Q.5 i. Differentiate between monotonic reasoning and non-monotonic reasoning? **4**

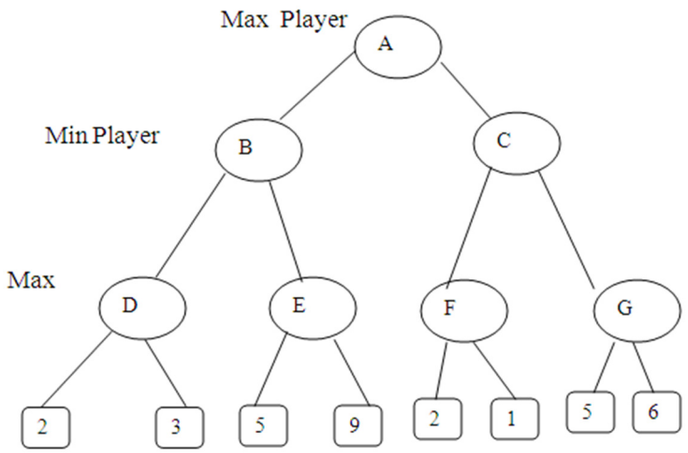
ii. Bag I contain 4 white and 6 black balls while another Bag II contains 4 white and 3 black balls. One ball is drawn at random from one of the bags and it is found to be black. Find the probability that it was drawn from Bag I. **6**

OR iii. How forward and backward reasoning work in Knowledge and reasoning? **6**

Q.6 Attempt any two:

i. Explain problem reduction with example. Describe the MINIMAX search strategy. **5**

ii. Find out alpha and beta value for given {A, B, C, D, E, F, G} node using alpha beta pruning algorithm? **5**



iii. Explain block world problem in Robotics? **5**

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Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2019

CS3EA01/ IT3EA01 / EC3ET01 / EI3ET01

Artificial Intelligence

Programme: B.Tech. Branch/Specialisation: CSE/IT/EC/EI

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated.Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. The "Turing Test" is **1**

(a) A test devised by Alan Turing to determine whether a secret code is breakable

(b) A test to determine whether a Turing Machine will halt

(c) A test of whether a machine is intelligence prescribed by Turing

(d) None of these

ii. Weak AI is **1**

(a) The embodiment of human intellectual capabilities within a computer.

(b) A set of computer programs that produce output that would be considered to reflect intelligence if it were generated by humans

(c) The study of mental faculties through the use of mental models implemented on a computer.

(d) All of these

iii. CSPs are **1**

(a) Ways of formulating problems using variables and constraints

(b) Problems that come in the way of satisfying constraints

(c) Problems that arise after constraint satisfaction

(d) None of these

iv. What is a heuristic function? **1**

(a) A function to solve mathematical problems

(b) A function which takes parameters of type string and returns an integer value

(c) A function whose return type is nothing

(d) A function that maps from problem state descriptions to measures of desirability

v. The sentence (¬A ∨ A) in Propositional Logic is. **1**
(a) A tautology (b) A contradiction
(c) A contingency (d) None of these

vi. The motivation for Semantic Nets is **1**
(a) To create a new type of computer network.
(b) To define the formal semantics of an FOL predicate.
(c) To link related formulas to avoid searching through a flat KB.
(d) None of these

vii. How to eliminate the redundant rule matching attempts in the forward chaining? **1**
(a) Decremental forward chaining
(b) Incremental forward chaining
(c) Data complexity
(d) None of these

viii. Which closely resembles propositional definite clause? **1**
(a) Resolution (b) Inference
(c) Conjunction (d) First-order definite clauses

ix. Which search is equal to minimax search but eliminates the branches that can't influence the final decision? **1**
(a) Depth-first search (b) Breadth-first search
(c) Alpha-beta pruning (d) None of these

x. Programming a robot by physically moving it through the trajectory you want it to follow is called: **1**
(a) Contact sensing control (b) Continuous-path control
(c) Robot vision control (d) Pick-and-place control

Q.2 i. If branches are b and depth is d then what is space and time complexity of BFS and DFS? **2**

ii. Suppose you design a machine to pass the Turning Test. What are capabilities machine must have? **3**

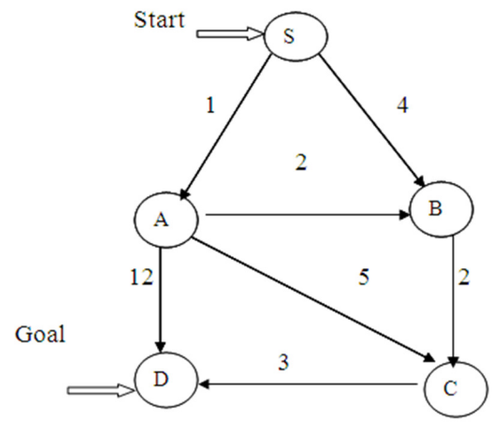
iii. What is production system? Explain any four different type of production systems. **5**

OR iv. What are possible steps required to solve any AI problem? **5**

Q.3 i. Which type of the problem you will suggest AO* algorithm? **2**

ii. Find out path from start node to goal node with the help of A* algorithm? **8**

Problem Statement is given below:



and if Heuristic value is:

Node	Value of the nodes
S	7
A	6
B	2
C	1
D	0

OR iii. (a) Prove that if a heuristic is consistent, it must be admissible. Construct an admissible heuristic that is not consistent. **8**
(b) Define constraint satisfaction problem with suitable example?

Q.4 i. Construct the truth table for (p∨ ¬p) and (p ^ ¬p) and also find out which one is tautologies and contradiction? **3**

ii. Rules are below: **7**
(a) A ∨ B ∨ ¬D
(b) A V B V C V D
(c) ¬B ∨ C
(d) ¬A
(e) φ = C
Show that {a,b,c,d} ├ Res φ, prove (from) {a,b,c,d} using resolution?

OR iii. Define semantic net with suitable example and how it is differ from Frame? **7**

P.T.O.

Marking Scheme
CS3EA01/ IT3EA01 / EC3ET01 / EI3ET01
Artificial Intelligence

Q.1 i. The "Turing Test" is **1**
(c) A test of whether a machine is intelligence prescribed by Turing

ii. Weak AI is **1**
(c) The study of mental faculties through the use of mental models implemented on a computer.

iii. CSPs are **1**
(a) Ways of formulating problems using variables and constraints

iv. What is a heuristic function? **1**
(d) A function that maps from problem state descriptions to measures of desirability

v. The sentence (¬A ∨ A) in Propositional Logic is. **1**
(a) A tautology

vi. The motivation for Semantic Nets is **1**
(c) To link related formulas to avoid searching through a flat KB.

vii. How to eliminate the redundant rule matching attempts in the forward chaining? **1**
(b) Incremental forward chaining

viii. Which closely resembles propositional definite clause? **1**
(d) First-order definite clauses

ix. Which search is equal to minimax search but eliminates the branches that can't influence the final decision? **1**
(c) A**l**pha-b**et**a pruning

x. Programming a robot by physically moving it through the trajectory you want it to follow is called: **1**
(b) Continuous-path control

Q.2 i. BFS 1 mark **2**
DFS 1 mark

ii. Capabilities machine must have **3**

iii. Production system 2 marks **5**
Any four different type of production systems 3 marks

OR iv. Possible steps required to solve any AI problem **5**
1 mark for each step (1 mark * 5)

Q.3 i. Type of the problem you will suggest AO* algorithm **2**

ii. Find out path from start node to goal node with the help of A* algorithm **8**
Apply Correct algorithm 4 marks
Complete Solution + 4 marks

OR iii. (a) Prove that if a heuristic is consistent, it must be admissible. Construct an admissible heuristic that is not consistent. **8**
Correct approach 3 marks
Complete Solution + 2 marks
(b) Define constraint satisfaction problem with suitable example?
Constraint satisfaction problem 2 marks
Example 1 mark

Q.4 i. Construct the truth table for (p∨ ¬p) and (p ^ ¬p) and also find out which one is tautologies and contradiction? **3**
Truth table 1 mark
Tautologies 1 mark
Contradiction 1 mark

ii. Correct approach 4 marks **7**
Complete solution + 3 marks

OR iii. Define semantic net 3 marks **7**
Example 2 marks
Differ from Frame 2 marks

Q.5 i. Monotonic reasoning 2 marks **4**
Non-monotonic reasoning 2 marks

ii. Apply correct theorem 4 marks **6**
Complete solution + 2 marks

OR iii. Forward reasoning work 3 marks **6**
Backward reasoning work 3 marks

Q.6 Attempt any two:

i. Problem reduction 2 marks **5**
Example 1 mark
MINIMAX search strategy. 2 marks

ii. Apply correct algorithm 3 marks **5**
Complete solution + 2 marks

iii. Block world problem in Robotics **5**

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