(Printed Pages : 4) Roll No. 19CSE28

AC-1952

B.E. VI Semester (New Course) Examination, May-2022

Artificial Intelligence

CSE

Time : Three Hours] *[Maximum Marks : 60*

[Minimum Marks : 24

Section-A

(True/False Type Questions) 1×10=10

Note : All questions are **compulsory.**

1. (a) Turing test is the necessary and sufficient test for deciding whether the machine is intelligent or not. (T/F)
   (b) John McCarthy has credited as 'Father of AI'. (T/F)
   (c) Empty clause is a sign of contradiction. (T/F)
   (d) LISP and PROLOG are not used for Logic Programming. (T/F)
   (e) HMM are used for processing & analizing random data. (T/F)
   (f) In knowledge Pyramid Model, the knowledge is always shown at the base/bottom of the pyramid. (T/F)
   (g) BFS and DFS are good examples of Informed Search Techniques. (T/F)
   (h) Hill Climbing and Simulated Annealing both are good examples of Heuristic Search Techniques. (T/F)
   (i) Natural Language Understanding and Natural Language Translation are the same thing. (T/F)
   (j) In predicate calculus, the quantifiers are used to denote the scope of a variable. (T/F)

Section-B

(Short Answer Type Questions)

Note : Attempt any **four** questions out of **six.** 5×4=20

2. (a) Explain Turing Test with the help of block diagram?
   Also discuss some limitations of Turing Test?

P.T.O.

(b) Differentiate between strong AI and Weak AI?

3. (a) Define Water-Jug problem? Give production Rules for Water-Jug Problem? Give one possible solution for Water-Jug Problem by assuming the capacity of the Jug's are 4 liter and 3 liter respectively.

(b) Discuss Applications of Artificial Intelligence in the various areas of Science, Technology, Engineering and Military?

4. Attempt any **two** parts:

(a) Differentiate between Conventional Problems & AI Problems?

(b) Differentiate between Natural Intelligence and Artificial Intelligence?

(c) Differentiate between Uninformed Search and Informed Search?

5. Attempt any **two** parts:

(a) Write Simple Hill Climbing Algorithm?

(b) Write steepest Ascent Hill Climbing Algorithm?

(c) Write Simulated Annealing Algorithm?

(d) Discuss major drawbacks of Hill climbing, and various techniques to overcome from the drawbacks encountered during Hill climbing?

6. Attempt any **two** parts:

(a) Write Algorithm of Breadth First Search?

(b) Write Algorithm of Depth First Search?

(c) Solve following cryptarithmetic problem, and show all the steps:

$$\begin{array}{r} S\ E\ N\ D \\ +\ M\ O\ R\ E \\ \hline M\ O\ N\ E\ Y \end{array}$$

7. Attempt any **two** parts:

(a) Discuss various characteristics of AI Problems?

(b) Discuss various AI Techniques for solving the complex AI problems?

(c) Write short notes on Computer Vision?

Section-C

(Long Answer Type Questions)

Note : Attempt any **three** questions out of **five**. 10×3=30

8. Attempt any two parts.

   (a) Write Algorithm of Prepositional Resolution?

   (b) Write Algorithm of Predicate Resolution?

   (c) Write A* Algorithm?

9. Read following statements carefully:

   - Marcus was a man
   - Marcus was a Pompeian.
   - Marcus was born in 40 AD
   - All men are mortal
   - All Pompeian died when volcano errupted in 79 AD.
   - No mortal lives longer than 150 years.
   - It is now 2022.
   - Alive means not dead.
   - If someone dies than he/she dead at all later times.

   Now Answer the following questions-

   (a) Convert all the above statements into WFF's, and clause form (canonical form) one by one?

   (b) Give a Resolution Proof of 'Marcus is not alive'.

10. Attempt any **one** part:

   (a) Explain briefly the Principal Component Analysis (PCA) Technique? How can we take advantage of PCA technique in order to solve complex problems of Machine Learning/Pattern Recognition? You may justify your answer either via theoretically or graphically or numerically?

(b) Explain briefly the Linear Discriminant Analysis (LDA) Technique? How can we take advantage of LDA technique in order to solve complex problems of Machine Learning/Pattern Recognition? You may justify your answer either via theoretically or graphically or numerically?

11. Attempt any **one** part:

(a) Explain briefly Support Vector Machine (SVM) technique? How can we take advantage of SVM technique in order to solve complex problems of Machine Learning/Pattern Recognition? You may justify your answer either via theoretically or graphically or numerically?

(b) Attempt any **two** parts:

(i) Differentiate between supervised & unsupervised Learning with suitable block diagram and examples?

(ii) Differentiate between classification and clustering with suitable diagram and examples?

(iii) Discuss Baye's Theorem explaining the concept of conditional probability? Also explain Baye's formula?

(iv) Discuss various Levels of knowledge used in NLP?

12. Attempt any **two** parts:

(a) Explain briefly Hidden Markov Model (HMM)? Explain via a suitable example that, how HMM are used for prediction/forecasting future information/data from the past?

(b) Discuss utility Theory in brief alongwith its components? Explain utility function and Axioms of utility Theory?

(c) Attempt any **two** parts:

(i) Write K-means clustering Algorithm

(ii) Write K-Nearest Neighbour Algorithm

(iii) Explain Concept of Decision Trees via suitable example?