Reg.No. | | | | | | | |

Bansilal Ramnath Agarwal Charitable Trust's
VISHWAKARMA INSTITUTE OF TECHNOLOGY, PUNE – 411037.
(An Autonomous Institute Affiliated to Savitribai Phule Pune University)

Examination: ESE

Year: TY-BTech **Branch:** Computer Engineering

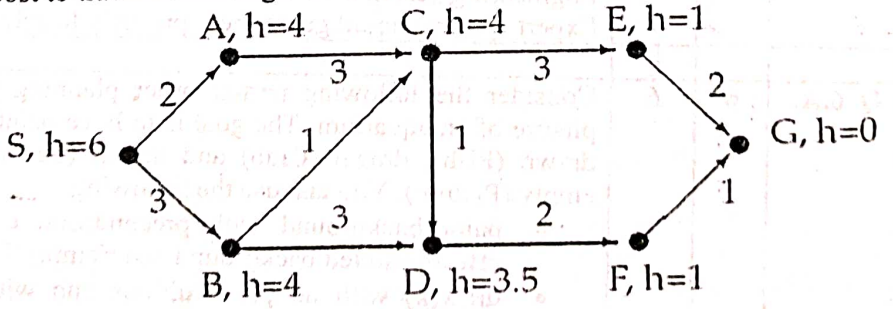
Subject: Artificial Intelligence **Subject Code:** CS3202

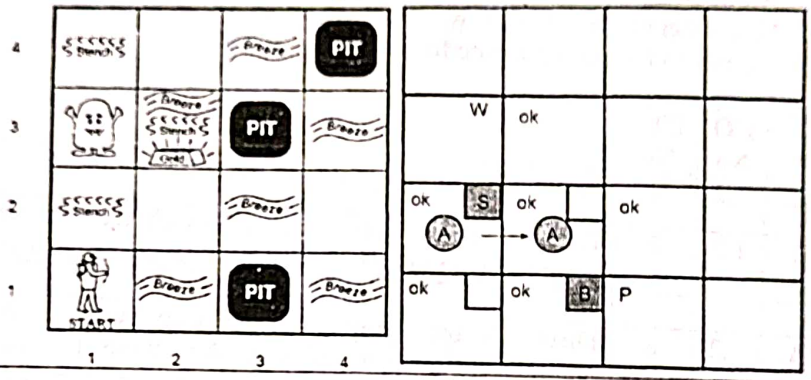
Max. Marks: 60 **Total Pages of Question Paper: 3**

Day & Date: Tuesday, December 20, 2022 **Time:** 8.30 am to 10.30 am

Instructions to Candidate

1. All questions are compulsory.
2. Neat diagrams must be drawn wherever necessary.
3. Figures to the right indicate full marks.

Q. No.	CO No	BT* No		Max marks
Q. 1. A.	1,2	2	Explain Learning agent with suitable example	4
B.	1,2	2	Explain with suitable example how choice of representation can have a major impact on the efficiency of the problem solving process.	6
Q. 2. A.	1,2	2	Discuss in brief properties of task environment. Also explain why BFS and DFS methods are called weak methods in searching.	6
B.	1,2	2	Identify the difference between AI technique and Non-AI technique with suitable example.	4
Q. 3. A.	3	5	If a heuristic search is used to solve the eight-puzzle from the starting configuration below using the number-of-tiles-out-of-place as the heuristic, which of the following nodes will not be considered during the search? Justify your answer. 1 2 4 5 3 7 8 6 A. 1 2 / 4 5 3 / 7 8 6 B. 1 5 2 / 4 3 / 7 8 6 C. 1 5 2 / 4 3 / 7 8 6 D. 1 2 3 / 4 5 / 7 8 6	06
			OR	
	3	5	Suppose we want to use the A* algorithm on the graph below to find the shortest path from node S to node G. Each node is labeled by a capital letter and the value of a heuristic function. Each edge is labeled by the cost to traverse that edge.  	06
B.	6	1	What do you mean by admissibility of an algorithm? State any two	4

			search strategies which are admissible	
Q. 4. A.	4	4	Consider the Wumpus world example as shown in the figure below. The specification of the problem is as follows. The agent has a single shot to shoot at a neighboring tile and kill the Wumpus if it is there, – the agent can pick up the pile of gold if it is at the same tile, – the agent can move to neighboring tiles, – the agent perceives a breeze at neighboring tiles of pits, – the agent perceives stench at neighboring tiles of the Wumpus. Suppose the agent has progressed to the point shown fig. 2, having perceived nothing in [1,1], a breeze in [2,1], and a stench in [1,2]. And is now concerned with the contents of [1,3], [2,2], and [3,1]. Each of these can contain a pit, and at most one can contain wumpus. Construct a set of possible worlds. Mark the worlds in which KB is true and those in which each of the following sentences is true. α1 = "There is no pit in [2,2] α1 = " There is a wumpus in [1,3]. 	6
			OR	
	4	4	**Prove that "THE UNICORN IS MAGICAL".** "If the unicorn is mythical, then it is immortal, but if it is not mythical, then it is a mortal mammal. If the unicorn is either immortal or a mammal, then it is horned. The unicorn is magical if it is horned". Use these propositional variables: Y = unicorn is mYthical R = unicorn is moRtal M = unicorn is a maMmal H = unicorn is Horned G = unicorn is maGical	6
B.			Convert following sentences into predicate logic and prove that, book supports the cup using resolution. 1. If x is on top of y, y supports x 2. If x is above y and they are touching each other then x is on top of y. 3. A cup is above a book. 4. A cup is touching a book.	4
Q. 5. A.	4	4	Define Expert System? State what are the components of expert system? Analyze how Expert system is designed using PROLOG.	4
B.	4	4	Organize an expert system for admission in various disciplines of Engineering. Define at least four rules in PROLOG. Analyze how Expert system should guide them properly to select a proper discipline.	6
Q. 6.A.	6	6	Consider the following partial order planning problem for creating a picture of an aquarium. The goal is to have painted background and also drawn (Fish), drawn (Crab) and drawn (Seahorse). The start state is empty (Picture). You can use the following: • paint background with precondition empty(Picture) and with effects painted background and ¬empty(Picture) • draw(x) with no preconditions and with effects drawn(x) and ¬empty(Picture) Write the start state and the finish state. Draw a partial order plan with preconditions above the operators and effects below the operators. Draw	6

			the causal links.	
B.	6	6	Design the operators with their preconditions and post conditions for the problem of planning the preparation of scrambled eggs.	4

CO Statements:

1. Understand the basics of the theory and practice of Artificial Intelligence as a discipline and about intelligent agents capable of problem formulation.
2. Identify problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
3. Evaluation of different uninformed and informed search algorithms on well formulated problems along with stating valid conclusions that the evaluation supports.
4. Formulate and solve a given problem using Propositional and First Order Logic.
5. Analyze the AI problem using different planning techniques.
6. Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.

***Blooms Taxonomy (BT) Level No:**

1. Remembering; 2. Understanding; 3. Applying; 4. Analyzing; 5. Evaluating; 6. Creating