PG/IS/MA-1106/10

M.Sc. 1st Semester Examination, 2010

APPLIED MATHEMATICS WITH OCEANOLOGY AND COMPUTER PROGRAMMING

(*Graph Theory*)

PAPER—MA-1106

Full Marks : 25

Time : 1 hour

Answer **all** questions

The figures in the right-hand margin indicate marks

1. Answer any *two* questions : 2 x 2

(*a*) Define bipartite graph and digraph with example.

(*b*) Prove that every cutset in a connected graph G must contain at least one branch of every spanning tree of G.

(*c*) Show that a simple planar graph has at least one vertex of degree 5 or less.

2. Answer any *four* questions : 4 x 4

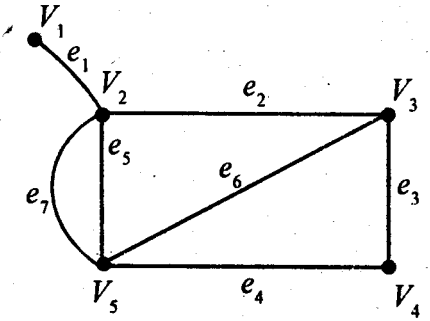
(*a*) Define planar graph. Show that a connected planar graph with m vertices and p edges has $p - m + 2$ regions.

(*b*) Prove that every tree with two or more vertices is two chromatic.

(*c*) Show that any connected graph with n vertices and $(n - 1)$ edges is a tree.

(*d*) Prove that the vertices of every planar graph can be properly coloured with five colours.

(*e*) Find the incident matrix of the graph :



[*Internal Assessment* : 5 Marks]