Sub Code:ECS505

Paper Id: 110515 Roll No: | | | | | | | | | | | | | |

B. TECH.
(SEM-V) THEORY EXAMINATION 2019-20
GRAPH THEORY

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10= 20

a) Calculate the number of edges in the graph G with 16 vertices, each of degree 2.
b) What do you mean by orthogonal vectors?
c) Can there is a path longer than Hamiltonian path (if any) in simple connected undirected graph? Why?
d) What is an edge covering
e) Differentiate between rooted and binary trees.
f) Find the chromatic number of a complete graph of n vertices.
g) What are the applications of a planer graph?
h) Define recurrence relation.
i) Define 1-isomorphic and 2-isomorphic.
j) Explain the radius and diameter of a graph with examples.

SECTION B

2. Attempt any *three* of the following: 10x 3 = 30

a) When is a graph said to be regular? Show that the number of vertices in a k-regular graph is even if k is odd. Find all non isomorphic simple graphs of order 4
b) Describe radius and pendent vertices. Explain rooted and binary trees in detail with diagram.
c) Prove that in a binary tree having n vertices the minimum height is [log2 (n+1)-1]
d) Explain geometrical dual and combinational dual graphs
e) Define edge connectivity and vertex connectivity of a graph. Construct a graph G with edge connectivity 4, vertex connectivity 3 and degree of each vertex of G ≥ 3.

SECTION C

3. Attempt any *one* part of the following: 10x 1 = 10

a. Discuss (i) Konigsberg Bridge Problem (ii) Travelling Salesman Problem
b. Write the Kruskal's algorithm for finding the minimum spanning tree of a graph, Illustrate the algorithm using an example.

4. Attempt any *one* part of the following: 10x 1 = 10

a. Describe the steps to find adjacency matrix and incidence matrix for a directed graph with a suitable example.
b. Suppose G and G' are two graphs having n vertices. For what values of n is it possible for G to have more components and edges than G'?

5. Attempt any *one* part of the following: 10 x 1 = 10

a. Explain thickness, crossing and covering with example. Define five color problems are there any graphs that cannot be colored with four colors?
b. Use the algorithm of Prim's to find a minimum spanning tree of any graph.

6. Attempt any *one* part of the following: 10x 1 = 10

a. Explain the operations on the graphs union, intersection and ring sum
b. Define connectivity and separability. Explain with diagram network flows Planer graphs,

7. Attempt any *one* part of the following: 10x 1 = 10

a. What are chromatic polynomials? Explain the concept of chromatic partition.
b. Show that every planar graph is S-colorable.

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