Semester VII (B.Tech.)

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Jaypee University of Engineering & Technology, Guna

T-2 (Odd Semester- 2023)

18B14CI645 – GRAPH ALGORITHMS AND APPLICATIONS

Maximum Duration: 1 Hour 30 minutes | Maximum Marks: 25

Notes:

1. This question paper has 5 questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

		Marks	CO No.
Q1.	Suppose that you are responsible for scheduling times for lectures in a university. You want to make sure that any two lectures with a common student occur at different times to avoid a conflict. Following table (Table-1) of various lectures and marked with an "X" such that any pair that has students in common.	**[05]**	**CO5**

Table:1

Lecture ↓	A	C	G	H	I	L	M	P	S
Astronomy (A)		X	X	X			X		
Chemistry (C)	X								X
Greek (G)	X			X		X	X	X	
History (H)	X		X			X			X
Italian (I)						X	X		X
Latin (L)			X	X	X		X	X	X
Music (M)	X		X		X	X			
Philosophy (P)			X			X			
Spanish (S)		X		X	X	X			

Develop graph for the problem with one vertex for each lecture and find minimum no. of separate times (slots) required to schedule all the lectures.

Q2. Obtain the chromatic polynomial for following graph, using λ number of colors. (Fig.1) **[05]** **CO4**

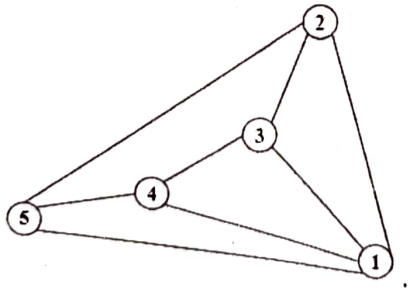

Figure 1

3. Explain following terms with suitable diagram: [05] CO3

(a) Dirac's theorem and Ore's theorem
(b) Graphs isomorphism
(c) Petersen graph and its properties
(d) Subdivision and edge contraction on a graph
(e) Independent set and dominating set of the graph

4. Test if there exists a Eulerian circuit on following graph (Fig 2). If it is exists, find such circuit using Fleury's algorithm (show every computational iteration). [05] CO5

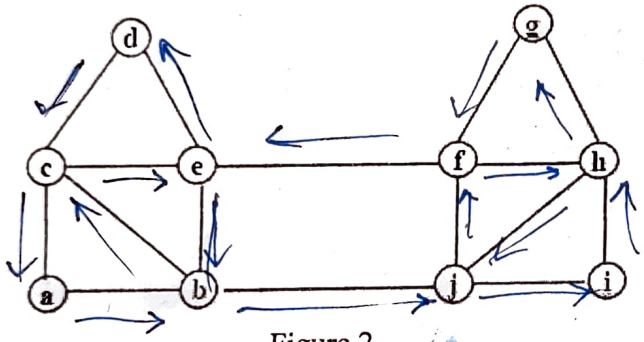

Figure 2

5. Show that there exists a simple graph with 12 vertices and 28 edges such that the degree of each vertex is either 3 or 5. Draw such graph. [05] CO4