UG–675 **BMC–34**

B.Sc. DEGREE EXAMINATION — JUNE, 2018.

Third Year

Mathematics With Computer Application

GRAPH THEORY

Time : 3 hours Maximum marks : 75

SECTION A — (5 × 5 = 25 marks)

Answer any FIVE questions.

1. When do you say that two graphs are isomorphic? Give an example.

2. Draw a connected graph with all vertices having even degree.

3. Define a bipartite graph and give an examples.

4. Define connectivity and edge-connectivity of a graph and illustrate with examples.

5. Write a note on Hamiltonian graphs.

6. Define a chromatic number of a graph.

7. Prove that a graph $K_{3,3}$ is non-planar.

8. Write a short note on Tournaments.

SECTION B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Prove that a graph G is connected if and only if for every partition of V into two non empty sets V_1 and V_2 there is an edge with one end in V_1 and one end in V_2.

10. Prove that a graph is bipartite if and only if it contains no odd cycle.

11. Explain with illustrations degree sequence and graphic sequence.

12. Prove that a connected graph has an Euler trial if and only if it has at most two vertices of odd degree.

13. If G is a graph with $p \geq 3$ and $\delta \geq p/2$, then prove that G is Hamiltonian.

14. If G is bipartite, then prove that $\chi_1(G) = \Delta(G)$.

15. Prove that a non-empty G is 2-colourable if and only if G is bipartite.

16. Prove if G is a connected plane graph then $p - q + r = 2$.