**SAINTGITS COLLEGE OF APPLIED SCIENCES**

**First Internal Assessment Examination, FEB 2019**

**Department of Mathematics, Semester 2**

**DISCRETE MATHEMATICS II**

Time : **2 hours** Total:**50 Marks**

**Section A**

*Answer any 5 questions. Each question carries 2 marks.*

1. Define a graph

2. Find the number of edges in a graph with 6 vertices each of degree 5 ?

3. Define connected graph

4. Is $k\_{4}$ bipartite ? Why?

5. State Handshaking Theorem

6. What is a tree?

 **(5 X 2 = 10 marks)**

 **Section B**

*Short essay questions*

*Answer any 5 questions. Each question carries 5 marks.*

7. Explain any 2 graph models

8. Prove that an undirected graph has an even number of vertices of odd degree

9. Find the adjacency matrix of the given graph

10. Prove that there is a simple path between every pair of distinct vertices of a connected undirected

 graph

11. Prove that an undirected graph is a tree if and only if there is a unique simple path between any 2 of

 its vertices

12. How many non-isomorphic simple graphs are there on 4 vertices? Draw all of them

**(5 X 5 = 25 marks)**

**Section C**

*Long essay questions*

*Answer any 1question. It carries 15marks.*

13. a) Define graph isomorphism. Is the following graphs isomorphic? Explain

 b) Write an algorithm to find an Euler circuit in a graph having an Euler circuit

14. a) Which of the following graphs are trees?

 b) Show that a full m-ary tree with $l$ leaves has $\frac{(ml-1)}{(m-1)}$ vertices and $\frac{(l-1)}{(m-1)}$ internal vertices

**(1 X 15 = 15 marks)**

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