Name: Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2021

Course: Artificial Intelligence **Semester: 6th**

Program: B.Tech-CSE- MT, LLB, BAO, CCVT, CSF, BFSI, MAD, GG, IOT, IFM, OG, DOps, BData, CSERA

Course Code: CSEG3005 **Max. Marks: 100**

Time 03 hrs.

SECTION A

1. Each Question will carry 5 Marks

2. Instruction: Write short answer, Q2 has a choice option.

S. No.		Marks	CO
Q 1	List the different characteristics of the intelligent agents.	5	CO1
Q2	Explain the criteria on which basis you can evaluate the search strategies. **OR** How can you analyze that a solution steps be ignored or undone? Explain Ignorable, Recoverable and Irrecoverable conditions with suitable examples.	5	CO2
Q3	Name the quantifiers and connectives of first order logic.	5	CO3
Q4	Differentiate between supervised learning and reinforcement learning.	5	CO4
Q5	Discuss the applications of Artificial Intelligence.	5	CO1
Q6	Trace the constraint satisfaction procedure solving the following crypto-arithmetic problem: T O + G O --- --- --- O U T	5	CO2

SECTION B

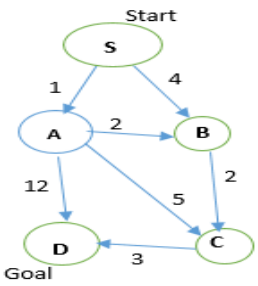
1. Each question will carry 10 marks

2. Instruction: Write short / brief notes.

<table>
<tr><td>Q 7</td><td>How to design an intelligent agent for an automated taxi driver with its PAGE description? What performance measure would you like an automated driver to aspire to? Determine what type of agent architecture is most appropriate for automated taxi driver intelligent agent.

OR

Discuss PEAS description for the following Intelligent Agents. Draw neat illustrations.
(a) Part picking robot
(b) Vacuum cleaner</td><td>10</td><td>CO1</td></tr>
<tr><td>Q8</td><td>Differentiate between forward and backward chaining? Illustrate their differences with suitable example.</td><td>10</td><td>CO3</td></tr>
<tr><td>Q9</td><td>Convert to FOPL, then to CNF and finally prove that “Kitty drinks milk” by resolution graph.
(i) Cats like milk
(ii) Cats drink everything they like
(iii) Kitty is a cat
To Prove: Kitty drinks milk
OR
Elaborate what is Knowledge Representation? Discuss the different methods of knowledge representation? Use suitable examples.</td><td>10</td><td>CO3</td></tr>
<tr><td>Q10</td><td>Given a graph below. Compute the shortest path, from S to D using A*.

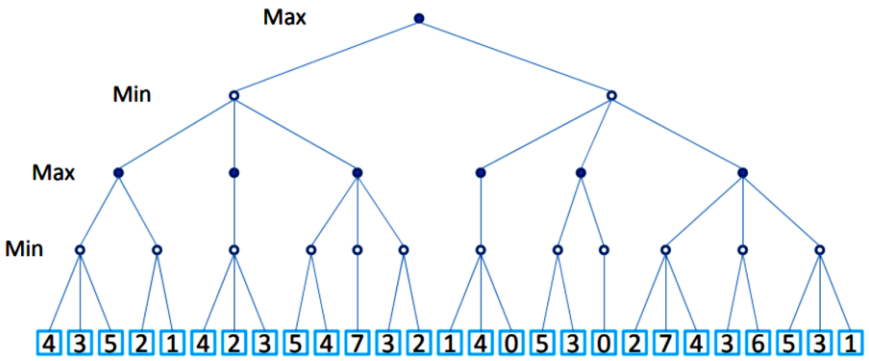
 

Heuristic value
<table>
<tr><td>S</td><td>7</td></tr>
<tr><td>A</td><td>6</td></tr>
<tr><td>B</td><td>2</td></tr>
<tr><td>C</td><td>1</td></tr>
<tr><td>D</td><td>0</td></tr>
</table>

OR

Solve 8 puzzle given below using hill climbing by finding appropriate heuristic function.

Start
<table>
<tr><td>1</td><td>2</td><td>3</td></tr>
<tr><td>4</td><td>5</td><td>6</td></tr>
<tr><td>7</td><td>8</td><td></td></tr>
</table>
Goal
<table>
<tr><td>1</td><td>2</td><td>3</td></tr>
<tr><td>8</td><td>5</td><td>6</td></tr>
<tr><td>4</td><td>7</td><td></td></tr>
</table></td><td>10</td><td>CO2</td></tr>
</table>

Q11	Consider the following game tree in which static scores are all from the first players' point of view. Suppose the first player is the maximizing player. Show the solution path using Max-Min search procedure.  **OR** Consider the following Production system: ***A farmer want to get a lion, a fox, a goose and some corn across a river. There is a bot but he can take one in addition to himself on each trip. The corn cannot be left with goose, as it will eat the corn; similarity the fox can eat goose if left together. The lion also cannot be left with the fox. How does everything get across the river? Assume animals do not wander off when left alone.*** a) Identify and mention the Start and Goal states. b) Draw the state-space search tree to find the first solution. c) Show the production rules for the problem.	**10**	**CO2**
SECTION-C **1. Question (a) and (b) carries 10 Marks each.** **2. Instruction: Part (b) has two options. Attempt any one question from part (b).**			
Q12	a) How could you divide the 'training Set' and 'test Set' in a Machine Learning Model? How much data will you allocate for training, validation, and test Sets? b) Consider a scenario: ***Harry installed a new burglar alarm at his home to detect burglary. The alarm reliably responds at detecting a burglary but also responds for minor earthquakes. Harry has two neighbors David and Sophia, who have taken a responsibility to inform Harry at work when they hear the alarm. David always calls Harry when he hears the alarm, but sometimes he got confused with the phone ringing and calls at that time too. On the other hand, Sophia likes to listen to high music, so sometimes she misses to hear the alarm.*** Here, compute the probability that Burglary alarm has sounded, but there is neither a burglary, nor an earthquake occurred, and David and Sophia both called the Harry. **OR** Discuss the role of weights and ANNs and explain the combined effects of the summation and transformation functions.	**10+10**	**CO4**