PG – 514

II Semester M.C.A. Examination, Nov./Dec. 2023
(CBCS) (2020-21 and Onwards)
COMPUTER SCIENCE
2MCA6 : Artificial Intelligence

Time : 3 Hours

Max. Marks : 70

Instructions : *1) Answer **any 5** from Section – **A**.*
*2) Answer **any 4** from Section – **B**.*

SECTION – A

Answer **any 5** questions from the following. **Each** question carries **6** marks :

1. a) Define agent. Mention types of agent in AI. **3**

   b) State the relationship between agent and environment. **3**

2. Prove that uniform-cost search and breadth-first search with constant step cost are optimal when used with the graph-search algorithm. Show a state space with constant step costs in which graph search using iterative deepening, find a sub optimal solution. **6**

3. Discuss 8-queens problem. How Euclidean distance and Manhattan distance are calculated ? Give any one application of each. **6**

4. What is learning ? Explain various learning techniques. **6**

5. Draw a semantic network representing the following knowledge. **6**

   a) Every vehicle is a physical object.

   b) Every car is a vehicle.

P.T.O.

c) Every car has 4 wheels.

d) Electrical system is a part of car.

e) Battery is a part of electrical system.

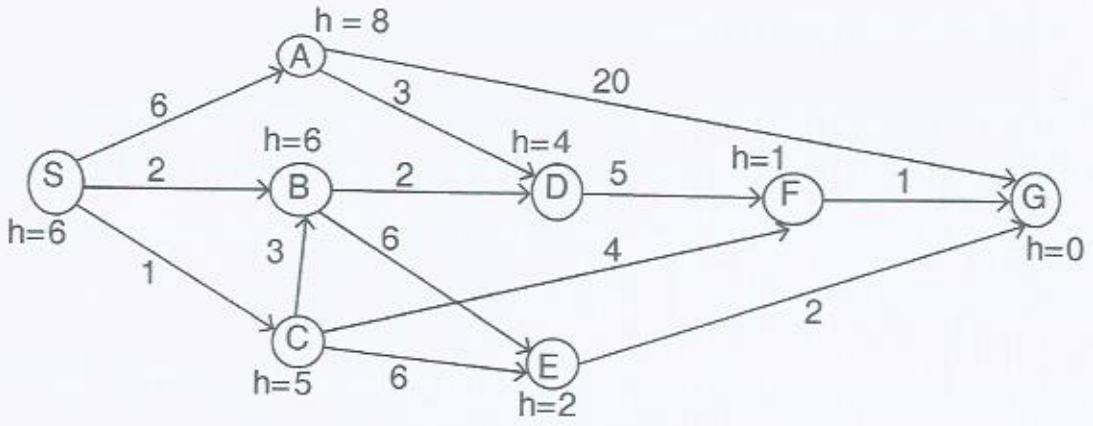
f) Pollution system is a part of every vehicle.

g) Vehicle is used in transportation.

h) Swift is a car.

6. Define planning. Explain the needs of planning. 6

7. Consider the search problem below with start state S and goal state G. The transition costs are next to the edges and heuristic values are next to the state. What is the final cost using A* search ? 6



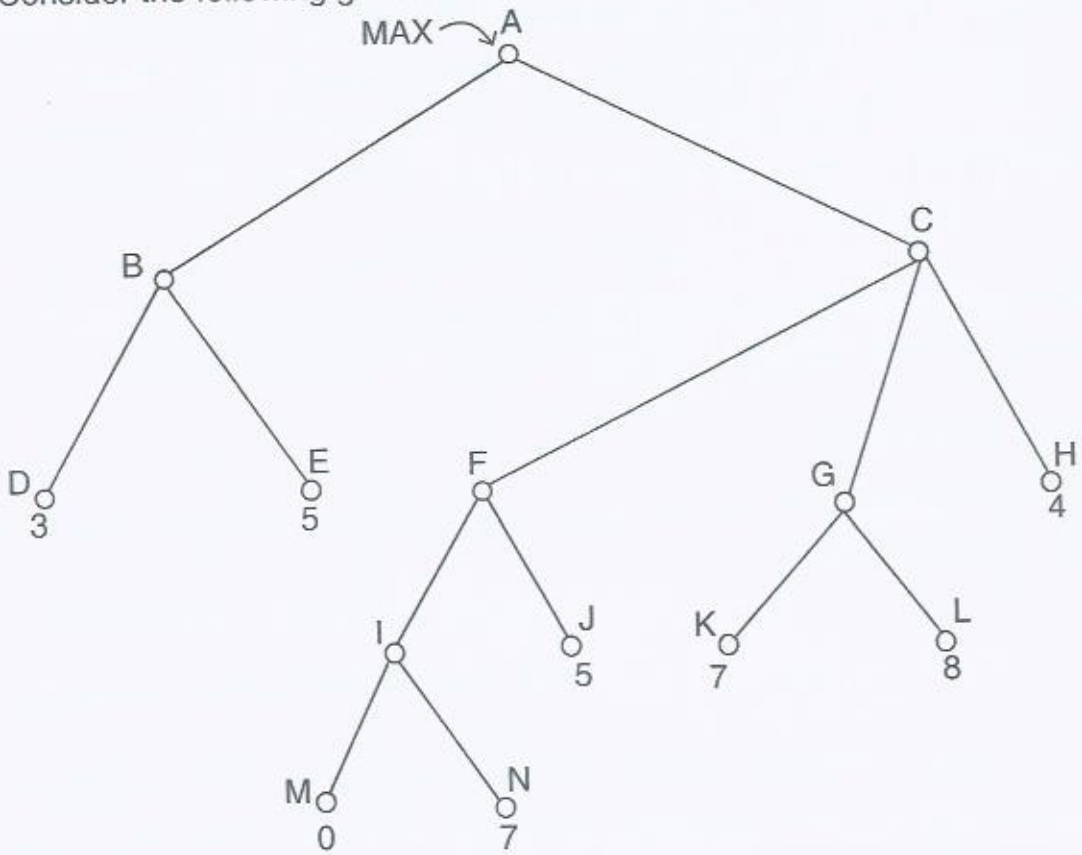
8. a) What is natural language processing ? Explain different stages of NLP and its advantages. 3

b) How machine learning is different from deep learning ? Explain any two system learning. 3

SECTION – B

Answer **any 4** questions. **Each** question carries **10** marks :

9. Consider the following game tree. **10**



a) Find the best move for the MAX player using the minmax procedure.

b) Perform a left-to-right alpha-beta pruning on tree. Indicate where the cut offs occur.

10. Consider the following sentences. **10**

a) John likes all kinds of food.

b) Apples are food.

c) Chicken is food.

d) Anything anyone eats and is not killed by food.

e) Bill eats peanuts and is still alive.

f) Sue eats everything Bill eats.

Translate these sentences in to formulas in predicate logic. Prove that "John likes peanuts" using background chaining. Convert the formula into clause form.

11. Explain the architecture of expert system. What are the advantages and limitations of expert system ? 10

12. Describe how minmax and alpha-beta algorithm change for two player, non-zero sum games in which each player has his or her own utility function. You may assume that each player knows the other's utility function. If there are no constraints on the two terminals utilities, is it possible for any node to be pruned by alpha-beta. 10

13. Elaborate in detail how neural network works. Explain the structure of AI network with neat diagram. What is the role of ANN in deep learning ? 10

14. Write a short note on :
    a) Fuzzy logic. 5
    b) Unification algorithm. 5