PG/IS/MTM - 106/14

M.Sc. 1st Semester Examination, 2014

APPLIED MATHEMATICS WITH OCEANOLOGY AND COMPUTER PROGRAMMING

(*Graph Theory*)

PAPER– MTM - 106

Unit – I

Full Marks : 25

Time : 1 hour

The figures in the right-hand margin indicate marks

1. Answer any *two* questions : 2 × 2

(*a*) Determine the values of m and n such that $K_{m,n}$ is Eulerian. 2

(*b*) Give an example of a non-plannar graph which satisfies the Euler's formula for planner graph. 2

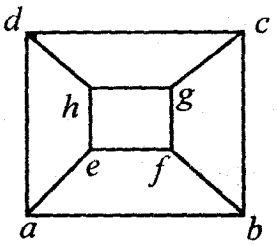
(*c*) Define the terms " radius" and "diameter" of a connected graph. 2

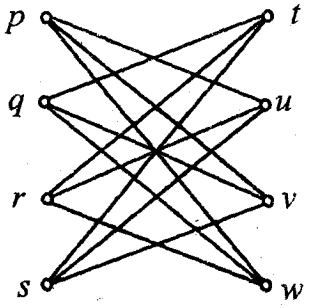
2. Answer any *four* questions : 4×4

(*a*) Show that any connected cycle free graph with n vertice has $(n-1)$ edges. 4

(*b*) Define binary tree. How many cut vertices a binary tree with n vertice may have ? Justify your answer. $1 + 3$

(*c*) Are the following graphs isomorphic. Justify your answer. 4





(*d*) Determine whether k_4 contains the following : $1 + 1 + 1 + 1$

(*i*) A walk that is not a trail.

(*ii*) A trail that is not a closed path.

(*iii*) A closed trail that is not a cycle.

(*iv*) A path that is cycle.

(*e*) What do you mean by the term "Chromatic polynomial" of a graph . Show that chromatic polynomial of a tree with n vertics is

$$P_n(\lambda) = \lambda(\lambda - 1)^{n-1}$$ 1 + 3

(*f*) Define planar graph. Show that any simple planar graph has at least a vertex of degree 5 or less. 1 + 3

[*Internal Assessment* : 05 Marks]