Graphic Era HILL UNIVERSITY

Established by an Act of the State Legislature of Uttarakhand (Abhinyam Sanshya 12 of 2011) University under section 2(f) of UGC Act, 1956

Term Evaluation (Odd) Semester Examination September 2025

Roll no. [redacted].....

Name of the Course: B.Tech- CSE
Semester: 3rd
Name of the Paper: Fundamentals of AI and ML
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.

Q1. (10 Marks)

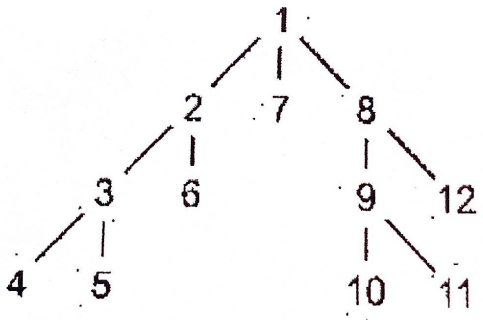
a. Why AI is important in modern era? Give some important application areas where AI has significant importance. CO1

OR

b. Discuss the structure of intelligent agent. Discuss all types of agents in detail with real life examples. CO1

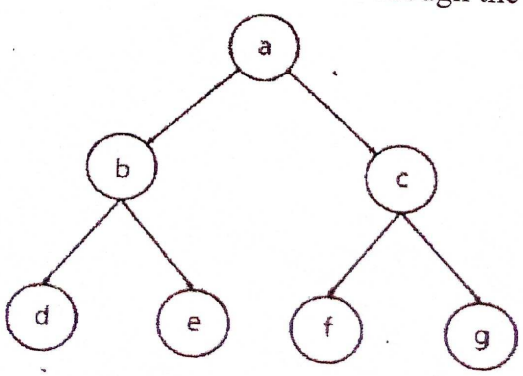
Q2. (10 Marks)

a. Consider the diagram below, apply depth first search (DFS) on the graph. Show all stack operation and find out the sequence generated by the algorithm.



OR CO2

b. Consider the diagram below, we want to get to the node 'g' starting from the node 'a'. Use the Breadth-First Search algorithm to traverse through the graph.



CO2

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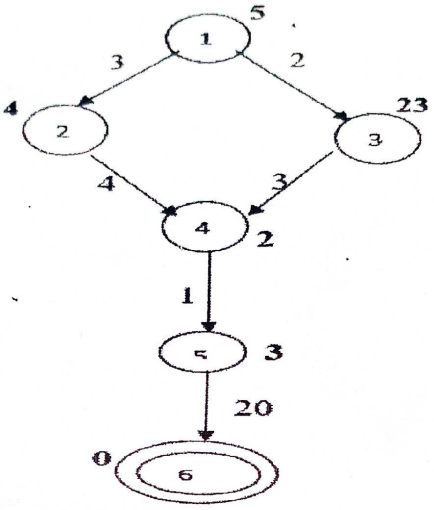
Q3.

a. Explain ***A* algorithm***. Apply A* algorithm on the following graph : Values at each node is the estimated heuristic cost from that node to goal node (ie. $h(n)$ ***value***) and values at each edge are the g(n) value (distance between nodes). Node '1' is a initial node and node '6' is a goal node.



OR

a. Consider a water jug problem. You are given two jugs, a 4-gallon one and a 3-gallon one, a pump which has unlimited water which you can use to fill the jug, and the ground on which water may be poured. Neither jug has any measuring markings on it. How can you get exactly 2 gallons of water in the 4-gallon jug? State the production rules for the water jug problem. CO6

Q4.

a. What are the different types of knowledge? Explain various knowledge representation issues in detail by using associated example. (10 Marks) CO1

OR

b. Differentiate between supervised learning and unsupervised learning. CO5

Q5.

a. Discuss Bayesian decision theory for decision making. Explain with suitable example. (10 Marks) CO2

OR

b. Translate following into predicate logic

i. Marcus was a man.
ii. Marcus was a Pompeian.
iii. All Pompeians were Romans.
iv. Caesar was a ruler.
v. All Romans were either loyal to Caesar or hated him. CO2