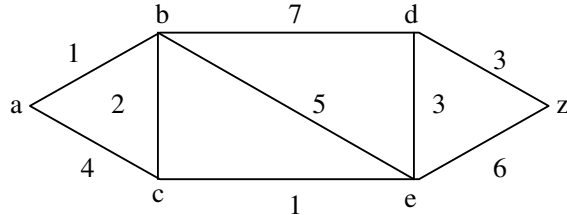


[4]

Q.3. Find a shortest distance from a to z & its length for the graph given below by Dijkstra's Algorithm -



OR

State & Prove Warshall's algorithm.

Q.4. Construct deterministic finite state automaton equivalent to the following non-deterministic finite state automaton.

$$M = (\{0,1\}, \{s_0, s_1\}, s_0, \{s_1\}f)$$

Where f is given by the following table -

		F	
	I		
S		0	1
s_0		$\{s_0, s_1\}$	$\{s_1\}$
s_1		\emptyset	$\{s_0, s_1\}$

OR

Explain Turing Machine.

-----XXX-----

[1]

ROLL NO.....

MATH. 205/21

II SEMESTER EXAMINATION, 2021

M. Sc. (MATHEMATICS)

PAPER-V

ADVANCED DISCRETE MATHEMATICS- II

TIME: 3 HOURS

MAX.- 80

MIN.- 16

Note: The question paper consists of three sections A, B & C. All questions are compulsory.

Section A- Attempt all very short answer type questions.

Section B- Attempt one question from each unit.

Section C- Attempt one question from each unit.

SECTION 'A'

2 × 8 = 16

Very Short Answer Type Questions

1. Define planar graph and their properties.
2. Write difference between path & cycle of a graph.
3. Define minimal spanning tree.
4. Define Rank & Nullity of graph.
5. In directed, graph, define indegree & outdegree of a vertex.
6. Define pendent vertex of a graph with example.
7. Define finite state machine.
8. Define accepting state of finite state machine with example.

[2]

SECTION 'B'

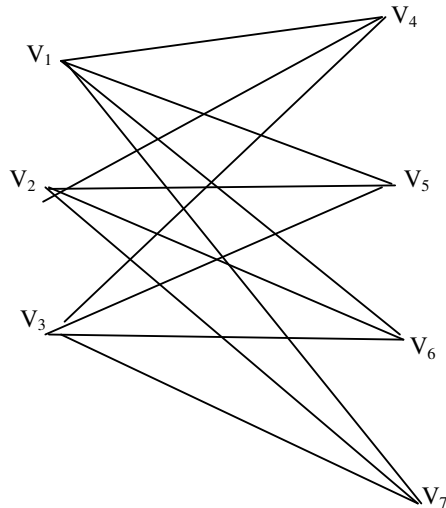
$4 \times 6 = 24$

Short Answer Type Questions (Word limit 200-250 words.)

Q.1. State & prove Euler's formula for connected planar graph.

OR

Show that following graph is complete Bipartite graph.



Q.2. Define cut set. Prove that every cutset in a connected graph G contains atleast one branch of every spanning tree of G.

OR

Define Adjacency matrix with example.

Q.3. Explain "Pre-order Search Method" in tree searching.

OR

Find the number of terminal vertices in a regular binary tree of height 4.

[3]

Q.4. Explain mealy machine with example.

OR

Explain Moore machine with example.

$4 \times 10 = 40$

SECTION 'C'

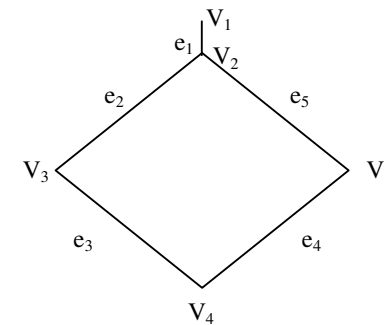
Long Answer questions (Word limit 400-450 words.)

Q.1. Prove that an undirected graph possesses an Eulerian path if & only if it is connected and has two vertices of odd degree.

OR

For tree searching, explain with example. Depth first order search & systematic order search.

Q.2. Define Eulerian path & Eulerian circuit. Find whether following graph is both Eulerian path & Eulerian Circuit?



OR

Define Spanning tree. Prove that a graph G has a spanning tree if & only if G is connected.