M.Sc. Computer Science
***MCSC-102(223411102): Artificial Intelligence**
Semester I, (Admissions of 2019)(CBCS Scheme)
December-2020 (OBE Phase I)

Time: Three Hours **Max. Marks: 70**

*****ER or Back Papers

Attempt any FOUR questions
All questions carry equal marks

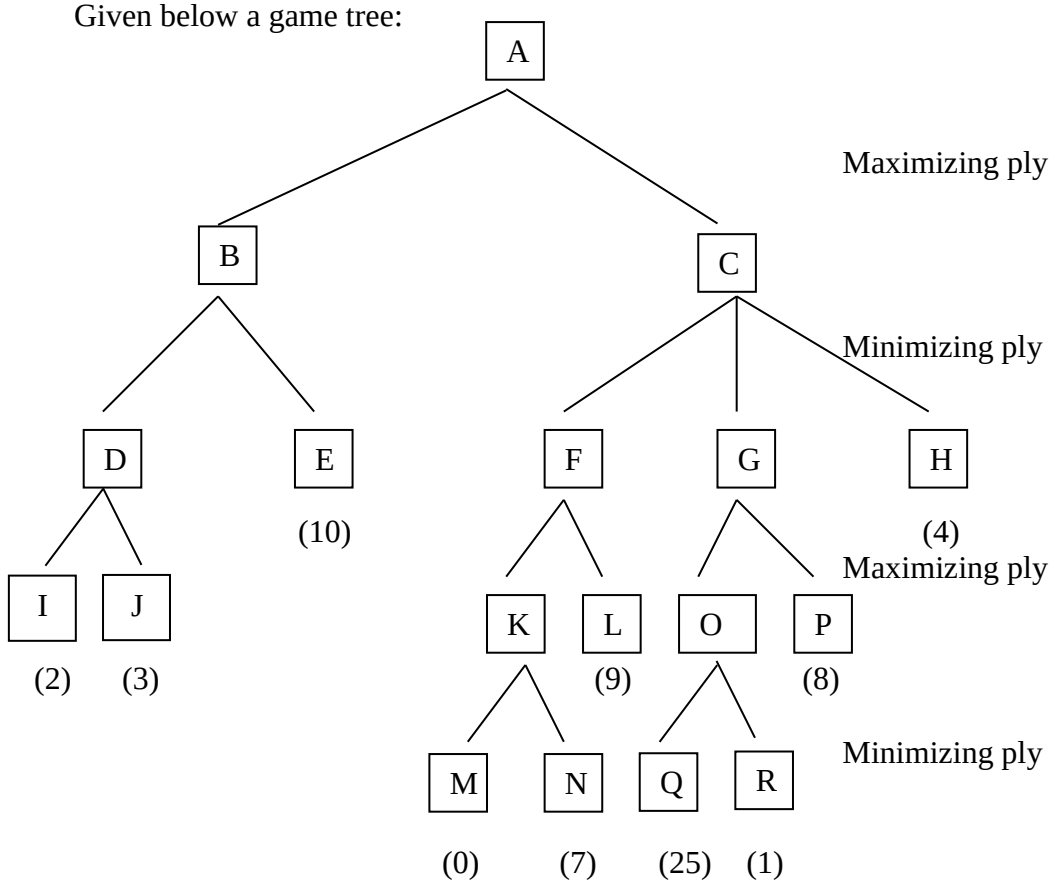
1. What is a rational agent approach to AI? How is it different than Turing test approach?

   For each of the following activities, give a PEAS description of the task environment and characterize it in terms of the kind of environment.

   - Playing a tennis match
   - Practicing a tennis match against a wall
   - Interactive English tutor
   - Shopping for used AI books on the internet
   - Bidding on an item at an auction

2. Is minimax procedure a depth-first or breadth-first procedure? Justify your answer.

   Given below a game tree:



- If the first player is a maximizing player then what move should be chosen under min-max procedure?
- What nodes would not be needed to be examined using α-β pruning procedure? Answer this using stepwise explanation and reasoning.

3. What do you mean by Planning? List various components of a Planning system. Describe the differences and similarities between problem solving and planning.

Consider the following block world problem and solve it using goal stack planning

Start: ON(C, A) $\wedge$
ONTABLE (A) $\wedge$
ONTABLE (B) $\wedge$
ARMEMPTY

goal: ON (A, B) $\wedge$
ON (B, C)

4. Write a Prolog program
   - to calculate the gcd (greatest common divisor) of two numbers.
   - for obtaining a list after deleting all occurrence of a particular element from a given list.
   - for reversing a given list

What is an Expert System? Distinguish between a Knowledge based System and an Expert System? Describe the various conflict resolution strategies in Rule Based Expert Systems.

5. Determine whether each of the following sets is unifiable. If yes, obtain a most general unifier.
   - w = {P(A,B,B),P(x, y, z)}
   - w = {Q(y, G(A,B)), Q(G(x, x),y)}
   - w = {Older(Father(y),y),Older(Father(x),John)}
   - w = {Knows(Father(y),y), Knows(x, x)}

For a triangle ABC, it is given that the sum of the interior angles: <A + <B + <C = 180 degrees. Show by resolution theorem that the exterior angle is the sum of the opposite interior angles.

6. You are explaining the problem of searching for a move in chess to your friend. Your friend notices that the algorithm needs to find the maximum of some function (i.e., the move that is best for you) and suggests that one should simply differentiate the function, set the result to zero, and solve. Explain why this will not work.

Develop all syntactically valid parses of the sentence “Jack slept on the table on the roof”. Define standard grammatical formalism and use it.