Printed Pages : 4

MCAE-24/MCA-511(A)

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 214563

Roll No. | | | | | | | | | | |

M. C. A.

(SEM. V) (ODD SEM.) THEORY EXAMINATION, 2014-15

ARTIFICIAL INTELLIGENCE

Time : 3 Hours] [Total Marks : 100

Note : Attempt **all** questions.

1 Attempt any **four** of the following : 5×4=20

a) Define the terms: Knowledge, Intelligence and Artificial Intelligence. Write the various applications of Artificial Intelligence.

b) What is Turing test? Suppose you design a machine to pass the Turing test then what are the capabilities such a machine must have?

c) Differentiate between simple-reflex agent and utility agent.

d) Discuss the basic element of natural language processing.

e) State and explain the Min-Max algorithm of game playing.

f) Prove that A* algorithm is optimal and complete.

2 Attempt any **four** of the following : **5×4=20**

a) Difference between declarative and procedural knowledge representations.

b) Describe, briefly the "Heuristic search strategy" by applying on Traveling Salesman Problem also write the heuristic function for TSP.

c) What is Production System? What are the main components of a Production System, Explain each with example?

d) Describe, briefly the "Hill Climbing" search strategy, problems and solutions. Which heuristic function is used?

e) Show the state space representation for the solution of water jug problem with the capacity of two jugs as 3 and 4 and fill 2 liter water in 4 liter jug. Devise all the production rules.

f) Give an example of a problem for which breath first search would work better than depth first search. Write the differences between these two approaches.

3 Attempt any **two** of the following : **10×2=20**

a) Convert following sentence into predicate logic and then prove "Marcus is dead" using resolution :

- Marcus was a man.
- Marcus was a Pompeian.
- Marcus was born in 40 AD
- All men are mortal
- All Pompeian's died when the volcano erupted in 1979
- No mortal lives longer than 150 years
- It is now 1991
- Alive means not dead.

b) Consider the following sentences :

- John likes all kinds of food.
- Apples are food.
- Chicken is food
- Anything anyone eats and isn't killed alive.
- Sue eats everything bill eats.

(i) Translate these sentences into formulas in predicate logic.

(ii) Prove that John likes peanuts using backward chaining.

c) Describe Bayesian networks. How is the Bayesian networks powerful representation for representing knowledge ?

4 Attempt any **two** of the following : **10×2=20**

a) What do you understand by pattern recognition? Differentiate between structured description and symbolic description.

b) Describe the role of Hidden Markov Model (HMM) in probabilistic reasoning.

c) Write short notes on any **two** of the following :

i. Supervised and Unsupervised Learning

ii. Reinforcement learning

iii. Principle Component Analysis (PLA).

5 Attempt any **two** of the following : **10×2=20**

a) Define the concept of Expectation Maximization Algorithm. Explain the role of E-step and M-step in EM algorithm.

b) What is clustering ? Describe k-means clustering technique with example.

c) Write short notes on any **two** of the following :

i. Support Vector Machine (SVM)

ii. Linear Discriminant Analysis

iii. Bayesian Classifier.
