Roll No. .....

Y – 3184

M.A./M.Sc. (Fourth Semester) EXAMINATION, May/June-2021

MATHEMATICS

Paper – 405

ADVANCED GRAPH THEORY

Time : Three Hours

Maximum Marks : 85 (For Regular Students) *Minimum Pass Marks : 29*

Maximum Marks : 100 (For Private Students) *Minimum Pass Marks : 34*

Note—Attempt *all* questions.

Unit-I

1. Prove that a connected graph is an Euler graph if and only if it can be decomposed into circuits. 17/20

Unit-II

2. (a) Show that a graph G with n vertices $(n-1)$ edges and no circuits is connected is this a tree.

   (b) Prove that it in a graph G there is one and only one path between every pair of vertices, then G is a tree. 17/20

Unit-III

3. Define edge and vertex connectivities of a graph G, and prove that the vertex connectivity of any graph G can never exceed the edge connectivity of G. 17/20

Unit-IV

4. Define a star graph and prove that covering g of a graph is minimal if and only if it contains no paths of length three or more. 17/20

Unit-V

5. Write observations that can be made on the properties of the adjacency matrix of digraph. 17/20