Total No. of printed pages = 4

MCA 182502

Roll No. of candidate

17/2/ 2021

M.C.A. 5th Semester End-Term Examination

ARTIFICIAL INTELLIGENCE

(New Regulation & New Syllabus)

(w.e.f. 2018 – 19)

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 : $(10 \times 1 = 10)$

   (i)   First order logic Statements contains

      (a)   Predicate and Preposition   (b)   Subject and an Object

      (c)   Predicate and Subject   (d)   None of the above

   (ii) An Algorithm is said as Complete algorithm if

      (a)   It ends with a solution (if any exists)

      (b)   It begins with a solution

      (c)   It does not end with a solution

      (d)   It contains a loop

   (iii) The main tasks of an AI agent are

      (a)   Input and Output

      (b)   Moment and Humanly Actions

      (c)   Perceiving, thinking, and acting on the environment

      (d)   None of the above

[Turn over

(iv) Ways to achieve AI in real-life are

    (a) Machine Learning   (b) Deep Learning

    (c) Both (a) and (b)   (d) None of the above

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

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

    (b) Each sentence is a declarative sentence

    (c) Propositional logic is a knowledge representation technique in AI

    (d) None of the above

(vi) Web Crawler is an example of

    (a) Intelligent Agent   (b) Problem-solving agent

    (c) Simple reflex agent   (d) Model-based agent

(vii) Which algorithm takes two sentences as input and returns a Unifier?

    (a) Inference   (b) Hill-Climbing

    (c) Unify algorithm   (d) Depth-first search

(viii) Which AI technique enables the computers to understand the associations and relationships between objects and events?

    (a) Heuristic Processing   (b) Cognitive Science

    (c) Relative Symbolism   (d) Pattern Matching

(ix) The search algorithm which is similar to the minimax search, but removes the branches that don't affect the final output is known as —————

    (a) Depth-first search   (b) Breadth-first search

    (c) Alpha-beta pruning   (d) None of the above

(x) Among the given options, which is also known as inference rule?

    (a) Reference   (b) Reform

    (c) Resolution   (d) None of the above

2. (a) Define Artificial Intelligence. Why do we need Artificial Intelligence?
       (2 + 3 = 5)

   (b) Give some real-world applications of AI. (3)

   (c) Which assessment is used to test the intelligence of the machine? Explain. (3)

   (d) What are the different domains/Subsets of AI? (4)

3. (a) Explain Tic-Tac-Toe problem using AI Technique using an example. (7)

   (b) Consider the following graph, starting from state A. Execute DFS and BFS. The goal node is G. Show the order in which the nodes are expanded. Assume that the alphabetically smaller nodes are expanded first to break ties. (8)
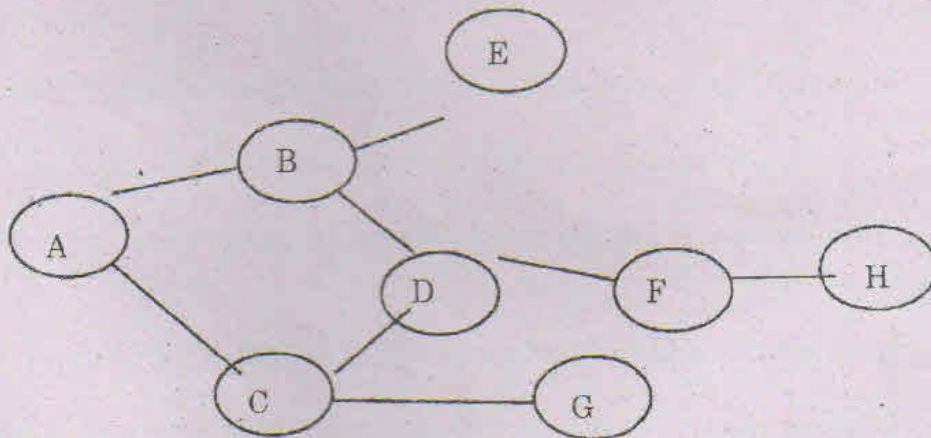
4. (a) Explain A* algorithm. (5)

   (b) Explain move generator and evaluation functions for Tic-Tac-Toe game. (5)

   (c) Explain Path finding Problem using AI Technique. (5)

5. (a) Convert the following sentences into logic. (4)

      (i) "There exist some numbers which are both real AND rational".

      (ii) "There exist some numbers for which rational implies real".

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

   (c) What are the shortcomings of Propositional Logic? (2)

   (d) When is satisfiability of a sentence in logic? What is a Valid sentence? (3)

   (e) What is a Chatbot? (2)

6.   (a)   Define an Expert system and its applications.   (3)

     (b)   What are the key elements of an Expert system?   (4)

     (c)   What are the strategies used by an Inference Engine for acquiring knowledge from a knowledge base of an Expert system?   (4)

     (d)   Describe the following Expert Systems :   (4)

         DENDRAL and MYCIN

7.   (a)   Explain an Artificial Neural Network.   (2)

     (b)   What is the use of Artificial Neural Network? Explain Supervised and Un-Supervised learning? $(2 + 3 = 5)$

     (c)   How many types of the artificial neural network used in machine learning?   (3)

     (d)   How is ANN useful in making a machine intelligent?   (3)

     (e)   What is the convolutional neural network?   (2)

8.   (a)   How Artificial intelligence, Machine Learning, and Deep Learning differ from each other?   (4)

     (b)   Explain the different components of an Expert System.   (3)

     (c)   What is the use of computer vision in AI?   (2)

     (d)   What is a Bayesian network, and why is it important in AI?   (3)

     (e)   What is a Game theory? How is it important in AI?   (3)

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