Roll No.	
Paper Code: CS-702	

B. Tech.
SEVENTH SEMESTER EXAMINATION, 2016-2017
ARTIFICIAL INTELLIGENCE

[Time: 3 Hours] [MM: 100]

Note: Attempt ***ALL*** questions. Assume suitable data, if required. All question carry equal marks.

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

(a) Define the term artificial intelligence (AI). Briefly describe the contribution of different disciplines in the emergence of AI.
(b) What is Turing test? How does Turing test verify that a given program is an intelligent program.
(c) Consider a robot soccer player agent program. Develop a PEAS description of the task environment of this program.
(d) Write the procedure to solve 8-queens problem. Explain your answer with example.
(e) Explain goal based agent program with example.
(f) Describe the state-of-the-art applications of AI.

2. Attempt any ***FOUR*** parts of the following:- **(5x4=20)**

(a) Differentiate between uninformed search strategies with informed search strategies.
(b) Describe DFS and BFS search strategies with example and compare their performances.
(c) Explain iterative deepening search with example and evaluate its performance.
(d) Explain A* search with example and prove its optimality.
(e) Describe hill climbing search strategy.
(f) Describe the procedure to solve 4x4 puzzle problem using suitable example.

3. Attempt any ***TWO*** of the following:- **(10x2=20)**

(a) (i) Describe the rules of inference for predicate logic.
(ii) Prove the validity of the following argument using natural deduction computation procedure.
$(\forall x)(D(x) \rightarrow B(x))$ and $(\exists x)\ (A(x) \wedge D(x))$
$/\therefore (\exists x)\ (A(x) \wedge B(x))$

(b) Write short notes on the following:
(i) Probabilistic reasoning
(ii) Utility theory

(c) Explain hidden Markov model (HMM) with example.

4. Attempt any ***TWO*** of the following:- **(10x2=20)**

(a) What is machine learning? Compare between supervised learning techniques and unsupervised learning techniques.
(b) Describe Bayesian classifier technique with consideration of risk analysis.
(c) What do you understand by learning with hidden data? Explain expectation maximization algorithm in brief.

5. Attempt any ***TWO*** of the following:- **(10x2=20)**

(a) Describe the structure of a pattern recognition system. Explain statistical pattern recognition technique with example.

(b) Elaborate the following techniques in detail:
(i) Principle component analysis
(ii) Linear discriminant analysis

(c) What is the role of classifier in a pattern recognition system. Explain any two classification techniques used in supervised and unsupervised classification each.