JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech-VI Semester (CSE/IT)

COURSE CODE (CREDITS): 20B1WCI732 (2) MAX. MARKS: 25

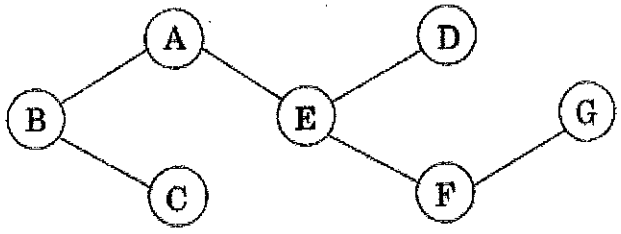
COURSE NAME: From Graph to knowledge Graph

COURSE INSTRUCTOR: Ravindara Bhatt MAX. TIME: 1 Hour 30 Min

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	The National Resident Matching Program differs from the scenario for the stable marriage problem in two ways. First, a hospital may be matched with more than one student, so that hospital h takes $r_h >= 1$ students. Second, the number of students might not equal the number of hospitals. Describe how to modify the Gale-Shapley algorithm to fit the requirements of the National Resident Matching Program. OR Determine the stable matching resulting from the Proposal Algorithm run with men proposing, given the preference lists below. **Men** $\{u, v, w, x, y, z\}$ **Women** $\{a, b, c, d, e, f\}$ $u: a > b > d > c > f > e$ $a: z > x > y > u > v > w$ $v: a > b > c > f > e > d$ $b: y > z > w > x > v > u$ $w: c > b > d > a > f > e$ $c: v > x > w > y > u > z$ $x: c > a > d > b > e > f$ $d: w > y > u > x > z > v$ $y: c > d > a > b > f > e$ $e: u > v > x > w > y > z$ $z: d > e > f > c > b > a$ $f: u > w > x > v > z > y$	CO2	5
Q2	a) Show that for any bipartite graph, the GREEDY-BIPARTITE-MATCHING procedure returns a matching at least half the size of a maximum matching. b) Hopcroft-Karp algorithm is used to find a maximum matching for the graph. Illustrate with the help of an example.	CO2	2 +3

Q3	a) List two different ways to obtain node features for a graph G = (V, E). b) Why graphlet counting is expensive? Can we design a more efficient graph kernel?	CO3	2+ 3
Q4	a) In a graph G, a set S ⊆ V(G) is a dominating set if every vertex not in S has at-least one neighbor in S. (True/ False) b) In a graph G, S ⊆ V(G) is an independent set if and only if complement of S is a vertex cover. (True/ False) c) The smallest size of vertex cover has size ___.  d) Suppose we have n resources to which we want to assign to n tasks on a one-to-one basis. The matrix below shows four jobs (J1, J2, J3, and J4) need to be executed by four workers (W1, W2, W3, and W4), one job per worker. Show how to minimize the total cost of the assignment. *J1* 82 83 69 92 *W2* 77 37 49 92 *W3* 11 69 5 86	CO2	1+ 1 + 1+ 2
Q5	a) Compare and contrast NER (Named Entity Recognition) using unsupervised learning versus supervised learning. b) List the categories of relation extraction method. What are the three common metrics are used to evaluate the performance of Relation Extraction systems?	CO3	2.5 + 2.5