

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

Paper ID : 214427

Roll No.

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M.C.A.

Theory Examination (Semester-IV) 2015-16

ARTIFICIAL INTELLIGENCE

Time : 3 Hours

Max. Marks : 100

## Section-A

Q1. Attempt all the parts. All parts carry equal marks. Write  
answer of each part in short. (10×2=20))

- (a) What is machine learning? How many types of learning are there?
- (b) List the characteristics of intelligence.
- (c) What is "overfitting"? How do we overcome overfitting?
- (d) Explain the statistical nature of the learning process.

(1)

P.T.O.

- (e) Represent the following sentence in the Predicate form "All the children like sweets".
- (g) What do you understand by Natural Language Processing?
- (g) What is artificial intelligence? How it is different than general intelligence?
- (h) Describe the role of computer vision in artificial intelligence.
- (i) Write four properties a good system should possess for the knowledge representation in a particular domain.
- (j) Explain Maximum likelihood hypothesis and Maximum a posteriori.

### Section-B

**Q2. Attempt any 5 questions from this section. (5×10=50)**

- (a) Explain how Bayesian statistics provide reasoning under various kinds of uncertainty.
- (b) Describe A\* search technique. Prove that A\* is complete and optimal.
- (c) Give an example of a problem for which breadth first search would work better than depth first search. Write the difference between these two approaches.

(2)

- (d) What is Bayesian reasoning? What does a Bayesian network represent? Explain.
- (e) Describe alpha-beta pruning and give the other modifications to the min-max procedure to improve its performance.
- (f) Explain the expectation and maximization (EM) algorithm for finding the maximum likelihood with hidden variables.
- (g) Design principles of pattern recognition system. Explain Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA).
- (h) What do you understand by pattern recognition? Differentiate between structured description and symbolic description.

### Section-C

**Note: Attempt any 2 questions from this section. (2×15=30)**

- Q3. To which category of clustering schemes does the k-means algorithm belong? What is its major advantage? Which are the factors that influence the computation duration of this algorithm?

(3)

P.T.O.

Q4. Convert the 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 dead when the volcano erupted in 1979.
- No mortal lives more than 150 years.
- It is now 1991.
- Alive means not dead.

Q5. Write whort note on the following :

- i. Support vector machine (SVM)
- ii. Linear Discriminant Analysis
- iii. Bayesian classifier