



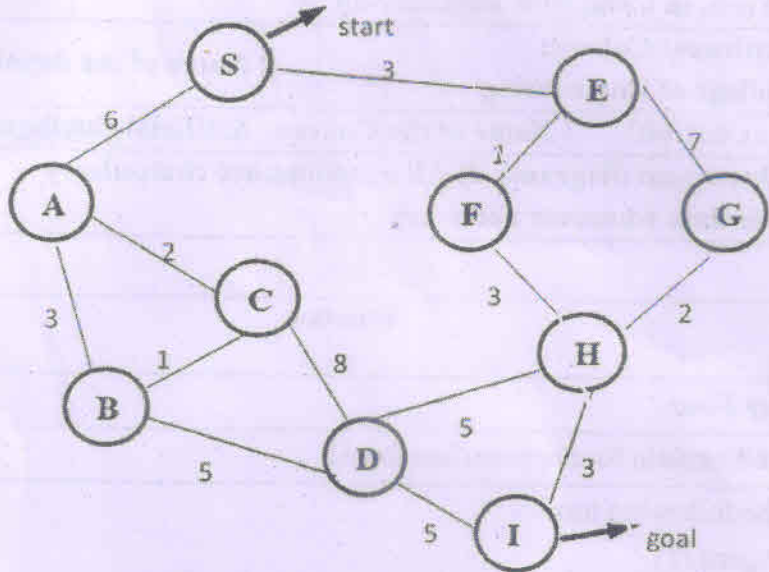
SOMAIYA
VIDYAVIHAR UNIVERSITY

7 30/05/2023 (E)

Semester: Jan 2023 – May 2023		
Maximum Marks: 100	Examination: ESE Examination	Duration:3 Hrs.
Programme code: 01	Class: TY	Semester: VI (SVU 2020)
Programme: B. Tech. in Computer Engineering		
Name of the Constituent College: K. J. Somaiya College of Engineering		Name of the department: COMP
Course Code: 116U01C603	Name of the Course: Artificial Intelligence	
Instructions: 1)Draw neat diagrams 2) All questions are compulsory 3) Assume suitable data wherever necessary		

Que. No.	Question	Max. Marks
Q1	Solve Any Four	20
i)	Define and explain four approaches for AI.	5
ii)	Define the following term :- a) Agent (1) b) Rational agent (1) c) Omniscient Agent (1) d) Turing Test (2)	5
iii)	Write well-formed formulae for the following : a) Some students took French in spring 2001. (1.5) b) Every student who takes French passes it. (1.5) c) Only one student took Greek in spring 2001. (2)	5
iv)	Describe constraint satisfaction problems. While solving CSPs, which variable should be assigned next, and in what order should its values be tried?	5
v)	Differentiate between ADL and STRIPS language of planning.	5
vi)	Discuss the characteristics of expert system.	5

Que. No.	Question	Max. Marks
Q2 A	Solve the following	10
i)	Consider the Water Jug Problem “You are given two jugs, a 4-gallon one and 3-gallon one. Neither has any measuring marker on it. A pump which has unlimited water which you can use to fill the jug, and ground on which water may be poured. How can you get exactly 2 gallons of water in the 4-gallon jug?” Describe the operator and production rules.	5
ii)	Discuss the properties of task environment for part picking robot.	5
OR		

Q2 A	Sketch the architecture of utility agent. Discuss the component with the help of suitable example.	10
Q2 B	<i>Solve Any One</i>	10
	<p>Consider the graph given in Figure 1 below. Assume that initial state is S and goal state is I.</p>  <p style="text-align: center;">Figure 1</p>	
i)	<p>Draw the state space tree (4). Find a path from the initial state to the goal state with cost using the following algorithm.</p> <ul style="list-style-type: none"> - Breadth First Search (BFS - 3) - Depth First Search (DFS - 3) 	10
ii)	<p>Assuming the heuristic function : $h(S)=10$, $h(A) = 8$, $h(B)=5$, $h(C)=7$, $h(D)=3$, $h(E)=6$, $h(F)=5$, $h(G)=3$, $h(H)=1$, $h(I)=0$.</p> <p>Use the A* Search to find a path from the initial state to the goal state with cost.</p>	10

Que. No.	Question	Max. Marks
Q3	<i>Solve the following.</i>	20
i)	Explain the knowledge engineering process for one bit full adder circuit.	10
ii)	<p>Consider the following set of sentences.</p> <ol style="list-style-type: none"> Whoever can read is literate. Dolphins are not literate. Some dolphins are intelligent. Prove/Goal - Some who is intelligent, cannot read. <p>Convert the sentences in First Order Logic (4). Prove the sentence using resolution.(3+3)</p>	10
OR		
ii)	Consider a new burglar alarm installed at home. It is fairly reliable at detecting a burglary, but also responds on occasion to minor earthquakes. There are two neighbours, John and Mary, who have promised to call the home owner at work	10

	<p>when they hear the alarm. John always calls when he hears the alarm, but sometimes confuses the telephone ringing with the alarm and calls then, too. Mary, on the other hand, likes rather loud music and sometimes misses the alarm altogether. (Assume necessary data)</p> <ol style="list-style-type: none"> Draw topology of the network. Associate a conditional probability table for each node.(2) Given the evidence that neither a burglary nor an earthquake has occurred and both John and Mary call, Estimate the probability of ringing the alarm bell. (3) What are the reasons that uncertainty gets introduced in problem solving?(3) 	
Que. No.	Question	Max. Marks
Q4	Solve the following	20
i)	Explain the partial order planning algorithm for wearing shoes.	10
OR		
i)	Discuss the Steps to build an NLP? Give applications of NLP in various areas.	10
ii)	<p>Discuss the alpha-beta pruning algorithm. Comment on its strength and weaknesses. Solve the given problem instance using alpha-beta pruning to compute final score and declare the winner.</p> <div style="text-align: center;"> <pre> graph TD A((A)) --- B((B)) A --- C((C)) B --- D((D)) B --- E((E)) C --- F((F)) C --- G((G)) D --- D2[2] D --- D3[3] E --- E5[5] E --- E9[9] F --- F0[0] F --- F1[1] G --- G7[7] G --- G5[5] </pre> </div>	4+2+4

Figure 2

Que. No.	Question	Max. Marks
Q5	Solve Any Four.	20
i)	Define the terms chromosome (1), fitness function (1), crossover (2) and mutation (1) used in Genetic Algorithm.	5
ii)	Discuss the problems in hill climbing algorithm solutions.	5
iii)	Discuss the heuristic property admissibility with example.	5
iv)	Discuss the Universal Instantiation and Existential Instantiation Elimination with example.	5
v)	Describe the architecture of the Expert System with a diagram.	5
vi)	Discuss the Learning process in Decision Tree.	5