Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sanshya 12 of 2011)
University under section 2(f) of UGC Act, 1956

Mid Term (Odd) Semester Examination October 2024

Roll no. 2319813

Name of the Course and semester: B. Tech (3rd Semester)

Name of the Paper: Fundamentals of Artificial Intelligence and Machine Learning

Paper Code: TCS364

Time: 1.5 hour Maximum Marks: 50

Note:

(i) Answer all the questions by choosing any one of the sub questions
(ii) Each question carries 10 marks.
(iii) Please specify COs against each question.

Q1. (10 Marks)

a. Elaborate the terms "Aritificial Intelligence", "Machine Learning" and "Deep Learning". Show how these terms are related to each other with appropriate justification and examples. (CO1)

b. Highlight the applications of AI in Banking and Finance sectors and explain its impact on FinTech sector.

OR

c. Enlist the different types of intelligent agents. With the help of an appropriate diagram, explain the detailed working of Goal-Based Intelligent Agents. (CO1)

d. Describe "The Turing Test". What would a computer need to pass the Turing test? (CO1)

Q2. (10 Marks)

a. Explain how the PEAS framework helps define an AI agent's task. Assess whether the PEAS framework is sufficient for evaluating intelligent agents in dynamic environments like stock market prediction systems. Justify your answer. Design a PEAS framework for an AI-based personal assistant like Siri or Alexa.

OR

b. Things that might come under the heading "AI" are increasing being incorporated into everyday systems and devices. Discuss the use of AI techniques in: (CO1)

- Photocopier Machines
- Vacuum cleaning robot
- Web-based shopping sites
- A self-driving car

Q3. (10 Marks)

a. Sketch the difference between, with example: (CO2)

- Heuristic Search Vs Blind Search.
- Propositional Logic Vs Predicate Logic.

OR

b. With appropriate example of each, elaborate the techniques of knowledge representation in AI. **Also, Test the validity of the following arguments: (CO2)**

- James is either a policeman or a footballer.
- If he is a policeman, then he has big feet.

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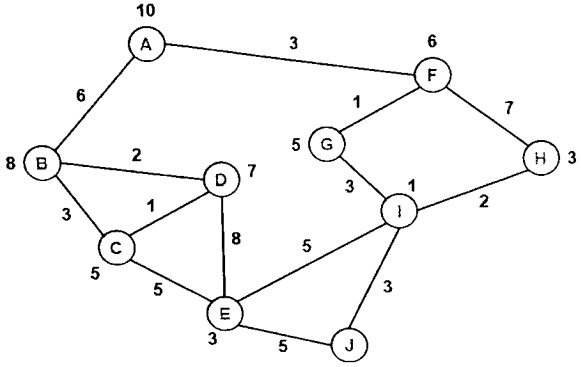
- James has not got big feet, so he is a footballer.

Q4. (10 Marks)

a. In the given graph, where edge values represent distance between the nodes and values on the nodes represent heuristic values. Calculate the optimal path between the node A and J using **A* algorithm.** (CO2)



OR

b. Consider the given start and goal states of 8-puzzle problem. By using hill climbing technique solve the given problem. Find a heuristic function that makes this work: (CO2)

1	2	3
8	5	6
4	7	

Start

1	2	3
4	5	6
7	8	

Goal

Q5. (10 Marks)

a. Compute MGU of the following, to prove unification is **possible or not**: (CO2)

- {p(f(a),g(X)) and p(Y,Y)}
- {p(a, X, h(g(Z))); p(Z, h(Y), h(Y))}
- {p(f(y), w, g(z, y)) = p(x, x, g(z, A))}
- {p(x, g(f(a), u)) = p(g(u, v), x)}
- {p(a, g(x, a), f(y)) = p(a, g(f(b), a), x)}

b. Consider the following at sentences: (CO2)

i. Dogs likes bones
ii. Dogs eat everything they like
iii. Pasta is a dog

Prove that **Pasta eats bones**, using resolution.

OR

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a. **Convert the following sentences into predicates:** (CO2)

(i) Every city has a dogcatcher who has been bitten by every dog in the city.

(ii) It rained on Tuesday.

(iii) If it doesn't rain tomorrow. Tom will go to the mountains.

(iv) All person play football are tall.

(v) Some person like anchovies.

(vi) Every person who get married and have at least a child is called father

(vii) John didn't study but is lucky.

(viii) Anyone who studies or is lucky can pass all their exams.

(ix) Anyone passing their exams and winning the lottery is happy.

(x) Anyone who is lucky wins the lottery.