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**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
MID TERM EXAMINATION - OCT 2023**

Semester : Semester VII - 2020

Course Code : CSE3005

Course Name : Sem VII - CSE3005 - Applied Artificial Intelligence

Program : B. TECH

Date : 30-OCT-2023

Time : 11:30AM - 1:00PM

Max Marks : 60

Weightage : 30%

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS

(5 X 2 = 10M)

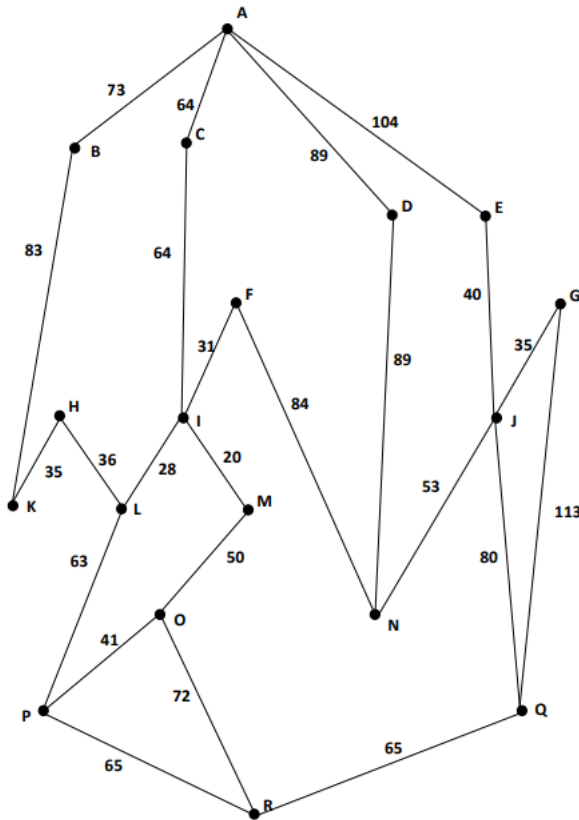
1. Mentioned the search algorithm that is used to traverse the game tree for pruning nodes in alpha-beta pruning.
(CO1) [Knowledge]
2. Consider 3 cells (A, B, and C) in a grid, such that they have sector numbers N_A , N_B , and N_C respectively. If A is connected to B and C is also connected to B, write down the values of:
 1. $N_A - N_C$
 2. $N_B - N_C$, and
 3. $N_A - N_B$(CO1) [Knowledge]
3. Consider a well-formed formula where we have n distinct propositional variables. Mention the number of rows that we will have in the truth table for that well-formed formula
(CO1) [Knowledge]
4. Expand DNF, and mention what each set of conjunctions in the DNF is called.
(CO1) [Knowledge]
5. State true or false: In Greedy Best First search, we select the node which minimizes the estimated cost for the entire journey from source to destination.
(CO1) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(3 X 10 = 30M)

6. For the given map, calculate the distance to R from the node A, using Greedy Best-First Search, as well as A* Search. Are the distances the same?



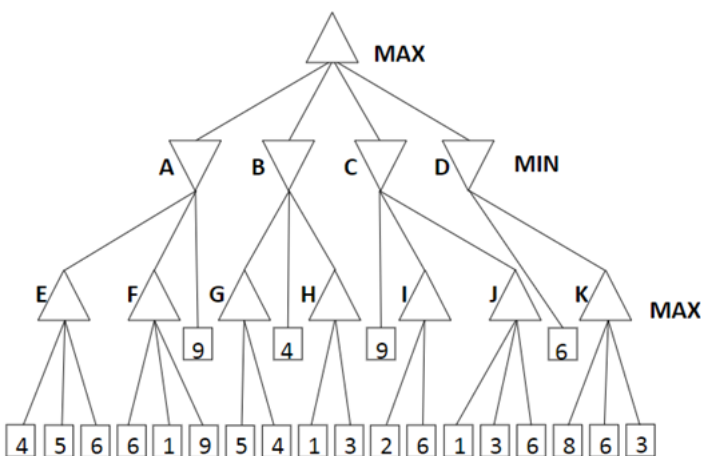
Town	Straight Line Distance To R
A	240
B	186
C	182
D	163
E	170
F	150
G	165
H	139
I	120
J	130
K	122
L	104
M	100
N	77
O	72
P	65
Q	65
R	0

(CO2) [Comprehension]

7. Consider a situation of the water jug problem, where we have a 3 litres jug and a 9 litres jug. Describe all the different ways to measure out integral volumes of water, from 1 litre to 12 litres. In case no method is possible, write "No solution possible".

(CO2) [Comprehension]

8. Consider the below game tree, which has upper triangles as max nodes, lower triangles as min nodes and squares as leaves.



- Perform min-max search for the expected value at the root.
- Perform Alpha-Beta Pruning.
- Perform ideal ordering to maximize the pruning.
- How many nodes are finally pruned?

(CO2) [Comprehension]

PART C

ANSWER THE FOLLOWING QUESTION

(1 X 20 = 20M)

9. Consider the following axioms:

1. Sam owns a dog
2. Everyone who owns any dog is an animal lover
3. No animal lover kills an animal
4. Tuna is a cat
5. All cats are animals
6. Either Sam, or Curiosity, killed Tuna.

Prove that: Curiosity killed Tuna.

Use the following predicates:

- $\text{owns}(x, y)$ = x owns y
- $\text{dog}(x)$ = x is a dog
- $\text{animalLover}(x)$ = x is an animal lover
- $\text{animal}(x)$ = x is an animal
- $\text{kills}(x, y)$ = x kills y
- $\text{cat}(x)$ = x is a cat

(CO3) [Application]