Total No. of printed pages = 4

MCA 202301

Roll No. of candidate | | | | | | | | | | |

2021

M.C.A. 3rd Semester End-Term Examination

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

(New Regulation(w.e.f 2020–21) and New Syllabus(w.e.f 2020–21))

Full Marks – 70 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No. 1 and any *four* from the rest.

1. Choose the most correct answer from the following questions. *(10 × 1 = 10)*

(a) A hybrid Bayesian Network contains

(i) Both discrete and continuous variables

(ii) Only discontinuous variables

(iii) Both discrete and discontinuous variables

(iv) Continuous variables only

(b) Which of the following search algorithm requires less memory

(i) optimal search (ii) breadth first search

(iii) depth first search (iv) linear search

(c) The maximum depth to which the alpha-beta pruning can be applied.

(i) Eight states (ii) Six states

(iii) Ten states (iv) Any depth

(d) The process of capturing the inference process as Single Inference Rule is known as

(i) Clauses

(ii) Resolution

(iii) Generalized Modus Ponens

(iv) Variables

(e) The PEAS in the task environment is about

(i) Peer, Environment, Actuators, Sense

(ii) Performance, Environment, Actuators, Sensors

(iii) Perceiving, Environment, Actuators, Sensors

(iv) None of the above

(f) In state-space, the set of actions for a given problem is expressed by the

(i) Intermediate States

(ii) Successor function that takes current action and returns next state

(iii) Initial States

(iv) None of the above

(g) For propositional Logic, which statement is false?

(i) The sentences of Propositional logic can have answers other than True or False.

(ii) Each sentence is a declarative sentence.

(iii) Propositional logic is a knowledge representation technique in AI.

(iv) None of the above.

(h) Which algorithm is used in the Game tree to make decisions of Win/Lose?

(i) Heuristic Search Algorithm

(ii) DFS/BFS algorithm

(iii) Greedy Search Algorithm

(iv) Min/Max algorithm

(i) An AI agent perceives and acts upon the environment using .

(i) Sensors (ii) Perceiver

(iii) Actuators (iv) Both (a) and (c)

(j) Rational agent always does the right things.

(i) True (ii) False

2. (a) What is an intelligent agent in artificial intelligence? What is a rational agent? Is there a difference? (3)

(b) What is meant by an agent's percept sequence? (2)

(c) What is the expansion of PEAS in a task environment ? (2)

(d) What are the different kinds of environments are present in AI? Explain with an example each. (5)

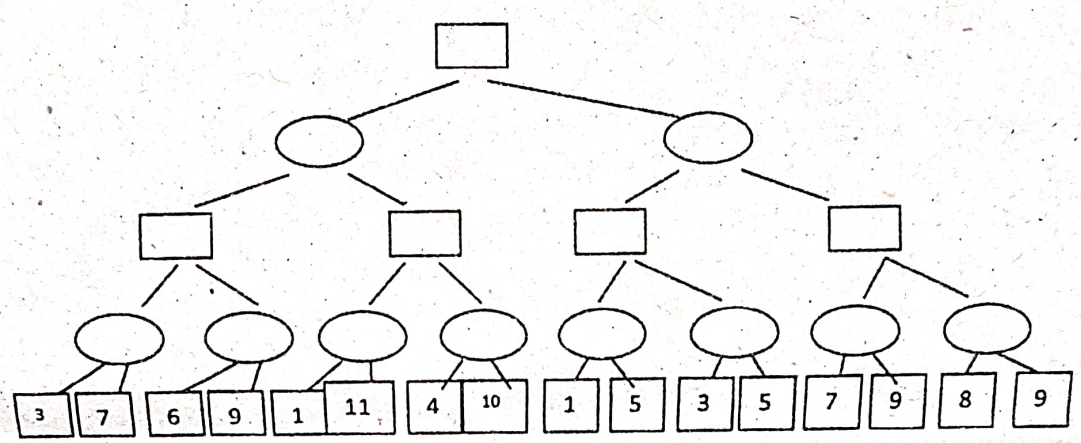
(e) What kinds of environment is strategic in AI? Is it stochastic? What kind of environment is a crossword puzzle? (3)

3. (a) Explain 8- Puzzle Problem using AI Technique. (7)

(b) Consider a Water Jug problem. You are 2 jugs, a 4 gallon and a 3 gallon jugs. Neither has any measuring mark in it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallon of water into a 4 gallon jug? State the production rules for the water jug problem. (8)

4. (a) Explain A* algorithm with a suitable example. (7)

(b) Apply MINIMAX and Alpha Beta pruning on the following game tree. Also find the time complexity. (8)



5. (a) How is knowledge represented in AI? (2)

(b) What are the various techniques of knowledge representation in AI? (4)

(c) What does the language of FOPL consists of? (3)

(d) What is Modus Ponens? (2)

(e) convert the following sentences into logic. (4)

(i) "There exist some numbers which are either real OR rational"

(ii) "All real numbers are rational".

6. (a) What is an Expert System? (3)

(b) What are the key components of an Expert System? (3)

(c) Describe by way of an example as to how an expert system could be used in each of the following areas: (3 × 3=9)

(i) Healthcare

(ii) Prediction

(iii) Human resource management

7. (a) What is the difference between Artificial Intelligence and Machine Learning? How is Machine Learning different from Deep Learning? (3)

(b) What are the five popular algorithms of Machine Learning? (3)

(c) What are the different Algorithm techniques in Machine Learning? (3)

(d) What Are the Different Types of Machine Learning? (3)

(e) How would you design an Email Spam Filter? Give your ideas. (3)

8. (a) What is Tensor flow ? How many types of Tensors are there? (2)

(b) What are the main features of Tensor Flow? (3)

(c) What are the three working components of Tensor flow Architecture? (3)

(d) Describe the common steps to most of the Tensor flow algorithms. (3)

(e) Where can you run a Tensor flow? Explain with an example (4)