JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech- VI Semester (CSE/IT)

COURSE CODE (CREDITS): 20B1WCI732   MAX. MARKS: 35

COURSE NAME: From Graph to knowledge Graph

COURSE INSTRUCTORS: Ravindara Bhatt   MAX. TIME: 2 Hours

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

1. SPARQL provides a SQL-like way of specifying expressive queries to be executed against RDF datasets. A simple, yet powerful, query that illustrates this expressiveness is shown in Figure 1. Explain the various elements of the query shown in Figure 1.   **[CO4] [5 Marks]**

PREFIX	foaf: http://xmlns.com/foaf/0.1/
SELECT	?person, ?homepage
FROM	http://example.org/dataset.rdf
WHERE	?person a foaf:Person;
	foaf:homepage ? homepage .
ORDER BY	? homepage DESC
LIMIT 5	

Figure 1

2. Machineco has four machines and four jobs to be completed. Each machine must be assigned to complete one job. The time required to setup each machine for completing each job is shown in Table 1. Machineco wants to minimize the total setup time needed to complete the four jobs. Use Hungarian method to solve this problem.   **[CO2] [5 Marks]**

Table 1: Setup time for Machineco

Machine	Time (Hours)			
	Job 1	Job 2	Job 3	Job 4
1	14	15	8	7
2	2	12	6	5
3	7	8	3	9
4	2	4	6	10

3.

   a. What is Gale-Shapley algorithm problem? Give an example of the stable matching problem with two men and two women in which there is more than one stable matching.

b. With the help of an example explain the following terms: maximum size of independent set, maximum size of matching, minimum size of vertex cover, minimum size of edge cover.

[CO2] [2+ 3 Marks]

4.

a. Give a proof or a counterexample for each statement below (True or False)
   i. Every k-connected graph is k-edge-connected.
   ii. Every k-edge-connected graph is k-connected

b. Determine κ (G), κ' (G), and δ(G) for the graph shown in Figure 2.
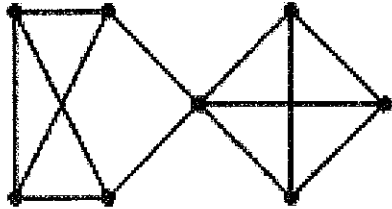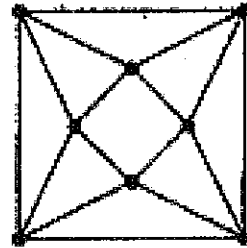
Figure 2

Figure 3

[CO2] [3 + 2 Marks]

5.

a. Prove that the chromatic number of a graph equals the maximum of the chromatic numbers of its components.
b. For the Graph shown in Figure 3, compute χ (G).

[CO2] [2.5 + 2.5 Marks]

6.

a. What are the challenges in Relation Extraction?
b. Compare and contrast supervised versus unsupervised relation extraction.

[CO3] [2.5 + 2.5 Marks]

7.

a. What are the difference between Ontology and a Knowledge Graph?
b. What is an example of a knowledge graph?

[CO3] [2.5 + 2.5 Marks]