



Faculty	Faculty of Computing		
Assessment Type	Internal Assessment	Paper Code	C-MAT -Int2
Module Name	Mathematics -2	Module Code	C6-DMA-19
Total Marks	70	Time	2 weeks

Instructions

Answer all your questions

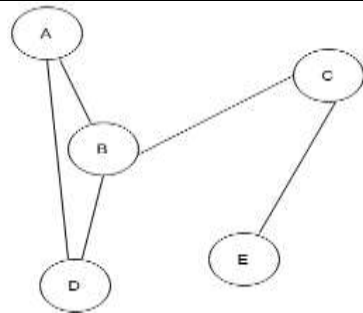
Submit on or before 02/07/2021

Section A (Answer all questions. Each question carries 2 marks)

1. Which of the following statements for a simple graph is correct?

- a) Every path is a trail
- b) Every trail is a path
- c) Every trail is a path as well as every path is a trail
- d) Path and trail have no relation

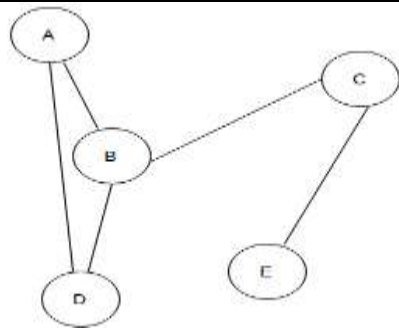
2. In the given graph identify the cut vertices



Graph 2.

- a) B and E
- b) C and D
- c) A and E
- d) C and B

3. For the given graph(G), which of the following statements is true?



Graph 3.

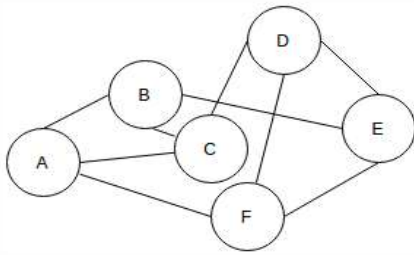
- a) G is a complete graph
- b) G is not a connected graph
- c) The vertex connectivity of the graph is 2
- d) The edge connectivity of the graph is 1

4. What is the number of edges present in a complete graph having n vertices?

- a) $(n*(n+1))/2$
- b) $(n*(n-1))/2$
- c) n
- d) Information given is insufficient

5. The given Graph is regular.

- a) True
- b) False



Graph 5.

6. What is the maximum number of children that a binary tree node can have?

- a) 0
- b) 1
- c) 2
- d) 3

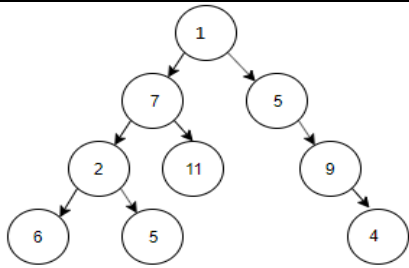
7. A binary tree is a rooted tree but not an ordered tree.

- a) true
- b) false

8. The number of elements in the adjacency matrix of a graph having 7 vertices is _____

- a) 7
- b) 14
- c) 36
- d) 49

9. For the tree below, write the in-order traversal.



Graph 9.

- a) 6, 2, 5, 7, 11, 1, 5, 9, 4
- b) 6, 5, 2, 11, 7, 4, 9, 5, 2
- c) 1, 7, 2, 6, 5, 11, 5, 9, 4
- d) 1, 7, 6, 5, 11, 2, 9, 5, 4

10. For the tree in question 9 above, write the pre-order traversal.

- a) 2, 7, 2, 6, 5, 11, 5, 9, 4
- b) 1, 7, 2, 6, 5, 11, 5, 9, 4
- c) 2, 5, 11, 6, 7, 4, 9, 5, 2
- d) 2, 7, 5, 6, 11, 2, 5, 4, 9

Section B (Answer all questions.)

Question 1

Define the following terms as they relate to graphs and trees

- (a) Bipartite graph

[2]
- (b) Spanning tree

[2]
- (c) Path

[2]
- (d) Circuit

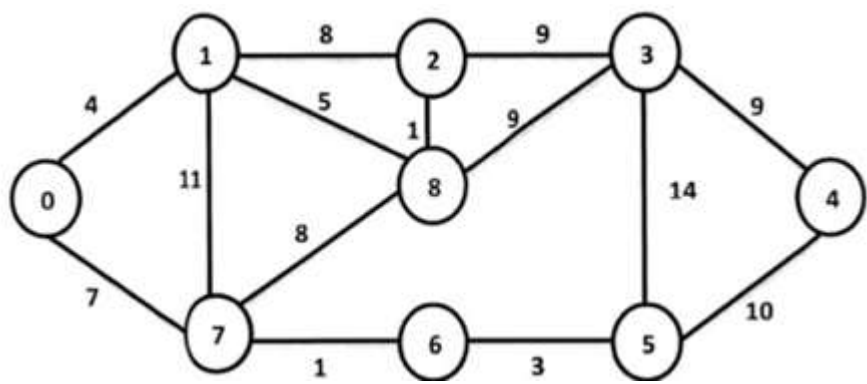
[2]
- (e) Traversal

[2]

Question 2

- (a) Given a network of 9 nodes and the distance between each node as shown in the figure below. Find the shortest path tree from node 0 to node 4 using Dijkstra’s algorithm.

[6]



Graph 2.

- (a) Use the binary prefix code tree to determine if the following prefix codes (code 1 and code 2) are valid or not. Justify your answer.

[4]

Message	A	B	C	D	E
Code 1	010	011	10	110	0011
Code 2	11	110		001	0001

Table 1.

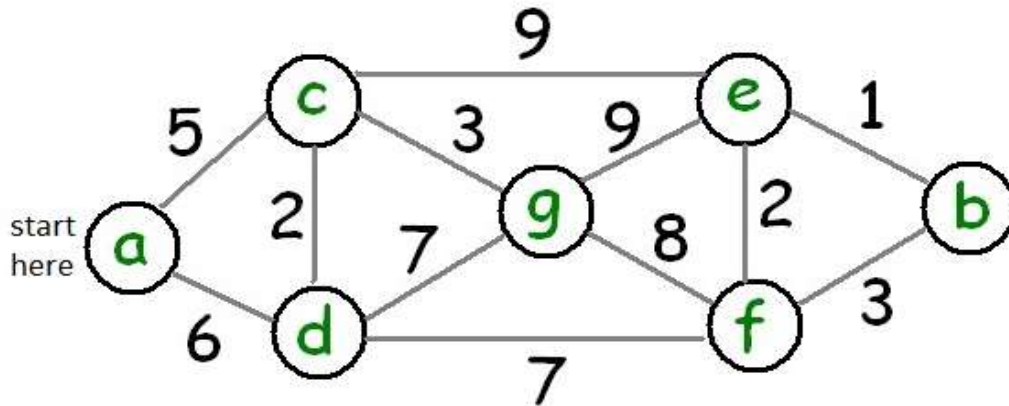
Question 3

(a) Explain with the aid of diagrams, the concept of minimum spanning tree (MST).

[4]

(b) Given the diagram below, apply the Kruskal's or Prim's MST algorithm on the following graph starting at vertex a to construct the minimum spanning tree.

[6]



Graph 3

Question 4

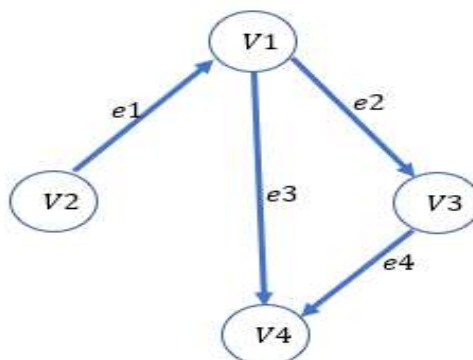
The diagram below has 4 vertices and 4 edges, you are required to find the following

(i) Adjacency matrix

[4]

(ii) Incidence matrix

[4]



Graph 4

(iii) Briefly explain what the degree of a vertex is.

[2]

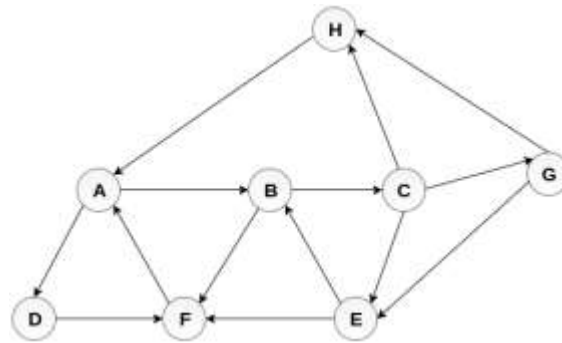
Question 5

(a) Distinguish between breadth first search and depth first search traversal. [4]

(b) Traverse the diagram below using:

(i) Breadth first search [3]

(ii) Depth first search [3]



Graph 5

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