
If a natural number n(≠1) is not a prime, then it is called a ______________ number

Composite
1.0000000

0.0000000
FBQ39
Let A be any set, the function IA :A→A : IAa=a is called ________________ on A.

Identity function
1.0000000

0.0000000
FBQ40
Let S be a non – empty set, any function S×S → S is called a _______________ on S.

Binary operation
1.0000000

0.0000000
FBQ41
Let * be a binary operation on a set S. we say that: * is _____________ on a subset T of S if a*b ∈ T ∀ a,b ∈ T

Closed
1.0000000

0.0000000
FBQ42
Let * be a binary operation on a set S. we say that: * is _____________ if, for all a,b,c ∈ S, (a*b)*c = a ×(b*c).

Associative
1.0000000

0.0000000
FBQ43
Let * be a binary operation on a set S. we say that: * is _____________ if for all a,b|s, a*b = b*a

Commutative
1.0000000

0.0000000
FBQ44
If ° and * are two binary operations on a set S, we say that * is ___________.

Distributive over
1.0000000

0.0000000
FBQ45
.Let * be a binary operation on a set S. if there is an element e ∈ S such that ∀ a∈ S, a * e = a and e* a = a then e is called an_________________ for *.

Identity element
1.0000000

0.0000000
FBQ46
The Cayley table is named after the famous mathemathecian

Arthur Cayley
1.0000000

0.0000000
FBQ47
____________ system consists of a set with a binary operation which satisfies certain properties is called a group

Algebraic
1.0000000

0.0000000
FBQ48
Let G be a group, for a ∈ G, we define

a0=e

a0=an-1, if n>0

a-a=(a-1)n, if n>0

n is called the exponent (or index) of ____________ an of a

The integral power
1.0000000
integral power
1.0000000
FBQ49
≡ is an equivalence relation, and hence partition Z into disjoint equivalence classes called ____________ modulo n.

Congruence class
1.0000000

0.0000000
FBQ50
If the set X is finite, say X = (1,2,3, …, n) then we denote S(x) by Sn and each of Sn is called a _______________ on n symbols

Permutation
1.0000000

0.0000000