SVKM's NMIMS
MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING / SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Academic Year: 2021-22

Programme: B. Tech (Computer Science & Business Systems) Year: III Semester: VI

Subject: Artificial Intelligence

Date: 08 April 2022

Marks: 100
Time: 10.00 am to 1.00 pm
Durations: 3 (hrs)
No. of Pages: 03

Final Examination

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

1) Question No. _1_ is compulsory.
2) Out of remaining questions, attempt any _4_ questions.
3) **In all _5_ questions to be attempted.**
4) All questions carry equal marks.
5) **Answer to each new question to be started on a fresh page.**
6) **Figures in brackets on the right hand side indicate full marks.**
7) **Assume Suitable data if necessary.**

Q1 Answer briefly:

(a) Describe intelligent agents and enlist applications of it. [4]

(b) Discuss various issues in search programs designing. [4]

(c) Explain different approaches to knowledge representation. [4]

(d) Explain the need for Dempster–Shafer's theory. [4]

(e) Explain an expert system with a block diagram and its characteristics. [4]

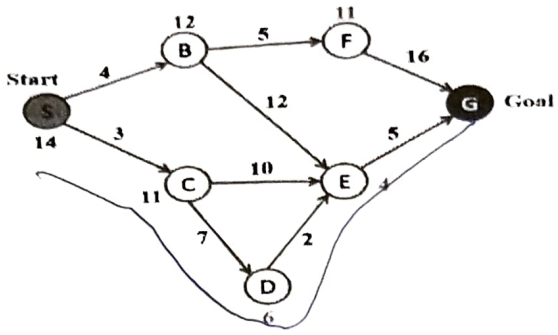
Q2 (a) Write and explain the algorithm of Simulated Annealing. [5]

(b) What is local beam search? Explain with an example. [5]

(c) Use predicate logic to convert a given knowledge base. [10]

1. Anyone who owns a rabbit hates anything that chases any rabbit
2. Anything which has a red nose is weird or is a clown.
3. Every Austinite who is not conservative loves some armadillo.
4. Every biker rides [something that is] either a Harley or a BMW.
5. Everyone who loves Santa loves any reindeer.

Q3 (a) Write A* algorithm. Also consider a search problem given below and apply A* algorithm to find the minimum cost path from node S to G. [7]



(b) What is depth limited search? Explain with an example. [3]

(c) Use first order logic to generate knowledge base and Solve using resolution [10]

a. All hounds howl at night.

b. Anyone who has any cats will not have any mice.

c. Light sleepers do not have anything which howls at night.

d. John has either a cat or a hound.

Prove by resolution

If John is a light sleeper, then John does not have any mice.

Q4 (a) Draw and explain the structure of a simple reflex agent and model based agent. [7]

(b) Enlist characteristics of intelligent agents. [3]

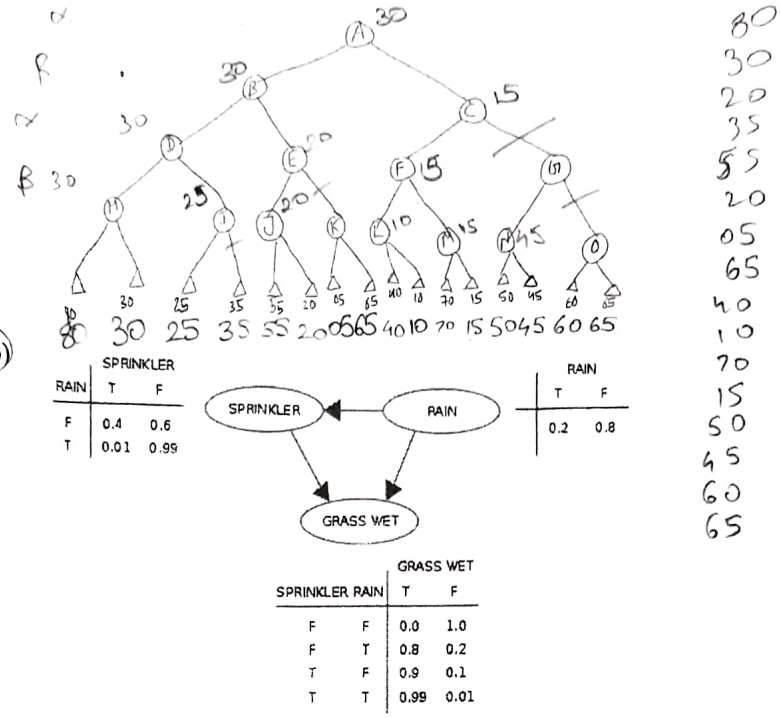
(c) You are given two jugs, a 4-gallon one and a 3-gallon one. Neither has any measuring markers on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water into the 4-gallon jug? Design the necessary rules and use them to construct the solution. [7]

(d) One of the problem characteristics is "Can solution steps be ignored or at least undone if they prove unwise?" Explain it with an example. [3]

Q5 (a) Solve the following using alpha-beta pruning algorithm. Also show which branches are pruned. [10]

2/3

0 3
4 3
0 3
3 0
3 3
4 2
0 2
2 0.



(b)

RAIN	SPRINKLER T	SPRINKLER F
F	0.4	0.6
T	0.01	0.99

RAIN T	RAIN F
0.2	0.8

SPRINKLER	RAIN	GRASS WET T	GRASS WET F
F	F	0.0	1.0
F	T	0.8	0.2
T	F	0.9	0.1
T	T	0.99	0.01

[10]

What is the probability that it is raining, given the grass is wet?

Q6 (a) Explain Components of Expert system. [4]

(b) Explain the steps we need to build a system to solve a particular problem. [4]

(c) Explain the constraint satisfaction problem with respect to the graph colouring problem. [6]

(d) What do you mean by planning in AI? Explain the Goal stack planning. [6]