TCS 604 96 Printed Pages : 2

Paper ID and Roll No. to be filled in your Answer Book

Roll No. | | | | | | | | | | | |

B. Tech (SEM.VI)

Examination, 2015

GRAPH THEORY

Time: 2 Hours Total Marks : 50

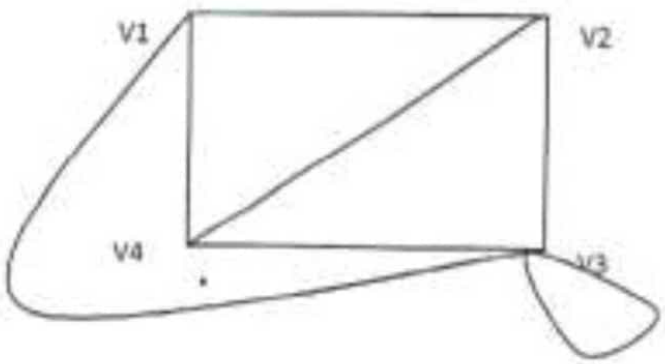
NOTE: ALL QUESTIONS ARE COMPULSORY.

Q.1. Attempt any four of the following: 2½ x 4

(a) Prove that a simple graph with n vertices and k components can have at most [(n-k) (n-k+1)]/2 edges.
(b) Define Hamiltonian Circuit and Hamiltonian path with suitable example.
(c) Define matching. How it is related to bipartite graph?
(d) Show that every tree with two or more vertices is 2-chromatic.
(e) Differentiate between incidence and adjacency matrix.

Q.2. Attempt any four of the following: 2½ x 4

(a) What is a Graph? Draw a complete graph with n=4.
(b) Draw all simple graphs of five vertices.
(c) Prove that there is one and only one path between every pair of vertices in a tree T.
(d) Perform ring-sum on two graphs and draw the final graph obtained.
(e) Calculate degree for all the vertices in the given graph:



Q.3. Attempt any two of the following: 5+5

(a) What is isomorphism? How is it connected to 1-isophirsm and 2-isomorphism?

(b) Explain Elementary reduction method used to prove a graph to be planar or non-planar.

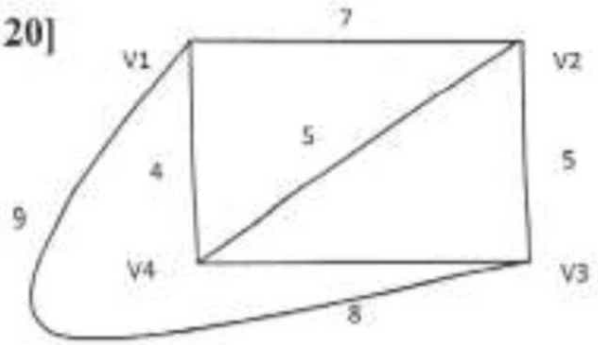
(c) Discuss the concept of Matching and Chromatic number used in coloring a graph. Elaborate your answer with suitable examples.

Q.4. Attempt any two of the following: 5+5

(a) What is Separable Graph? What is the importance of Connectivity in separable graph?

(b) What are the steps followed in Prim's algorithm to find minimal Spanning tree? Find the same in the graph given below:

[4 x 5= 20]



[4 x 5= 20]

(c) Prove the Euler formula for number of regions for all the connected planar graphs.

Q.5. Attempt any two of the following: 5+5

(a) What is the importance of Travelling Salesman Problem in Graph Theory?

(b) What do you understand by incidence matrix? Take a graph and draw its incidence matrix.

(c) Draw Circuit Matrix and Fundamental Circuit Matrix in the given graph.