MTH202 FINAL TERM SOLVED MCQs

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

When 5^k is even, then $5^k+5^k+5^k$ is odd.

- ► True
- ► False

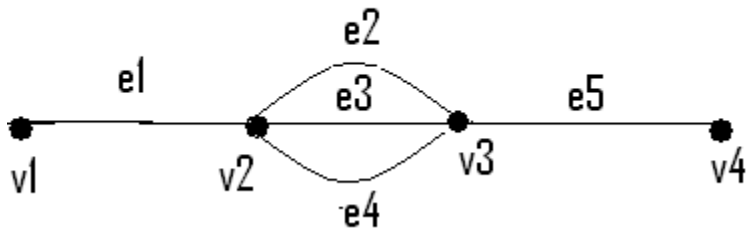
Question No: 2 (Marks: 1) - Please choose one

An arrangement of objects without the consideration of order is called

- ► Combination
- ► Selection
- ► None of these
- ► Permutation

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

In the following graph



How many simple paths are there from v_1 to v_4

- ► 2
- ► 3
- ► 4

Question No: 4 (Marks: 1) - Please choose one

Changing rows of matrix into columns is called

- ► Symmetric Matrix
- ► Transpose of Matrix
- ► Adjoint of Matrix

Question No: 5 (Marks: 1) - Please choose one

The list of the degrees of the vertices of graph in non increasing order is called

- ► Isomorphic Invariant
- ► Degree Sequence
- ► Order of Graph

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

A vertex of degree greater than 1 in a tree is called a

- ► Branch vertex
- ► Terminal vertex
- ► Ancestor

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

The word "algorithm" refers to a step-by-step method for performing some action

- ► True
- ► False
- ► None of these

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

The sum of two irrational number must be an irrational number

► True
► False

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

An integer n is prime if, and only if, n > 1 and for all positive integers r and s, if n = r·s, then

► r = 1 or s = 1.

► r = 1 or s = 0.

► r = 2 or s = 3.

► None of these

Question No: 10 (Marks: 1) - Please choose one

An integer n is even if, and only if, n = 2k for some integer k.

► True

► False

► Depends on the value of k

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

For any two sets A and B, A – (A – B) =

► A Ç B

► A È B

► A – B

► None of these

Question No: 12 (Marks: 1) - Please choose one

A walk that starts and ends at the same vertex is called

► Simple walk

► Circuit

► Closed walk

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

Associative law of union for three sets is

► A È (B È C) = (A È B) È C

► A Ç (B Ç C) = (A Ç B) Ç C

► A È (B Ç C) = (A È B) Ç (A È B)

► None of these

Question No: 14 (Marks: 1) - Please choose one

Two distinct edges with the same set of end points are called

□□□□□□□►□Isolated

□□□□□□□►□Incident

□□□□□□□►□Parallel

Question No: 15 (Marks: 1) - Please choose one

The probability of getting 2 heads in two successive tosses of a balanced coin is

$\frac{1}{4}$

□□□□□□□►□

$\frac{1}{2}$

□□□□□□□►□

$\frac{2}{3}$

□□□□□□□►□

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

What is the probability of getting a number greater than 4 when a die is thrown?

$\frac{1}{2}$

□□□□□□□▶□

$\frac{3}{2}$

□□□□□□□▶□

$\frac{1}{3}$

□□□□□□□▶□

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

If two relations are reflexive then their composition is

≡ **Antisymmetric**
≡ **Reflexive**
≡ **Irreflexive**
≡ **Symmetric**

Question No: 18 (Marks: 1) - Please choose one

If p and q are statement variables, the biconditional of p and q is

denoted by

▶ p«q

▶ ~q ®~p

▶ ~p ®~q

▶ None of these

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

Select the correct one

▶ A proof by contradiction is based on the fact that a statement can be true and false at the

same time.

► A proof by contraposition is based on the logical equivalence between a statement and its contradiction.

► The method of loop invariants is used to prove correctness of a loop without any conditions.

► None of the given choices

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

According to Demorgan's law

$\sim (p \vee q) = ?$

► $\sim p \vee \sim q$

► $\sim p \wedge \sim q$
► $\sim p \wedge q$
► $\sim p \vee q$

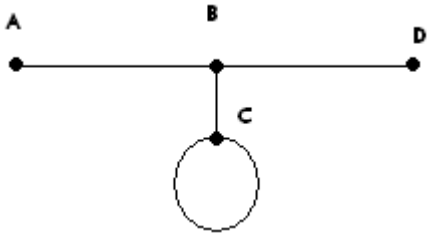
Question No: 21 (Marks: 2)

Find integers q and r so that a=bq+r , with 0≤r<b.
a=45 , b=6.

Ans:
If a =45 and b = 6 are two integers with $b \neq 0$ such that the q and r are non negitive integers.
a=bq+r
divides 45 by 6
this gives= 6.7 +3
divides 6 by 3
this gives = 3.2 +0
hence gcd of the (45,6) will be 3

Question No: 22 (Marks: 2)

Give the degree of each vertex in the figure (given below)



Ans: degree of A vertex = 1
Degree of B vertex = 3
Degree of C vertex = 3
Degree of D vertex = 1
Total degree of vertices = 8
Can be prove by formula
Degree of vertices = 2. no. of edges
= 2 . 4
= 8

Question No: 23 (Marks: 2)

What is the probability of getting a number greater than 2 when a dice is tossed?

As dice has 6 sides so possible event will be 36.
No. greater than 2 will be
3 ,4 ,5 ,6 = 18

P(E) =n(E)/(n(S))

= 18/36

= ½ will be the possibility to get no greater than 2

Question No: 24 (Marks: 3)

How many distinguishable ways can the letters of the word HULLABALOO be arranged if words are to begin with U and end with L

Question No: 25 (Marks: 3)

Write the Pre and Post Conditions of the

"Algorithm to compute a product of two negative integers".

Ans:
Pre condition: The input variables m and n are nonnegative integers.
Post condition: the out put variables p equals m.n.
Example:

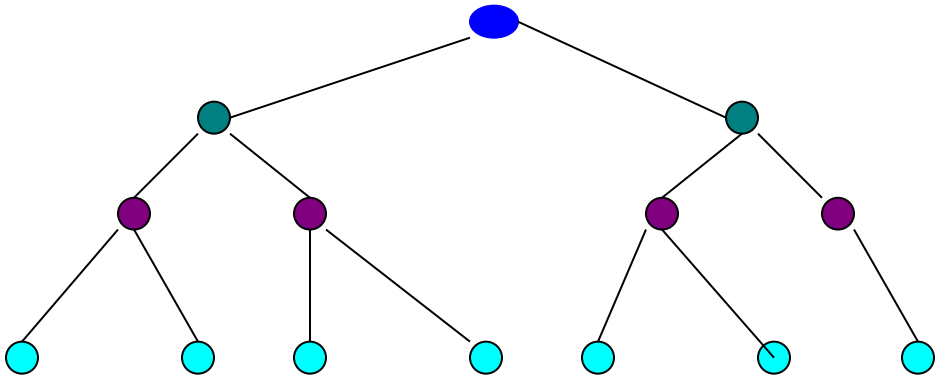
If $k \geq 0$, then $\binom{n}{k} = \frac{n(n-1)\dots(n-k+1)}{1 \cdot 2 \cdots k} = (-1)^k \binom{-n+k-1}{k}$
extends to all *n*.

extends to $k < 0$ via

$$\binom{n}{k} = \begin{cases} (-1)^{n-k}\binom{-k-1}{n-k} & \text{if } n \geq k, \\ (-1)^{n-k}\binom{-k-1}{-n-1} & \text{if } n \leq -1. \end{cases}$$

Question No: 26 (Marks: 3)

Draw a full binary tree with seven vertices.



Question No: 27 (Marks: 5)

Find n if

P(n,2) = 72

Given

P(n,2) = 72

n.(n-1)=72 by using the definition of permutation

n^2-1=72

n^2-n-72=0

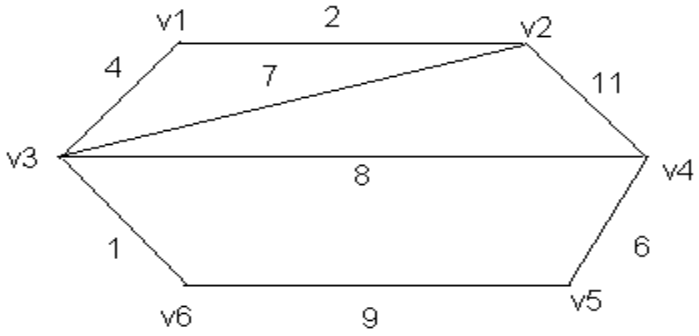
n=9,-8 since n must be positive so only the acceptable value for n is 9

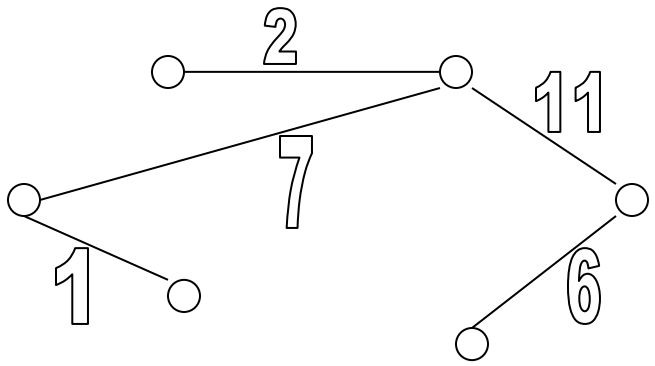
Question No: 28 (Marks: 5)

Five people are to be seated around a circular table. Two seating plans are considered as same if one is the rotation of other. How many different seating plans are possible?

Question No: 29 (Marks: 5)

Use Kruskal's Algorithm to draw the minimal spanning tree for the graph below. Indicate the order in which edges are added to form a tree.





Order of adding the edges:

{v3,v6},{v1,v2},{v4,v5},{v2,v3},{v2,v4},.

Question No: 30 (Marks: 10)

Show the sample space for tossing one penny and rolling one die.
(H = heads, T = tails) using tree diagram

Question No: 31 (Marks: 10)

,$10^{3n} + 13^{n+1}$ is divisible by 7 for all n>=1

Let $10^{3n} + 13^{n+1}$ is divisible by 7

Basis step:
P(1) is true.now
P(1):

(0.1)

$10_{3n} + 13_{n+1}$ is divisible by 7

Since $10_{3.1} + 13_{1+1} = 10_{(3)} + 13_2$
Which is divisible by 7
Hence P(1) is true.now

Inductive step:
Suppose p(k is true)
$10_{3k} + 13_{k+1}$ = 7.q
To prove p(k+1) $10_{3n} + 13_{n+1}$ is true is divdsible by 7

$10_{3k+1} + 13_{k+1+1} = 23_{4k+3}$
$= 23_{4k+3} + 2 - 2$
$= 21_{4k+3} + 2$
$= 7.3_{4k+3} + 2$
$= 7(3_{4k+3} + 2)$

=7. q where q is ant positive integer equal to $3_{4k+3} + 2$
So its proved that $10^{3n} + 13^{n+1}$ divisible by 7 for all n>=1

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