

D2 - Shubham - Sky-433 Date: 1-12-2023 (175)



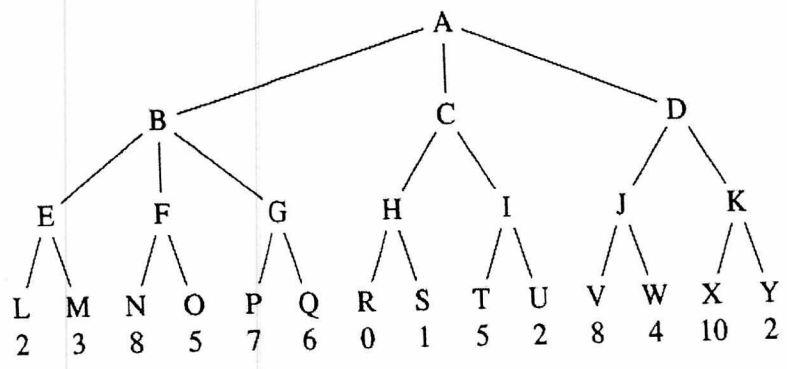
National Institute of Technology Hamirpur  
Himachal Pradesh-177 005, India  
End Semester Theory Examination (November 2023)  
Department of Computer Science and Engineering

Degree Program: B. Tech Physics & Photonic  
Science (4<sup>th</sup> Year, Semester: 7<sup>th</sup>)  
Course Title: Artificial Intelligence  
Date of Examination: 01-12-2023

Course Code: CS-411  
Time duration: 3 hours (02.30 PM to 05.30 PM)  
Teachers' name: Mr. Shubham  
Total Max Marks: 50

**General Instructions (All the questions are compulsory)**

1. Explain the following with proper examples
  - a. Explain the role of AI in social networks. (5)
  - b. In crowded populated cities, how can AI help to manage the traffic (5)
  - c. Consider the following game tree, and assume that the first player is the maximising player:



- I. Which move should the first player choose?
  - II. Assuming that nodes are searched left-to-right using the alpha-beta algorithm, which nodes would not be examined? Which move should the first player choose? Assuming that nodes are searched left-to-right using the alpha-beta algorithm, which nodes would not be examined? (2+3)
2. Solve the following function using Particle Swarm optimization algorithm. Find the maximum of the function  $f(x,y) = x^2 + y^2$ , where  $x$  and  $y$  are the dimension of the problem, the velocities of all particles are initialized to zero and inertia ( $W$ ) = 0.3, and the value of the cognitive and social constant  $C1 = 2$  and  $C2 = 2$ . The initial best solutions of all the particles are set to 1000. (10)
  3. Explain Frame Representation. Represent the following is the frame representation, Let's suppose we are taking an entity, Peter. Peter is an engineer as a profession, and his age is 25, he lives in city London, and the country is England. (5)

4. What is a Bayesian Network. Solve a problem using the Bayes theorem. A bag contains 4 balls. Two balls are drawn at random without replacement and are found to be blue. What is the probability that all balls in the bag are blue?  
(10)
5. Explain the Gradient Descent Algorithms, and different types of gradient descent algorithms. What is the significance of Vanishing and Exploding Gradients.  
(5+5)