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B.Tech. Examination, 2017

(First Semester)

(C.S. Branch)

Paper - II

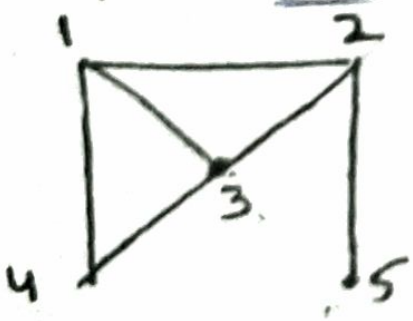
(GRAPH THEORY)

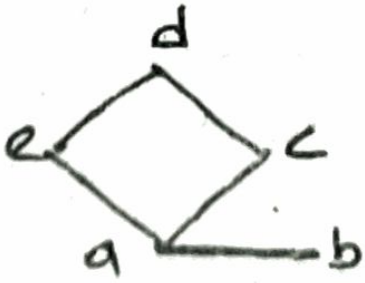
Time Allowed : Three Hours

Maximum Marks : 50

Note : Attempt any five questions. All questions carry equal marks.

Q. 1. (a) What do you understand by isomorphic graphs ? Whether the following graphs are isomorphic or not ? 5





(b) Discuss the travelling salesman problem. 5

Q. 2. (a) Define Euler circuit. Discuss Konigsberg bridge problem. 5

(b) Define chromatic number. Find the chromatic polynomial for the cycle of length 4, hence find its chromatic number. 5

Q. 3. Define the following by taking example : 10

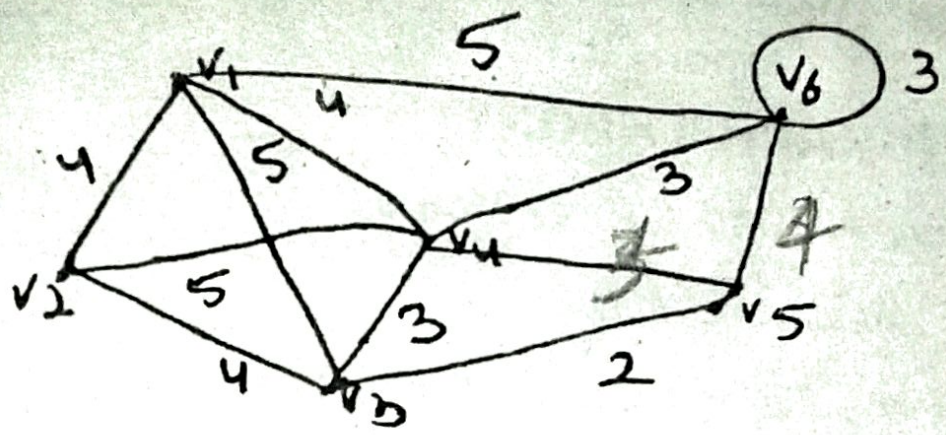
(i) Bipartite graph

(ii) Path matrix

(iii) Planar graph

(iv) Complete graph

Q. 4. (a) Apply Prim's algorithm to find a minimal spanning tree of the following graph. 5



(b) Explain Dijkstra's Algorithm. 5

Q. 5. Explain the following : 10

(i) Rooted tree

(ii) Complete binary tree

(iii) Spanning tree

(iv) Adjacency matrix

Q. 6. (a) Define (i) reduced incidence matrix (ii) fundamental circuit matrix and fundamental cut-set matrix of a connected graph. 5

(b) Show that a complete graph K_n is planar if $n \leq 4$. 5

Q. 7. Write short notes on any two of the following : 10

(a) Cayley's theorem

(b) Kuratowski graphs

(c) Covering and partitioning of a graph

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B.Tech. Examination, 2015

(First Semester)

(C.S. Branch)

Paper-II

(GRAPH THEORY)

Time Allowed : Two Hours

Maximum Marks : 50

Note : Attempt any five questions. All questions carry equal marks.

Q. 1. (a) Prove that a simple graph with n vertices and k components can have atmost

$$\frac{(n-k)(n-k+1)}{2} \text{ edges.}$$ **5**

(b) Prove that the set consisting of all the circuits and the edge-disjoint union of circuits in a graph G is an abelian group under the ring-sum operation. **5**

Q. 2. (a) Prove that a graph is an Euler graph if and only if it can be decomposed into circuits. **5**

(b) Draw a graph with six vertices, which is 5

(i) Hamiltonian and non-Eulerian

(ii) Eulerian and non-Hamiltonion.

Q. 3. Show that :

(i) If in Graph G, there is one and only one path between every pair of vertices, G is tree. 5

(ii) A connected graph with n vertices and n-1 edges is a tree. 5

Q. 4. Describe an algorithm to detect the planarity of a graph. Detect planarity of K_5. 10

Q. 5. Prove that for any connected planar graph G $v - e + r = 2$. Where v, e and r are number of vertices, edges and regions. 10

Q. 6. Explain the four color problem. Show that vertices of a planar graph with less that 30 edges in 4-colurable. 10

Q. 7. Define abborescence graph. Write down the procedure to obtain the expression in polish notation. 10

Q. 8. State and prove Cayley's theorem. 10
