Paper Code: MCA-413 **Roll No.** | | | | | | | | | | |

MCA

(SEM IV) EVEN SEMESTER EXAMINATION, 2015-16

ARTIFICIAL INTELLIGENCE

[Time: 3 hrs.] **[Max. Marks: 100]**

Note-Attempt All questions .All questions carry equal marks.

1. Attempt any **FOUR** parts of the following:- **[5x4=20]**

(a) What is artificial intelligence (AI), describe briefly.
(b) What is the difference between thinking humanly and thinking rationally approach of AI?
(c) How did mathematics play an important role in the foundation of AI?
(d) What is an agent program? Describe model based agent program in brief.
(e) Write a short note on the history of AI.
(f) Describe the role of AI in day today life.

2. Attempt any **TWO** of the following:- **[10x2=20]**

(a) Differentiate between uninformed search and informed search. Illustrate Iterative deepening depth first search with example.
(b) Explain bidirectional search with example and evaluate its performance.
(c) Explain A* search with example and prove its optimality.

3. Attempt any **TWO** of the following:- **[10x2=20]**

(a) (i) Negate the following predicate formulas:

$(\forall x)(\exists y)\,(P(x) \vee Q(y))$ and $(\exists x)\,(P(x) \wedge (\exists y)Q(y)) \rightarrow \neg\, R(y)$

(ii) Prove the validity of the argument:
All integers are rational numbers. Some integers are power of 2. Therefore some integers are rational numbers.

(b) Illustrate the rules of inference for first-order predicate logic.

(c) Describe the Bayesian classification technique with example.

4. Attempt any **TWO** of the following:- **[10x2=20]**

(a) What is unsupervised classification? Explain any two unsupervised techniques with examples.

(b) Write short notes on the following:
(i) Decision trees
(ii) Reinforced learning

(c) Discuss the expectation maximization technique with example.

5. Attempt any **TWO** of the following:- **[10x2=20]**

(a) (i) Describe statistical pattern recognition model with example.
(iii) How does principle component analysis (PCA) use for dimensionality reduction.

(b) Write short notes on the following:
(i) Nearest neighbor rule
(ii) K-means clustering

(c) Illustrate working principle of support vector machine with example.