**MTH202- Discrete Mathematics MIDTERM EXAMINATION**

**Time: 60 min**
**Marks: 40**

**Question No: 1 ( Marks: 1 ) - Please choose one**
The negation of "Today is Friday" is
> Today is Saturday
> Today is not Friday  **p_3**
> Today is Thursday

**Question No: 2 ( Marks: 1 ) - Please choose one**
An arrangement of rows and columns that specifies the truth value of a compound proposition for all possible truth values of its constituent propositions is called
> Truth Table          **p_4**
> Venn diagram
> False Table
> None of these

**Question No: 3 ( Marks: 1 ) - Please choose one**
For two sets A,B
$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ is called
> Distributivity of intersection over union
> Distributivity of union over intersection
> Distributivity Law    **p_44**
> None of these

**Question No: 4 ( Marks: 1 ) - Please choose one**
An argument is _____ if the conclusion is true when all the premises are true.
> Valid  **p_19**
> Invalid
> False
> None of these

**Question No: 5 ( Marks: 1 ) - Please choose one**
The row in the truth table of an argument where all premises are true is called
> Valid row
> Invalid row
> Critical row          **p_19**
> None of these

**Question No: 6 ( Marks: 1 ) - Please choose one**
Check whether
36 º 1 (mod 5)          36 Modulus5 = 1 remainder
33 º3 (mod10)           33 Modulus10 = 3 remainder

- ➢ Both are equivalent
- ➢ Second one is equivalent but first one is not
- ➢ First one is equivalent but second one is not

## Question No: 7 ( Marks: 1 ) - Please choose one
A binary relation R is called Partial order relation if
- ➢ It is Reflexive and transitive
- ➢ It is symmetric and transitive
- ➢ It is reflexive, symmetric and transitive
- ➢ It is reflexive, antisymmetric and transitive    **p_79**
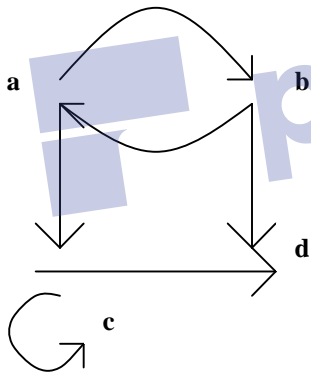
## Question No: 8 ( Marks: 1 ) - Please choose one
The order pairs which are not present in a relation, must be present in
- ➢ Inverse of that relation
- ➢ Composition of relations
- ➢ Complementry relation of that relation    **p_84**

## Question No: 9 ( Marks: 1 ) - Please choose one
The relation as a set of ordered pairs as shown in figure is



- ➢ {(a,b),(b,a),(b,d),(c,d)}
- ➢ {(a,b),(b,a),(a,c),(b,a),(c,c),(c,d)}
- ➢ {(a,b), (a,c), (b,a),(b,d), (c,c),(c,d)}    **p_63**
- ➢ {(a,b), (a,c), (b,a),(b,d),(c,d)}

## Question No: 10 ( Marks: 1 ) - Please choose one
A circuit with two input signals and one output signal is called
- ➢ NOT-gate (or inverter)
- ➢ AND- gate    **p_22**
- ➢ None of these

**Question No: 11 ( Marks: 1 ) - Please choose one**
If f(x)=2x+1 then its inverse =

➢ x-1
➢ $\frac{1}{2}(x-1)$ **not sure**    **p_112**
➢ $x^2 + 2$

**Question No: 12 ( Marks: 1 ) - Please choose one**
Null set is denoted by
➢ (phi) or { }.        **P_30**
➢ A
➢ None of these

**Question No: 13 ( Marks: 1 ) - Please choose one**
The total number of elements in a set is called
➢ Strength
➢ Cardinality
➢ Finite  **p_31**

**Question No: 14 ( Marks: 1 ) - Please choose one**
If f(x)= x+1 and g(x)= $-2x^2 +1$ then (2f - 1g)x=

➢ $2x^2 - x$
➢ 3x+2
➢ $2x^2 + 2x + 1$

**2(x+1)-1(− 2 x 2+ 1)**
**2 x +2+ 2 x 2-1**
**2 x 2+ 2x+1**

**Question No: 15 ( Marks: 1 ) - Please choose one**
Let
$a_0 = 1, a_1 = -2 \ and \ a_2 = 3$

$Then \sum_{j=0}^{2} a_j =$
➢ -6
➢ 2
➢ 8

**Question No: 16 ( Marks: 1 ) - Please choose one**
Which of the given statement is incorrect?

➢ The process of defining an object in terms of smaller versions of itself is called recursion.
➢ A recursive definition has two parts: Base and Recursion.
➢ Functions cannot be defined recursively
➢ Sets can be defined recursively.

**Question No: 17 ( Marks: 1 ) - Please choose one**
The operations of intersection and union on sets are commutative
➢ True          **p_44**
➢ False
➢ Depends on the sets given

**Question No: 18 ( Marks: 1 ) - Please choose one**
The power set of a set A is the set of all subsets of A, denoted P(A).
➢ False
➢ True          **p_58**

**Question No: 19 ( Marks: 1 ) - Please choose one**
What is the output state of an OR gate if the inputs are 0 and 1?
➢ 0
➢ 1      **p_22**
➢ 2
➢ 3

**Question No: 20 ( Marks: 1 ) - Please choose one**
The product of the positive integers from 1 to n is called
➢ Multiplication
➢ n factorial
➢ Geometric sequence

**Question No: 21 ( Marks: 2 )**
Let
R be the relation on from A to B as
R={(1,y) ,(2,x) ,(2,y),(3,x)}
Find
(a) domain of R
(b) range of R

**Question No: 22 ( Marks: 2 )**
Missing

**Question No: 23 ( Marks: 3 )**
Suppose that R and S are reflexive relations on a set A. Prove or disprove
$R \cap S$ is reflexive.

**Question No: 24 ( Marks: 3 )**

Find the sum of the infinite G.P.

$2, \sqrt{2}, 1, \ldots\ldots$

**Question No: 25 ( Marks: 5 )**

$f \quad f(x) = \dfrac{x}{2} + 3 \ and \ g(x) = \dfrac{3}{4}x - 2$

*then find the value of*

$5f(-2) - 7g(-4)$

**Question No: 26 ( Marks: 5 )**

Write the geometric sequence with positive terms whose second term is 9 and fourth term is 1.