Virtual University	**LATSEST MCQS FROM MIDTERM PAPERS**	**10 MAY 2011**
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MTH202 Discrete Mathematics

Question No. 1:

If p= It is raining q = She will go to college

"It is raining and she will not go to college" will be denoted by

☐ $p \wedge \sim q$ ☐ $p \wedge q$ ☐ $\sim (p \wedge q)$ ☐ $\sim p \wedge q$

Question No. 2:

The negation of "Today is Friday" is

☐ Today is Saturday ☐ **Today is not Friday** ☐ Today is Thursday ☐ None of given

Question No. 3:

The converse of the conditional statement $p \rightarrow q$ is

☐ $q \rightarrow p$ ☐ $\sim q \rightarrow \sim p$ ☐ $\sim p \rightarrow \sim q$ ☐ None of these

Question No. 4:

Contra-positive of given statement "If it is raining, I will take an umbrella" is

☐ **I will not take an umbrella if it is not raining. (Pg 19)** ☐ I will take an umbrella if it is raining.

☐ It is not raining or I will take an umbrella. ☐ None of these.

Question No. 5:

A statement is also referred to as a

☐ **Proposition (pg 4)** ☐ Conclusion ☐ Order ☐ None of these

Question No. 6:

The statement "It is not raining if and only if roads are dry" is logically equivalent to

☐ If roads are dry then it is not raining. ☐ None of these.

☐ **Roads are dry if and only if it is not raining** ☐ If it is not raining then roads are dry.

Question No. 7:

The statement $\sim(\sim p) = p$ Describes

☐ Commutative Law ☐ Implication Laws ☐ **Double negative law** ☐ Equivalence

Question No. 8:

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** ☐ Venn diagram ☐ False Table ☐ None of these

Question No. 9:

An argument is _____ if the conclusion is true when all the premises are true.

☐ **Valid (Pg 25)** ☐ Invalid ☐ False ☐ None of these

Question No. 10:

The row in the truth table of an argument where all premises are true is called

☐ Valid row ☐ Invalid row ☐ **Critical row (Pg 27)** ☐ None of these

Question No. 11:

The statement $p \to q \equiv (p \wedge \sim q) \to c$ **describes**

☐ Commutative Law ☐ Implication Laws ☐ Exportation Law ■ **Reductio ad absurdum**

Question No. 12:

$p \leftrightarrow q$ **is logically equivalent to** $(p \to q) \wedge (q \to p)$ ☐ TRUE ☐ FALSE

Question No. 13:

According to biconditional 1+1=3 if and only if sky is yellow. ■ **TRUE (Pg 20)** ☐ FALSE

Question No. 14:

A statement that is always true regardless of the truth values of the statement variables called Tautology.

■ **TRUE (Pg 10)** ☐ FALSE

Question No. 15:

If p and q are statement variables, then the conjunction of p and q is "p and q" denoted as "$p \vee q$".

☐ TRUE ■ **FALSE**

Question No: 3 (Marks: 1) - Please choose one

For two sets A,B

A ∩ (B U C) = (A ∩ B) U(A∩ C) is called

- ► Distributivity of intersection over union
- ► Distributivity of union over intersection
- ► None of these
- ► **Distributivity Law**

Question No: 6 (Marks: 1) - Please choose one

Check whether

36 ≡ 1 (mod 5) **36 Modulus5 = 1 remainder**

33 ≡3 (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

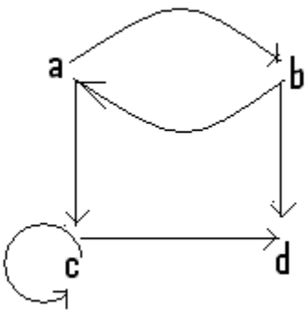
- ► It is Reflexive and transitive
- ► It is symmetric and transitive
- ► It is reflexive, symmetric and transitive
- ► **It is reflexive, anti-symmetric and transitive (Pg 92)**

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**
- ► **Complementary relation of that relation (pg 97)**

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)}**
- ► {(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**
- ► None of these

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

- ► x-1
- ► $\frac{1}{2}(x-1)$
- ► x^2 +2

$f(x)=2x+1$

$y=2x+1$

$x=\frac{y-1}{2}$

$f(x)^{-1}=\frac{y-1}{2}$

Question No: 12 (Marks: 1) - Please choose one
Null set is denoted by

- ► **(phi) or { }. (pg 39)**
- ► A
- ► None of these

Question No: 13 (Marks: 1) - Please choose one
The total number of elements in a set is called

- ► Strength
- ► **Cardinality (pg 141)**
- ► Finite

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
- ▶ $2x^2+2x+1$

$=(2f-1g)x$

$=2f(x)-g(x)$

$=2.(x+1)-(-2x^2+1)$

$=2x+2+2x^2-1$

$=2x^2+2x+1$

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. (Pg 159)
- ▶ A recursive definition has two parts: Base and Recursion.
- ▶ **Functions cannot be defined recursively (Pg 159)**
- ▶ Sets can be defined recursively. (Pg 165)

Question No: 17 (Marks: 1) - Please choose one

The operations of intersection and union on sets are commutative

- ▶ **True (Pg 42)**
- ▶ 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 (Pg 68)**

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**
- ▶ 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: 6 (Marks: 1) - Please choose one

Let A= {1, 2, 3, 4} and R = {(1, 1), (2, 2), (3, 3),(4,4)} then

- R is symmetric.
- R is anti symmetric.
- R is transitive.
- R is reflexive.
- **All given options are true**

Question No: 7 (Marks: 1) - Please choose one

The inverse of given relation
R = {(1,1),(1,2),(1,4),(3,4),(4,1)} is

- {(1,1),(2,1),(4,1),(2,3)}
- {(1,1),(1,2),(4,1),(4,3),(1,4)}
- **{(1,1),(2,1),(4,1),(4,3),(1,4)} (Pg 95)**

Question No: 11 (Marks: 1) - Please choose one

$(A \cap B)^c = (A^c \cap B^c)$

- True
- **False**

Question No: 13 (Marks: 1) - Please choose one

Let g be the functions defined by
g(x)= 3x+2 then gog(x) =

- $9x^2 + 4$
- 6x+4
- **9x+8**

$g(g(x)) = g(3x+2)$
$= 3(3x+2)+2$
$= 9x+6+2$
$= 9x+8$

Question No: 16 (Marks: 1) - Please choose one

The Common fraction for the recurring decimal 0.81 is

- $\frac{81}{100}$
- $\frac{81}{98}$
- $\frac{9}{11}$

(Pg 157)

Question No: 17 (Marks: 1) - Please choose one

A collection of rules indicating how to form new set objects from those already known to be in the set is called

- Base
- Restriction
- **Recursion (Pg159)**

Question No: 19 (Marks: 1) - Please choose one

The statement of the form $p \vee \sim p$ is:

- **Tautology (Pg 10)**
- Contradiction
- Fallacy

Question No: 20 (Marks: 1) - Please choose one

Let A,B,C be the subsets of a universal set U.
Then $(A \cup B) \cup C$ is equal to:
$A \cap (B \cup C)$

- $A \cup (B \cap C)$
- $\varnothing$
- $A \cup (B \cup C)$

Associative Law

Question: If R ={ (a, a),(b, b),(c, c)} is a relation on the set A={a, b, c} Then R is

- Symmetric only.
- Symmetric and reflexive only.
- Reflexive only.
- **Equivalence relation. (Pg 85)**

Question: The negation of the implication "If P is a square then P is a rectangle" is

- **If P is not a square then P is not a rectangle**
- P is not a square and P is a rectangle
- P is a square and P is not a rectangle.
- None of the above

Question: Identify the false statement

- **0 ∈ ∅**
- {∅}{∅} ⊆
- If A and B are two sets A B and BA then A = B**.** ⊆
- Two sets are disjoint if their intersection is empty set.
- A □A^c = U

Question: Let A be a set containing 3 elements then the total number of relations from A to A is

- 2*9
- 2^9
- **n*n**
- 2n

Question: Let A = {1,2,3} and B = {2,3,4,5} then

- A = B.
- A is a subset of B.
- A is improper subset of B.
- **Both 2 and 3.**

Question: Which of the following is not a Proposition?

- **x >11.**
- Sun rounds about the Earth
- 11+7=18
- None of above.

Question: F={x∈R | x131 + 29 x 12 -3=0}

- **finite**
- infinite
- (c) none of above

Question: Let A has the same cardinality as B if and only if ,there is a---------- correspondence between sets A and B

- one-one
- onto
- **(c) Both (a) and (b) (Pg 141)**

Question: Let A={0,1,2,3,4,5}and we define functions f: A → A and then g: A →A
f (3)=3 , f (4)=2 , f (5)=2 , f (2)=5, f (1)=2
g (1)=4 , g (3)=3 , g (5)=3 , g (2)=1
then fog(5) and gof(2)

- **(a) fog(5) = gof(2)**
- (b) fog(5) gof(2)
- (c) fog(3) = gof(1)
- (d) None of the above

$fog(5) = fg(5)$

$= f(3) = 3$

$gof(2) = gf(2)$

$= g(5) = 3$

Question: Choose the correct answer:
If f and g are two one-to-one functions, then their composition of gof is

- onto
- **one-to-one (Pg 134)**
- (c) bijective

Question: If 1=1 then 2=2 , the conditional statement is

- **True**
- False
- None of other.

If $1^3 + 2^3 + 3^3 + ..+ n^3 =$

Then,

$\left[\frac{n(n+1)}{2}\right]^2$ $(Pg\,157)$

$\frac{n(n+1)(2n+1)}{6}$

$\frac{n(n+1)}{2}$

None of these

Question: A set Z has n elements. How many functions are from Z to Z?

- 2_n
- **$n \times n$**
- n_n
- None of the other

Question: Compute the summation

$\sum_{i=0}^{2}\left(i^2+2\right)$

- 5
- 3
- 0
- **None of these.**

Question: Let S = {n∈Z / n = $(-1)_k$, for some integer k}

- S={1}
- S={-1}
- S={-1,1}
- None of the other

Question: If p=T,q=T,r=F

Then

$((\sim p) \wedge r) \rightarrow (q \wedge r))$

Must be

- F
- **T**
- qVr
- None of these.

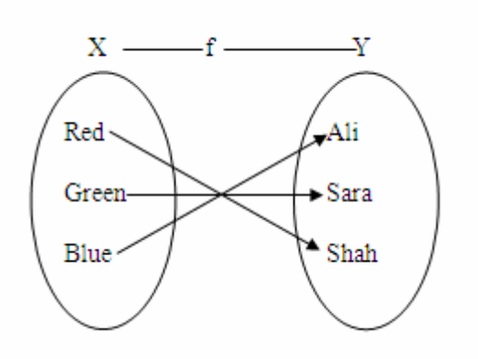
Question: If A={a,b,c,d} then the number of elements of power set P(A) are

- 2^4
- 2^5
- 2^6
- 2^7

Question: Consider the relation R={(1,1),(1,2),(1,4),(2,1),(2,2),(3,3),(4,4)} on A={ 1,2,3,4 } is

- Symmetric
- Transitive
- **Reflexive**
- All of these

Question: The function defined by the following diagram is *f*: *X*→*Y*



- One-to-one
- Onto
- **Both one-to-one and onto**
- None of these

Question: $1, 10, 10^2, 10^3, 10^4, 10^5, 10^6, 10^7, \ldots\ldots\ldots\ldots$
is

- **Arithmetic series (Pg 145)**
- Geometric series
- Arithmetic sequence
- Geometric sequence

Question:
Negations for the given statement "The train is late or my watch is fast" is

- **The train is not late or my watch is not fast.**
- The train is not late and my watch is not fast**.**
- The train is not late or my watch is fast
- None of these**.**

Question:
Let R be the relation from A={a_1,a_2,a_3}(Elements of A are ordered by their subscript)to itself given by the matrix representation . Then R is

$$\begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$$

- Reflexive and Symmetric.
- Symmetric and Transitive.
- **Irreflexive and Symmetric.**
- Irreflexive and Anti- Symmetric.

If out of 35 people each person like Discrete Mathematics or Data Structures ,25 like Discrete Mathematics, and 20 like Data structures then the number of people who like

both Discrete and Data Structures is……..

- **5**
- 15
- 10
- None of these.

Question: Inverse of a function may not be a function

- **True (Pg 124)**
- False

Question No: 1 (Marks: 1) - Please choose one

The inverse of given relation R = {(1,1),(1,2),(1,4),(3,4),(4,1)} is

- {(1,1),(2,1),(4,1),(2,3)}
- {(1,1),(1,2),(4,1),(4,3),(1,4)}
- **{(1,1),(2,1),(4,1),(4,3),(1,4)}**

Question No: 2 (Marks: 1) - Please choose one
Symmetric and antisymmetric are

- Negative of each other
- Both are same
- **Not negative of each other (Pg 90)**

Question No: 3 (Marks: 1) - Please choose one
Let A = {a, b, c} and

R = {(a, c), (b, b), (c, a)} be a relation on A. Is R

- Transitive
- Reflexive
- **Symmetric**
- Transitive and Reflexive

Question: In Boolean addition 1+1=

- **2**
- **1 (Pg 99)**
- **0**

Question No: 8 (Marks: 1) - Please choose one

The same element can never appear twice in a set

- True
- **False**

Question No: 9 (Marks: 1) - Please choose one

If f(x)=2x+1, $g(x)=x^2-1$ **then fg(x)=**

- x^2-1
- $2x^2-1$
- $2x^3-1$

$fg(x) = f(x^2 - 1)$

$f(x^2 - 1) = 2(x^2 - 1) + 1$

$= 2x^2 - 2 + 1$

$= 2x^2 - 1$

Question No: 13 (Marks: 1) - Please choose one
If a set contains exactly *m* distinct elements where *m* denotes some non negative integer then the set is .

- ► **Finite**
- ► Infinite
- ► None of these

Question No: 14 (Marks: 1) - Please choose one
If f(4) = 1 and g(1) = 4 then fog(1) =

- ► 3
- ► 1
- ► 4

$fog(1) = fg(1)$

$= f(4) = 1$

Question No: 15 (Marks: 1) - Please choose one
If ($A \cup B$) = A, then ($A \cap B$) = B

- ► **True**
- ► False
- ► Cannot be determined

Question No: 16 (Marks: 1) - Please choose one
The total number of elements in a set is called

- ► Strength
- ► **Cardinality**
- ► Finite

Question No: 17 (Marks: 1) - Please choose one
If f(x) = x and g(x)=-2x then (f+g)x =

- ► 3x
- ► $2x^2$
- ► **–x**

Question No: 19 (Marks: 1) - Please choose one

Which term of the sequence 4,1,-2,… is -77

- ► **26**
- ► 27
- ► 28

Question No: 20 (Marks: 1) - Please choose one
If a set A has 5 elements then power set of A. P(S) contains elements. Which are?

- ► 5^5
- ► 2^n
- ► 4^5
- ► 2^5

Question No: 13 (Marks: 1) - Please choose one

Let g be the functions defined by
g(x)= 3x+2 then gog(x) =

- $9x^2+4$
- 6x+4
- **9x+8**

$gg(x)$
$=3(3x+2)+2$
$=9x+6+2$
$=9x+8$