2016

M.Sc. 1st Semester Examination

APPLIED MATHEMATICS WITH OCEANOLOGY AND COMPUTER PROGRAMMING

PAPER—MTM-106 (Unit-1)

Full Marks : 25

Time : 1 Hour

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

[Graph Theory]

1. Answer any *two* questions : 2×2

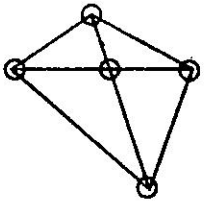
(a) When is a graph said to be regular ? Draw a regular graph. 1+1

(b) Show that number of vertices of a binary tree is an odd number. 2

(c) Define matching. Give a real problem which is solved by the concept of matching. 2

2. Answer any *four* questions : 4×4

(a) Define chromatic polynomial. Find the chromatic polynomial of the following graph :



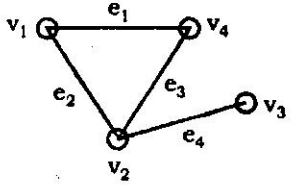
1+3

(b) Prove that a connected graph with n vertices is a tree if and only if it has (n – 1) edges. 4

(c) Define edge connectivity of a graph. Show that every circuit has even number of edges in common with any edge-cut. 1+3

(d) Show that a simple graph with n vertices and k components can have atmost $\frac{(n-k)(n-k+1)}{2}$ edges. 4

(e) Find the incidence and adjacency matrix of the following graph :



2+2

(f) Show that any simple connected planar graph satisfy the inequality $e \leq 3n - 6$, where n and e are the number of vertices and edges of the graph respectively. 4

(Internal Assessment : 5 Marks)