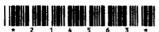
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MCAE-24/MCA-511(A)

(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:

 $5 \times 4 = 20$

- 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.

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[Contd...

- 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

2

• It is now 1991

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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.
 - 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?
- Attempt any two of the following: 10×2=20
 - What do you understand by pattern recognition? Differentiate between structured description and symbolic description.
 - 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:
 - a) Define the concept of Expectation Maximization Algorithm. Explain the role of E-step and M-step in EM algorithm.

 $10 \times 2 = 20$

- 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.