R16

Code No: 137CY

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, January/February - 2023

GRAPH THEORY

(Computer Science and Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Define degree of vertex in graph.	[2]
b)	What is Hamilton cycle and write its properties.	[3]
c)	What is path in graph?	[2]
d)	Explain weighted graph and its use.	[3]
e)	Define spanning tree.	[2]
f)	What is Hamilton path?	[3]
g)	What is a cover in graph?	[2]
h)	State Halts theorem.	[3]
i)	What is meant by a Chromatic Polynomial?	[2]
j)	Give properties of clique.	[3]

PART – B

(50 Marks)

2.a)	Write about union, sum and Cartesian product operations on graphs.	
b)	Give a detailed note on edge connectivity.	[5+5]
	OR	
3.a)	What are isomorphic graphs? Explain how to find isomorphism among graphs.	
b)	"A Connected graph is Euler iff every vertex has even degree". Justify your answer with proof.	[5+5]
4.a)	Elaborate cut sets in graph.	
b)	"A connected graph is tree iff every edge is a cut edge". Justify your answer.	[5+5]
	OR	
5.a)	Give an algorithm for finding block in a graph.	
b)	Demonstrate single source shortest path problem.	[5+5]
6.a)	Define Bipartite graph, Line graph and Hamilton graph and give examples.	
b)	Write down the algorithm for Kruskal's algorithm.	[5+5]
	OR	
7.a)	Explain necessary conditions for Hamilton and Euler graph.	
b)	Explain Prim's algorithm for finding spanning tree and illustrate with an example.	[5+5]

8.a) Discuss Hungarian method to find max match in Bipartite graph.
b) Show that every k-cube has perfect match. [5+5]

OR

9.a) Explain the steps to find minimal independent set in a graph.
b) State and explain Hall's theorem. [5+5]

10.a) Explain four color problem in detail.
b) Explain edge- coloring problem in brief. [5+5]

OR

11.a) Analyze Greedy Coloring algorithm.
b) Describe Brook's theorem. [5+5]

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