

**Subject: ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS**

Time: 3 Hours

Max. Marks: 100

**DECEMBER 2010**

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after half an hour of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

**Q.1 Choose the correct or the best alternative in the following: (2×10)**

a. Which of the following is a heuristics based searching technique:

- (A) Breadth First Search
- (B) Depth Limited Search
- (C) Hill-Climbing
- (D) Iterative Deepening Search

b. In which of the following systems, the inferencing procedure is not applied:

- (A) Propositional Calculus
- (B) Tuple-Calculus
- (C) Predicate Calculus
- (D) Rule –Based System

c. Which of the following is not a network architecture in Neural Networks:

- (A) Hopfield
- (B) Automaton
- (C) Kohonen
- (D) Perceptron

d. Which of the following Test is used to distinguish an intelligent machine from a dumb machine:

- (A) Alan Test
- (B) Akerkar Test
- (C) Turing Test
- (D) Russel Test

e. Which of the following is not a Clausal Form:

- (A) Conjunctive Normal Form
- (B) Subjective Normal Form
- (C) Disjunctive Normal Form
- (D) Prenex Normal Form

f. Which of the following is a Structure Representation Scheme:

- (A) Frames
- (B) Semantic Networks
- (C) Conceptual Graphs
- (D) Conceptual

- g. Which of the following approaches cannot be used for product selection recommendation:
- (A) Automated Collaborative Filtering
  - (B) Knowledge based approaches
  - (C) Hybrid Approaches
  - (D) Inferencing approaches
- h. Which of the following is not a part of an Expert System:
- (A) Inference Engine
  - (B) Rule Base
  - (C) Operating System
  - (D) Memory
- i. Which of the following is not a feature of Knowledge Representation Languages:
- (A) Object-orientedness
  - (B) Generalisation / Specialization
  - (C) Classification
  - (D) Association
- j. Which of the following is not an EXPERT SYSTEM
- (A) MYCIN
  - (B) DENDRAL
  - (C) XCON
  - (D) RCON

**Answer any FIVE Questions out of EIGHT Questions.  
Each question carries 16 marks.**

- Q.2** a. Using Truth Table, Prove that  $P \Leftrightarrow Q$  is equivalent to  $(P \Rightarrow Q) \wedge (Q \Leftarrow P)$  (4)
- b. Suppose A new operator exor denoted as  $\oplus$  has been defined in the following manner:

P	Q	P exor Q
T	T	F
T	F	T
F	T	T
F	F	F

Create a propositional calculus statement using  $\vee, \wedge$  and  $\oplus$  (exor) that is equivalent to  $P \text{ exor } Q$ . (8)

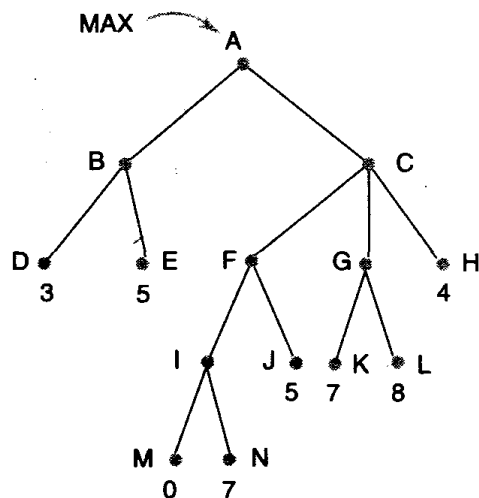
- c. Assume the following facts:  
 If it is not humid then it will rain  
 If it is humid, then it is hot.  
 It is humid now.  
 Using the propositional logic inference, answer the question, will it rain? (4)
- Q.3** a. What do you mean by Artificial Intelligence? Mention some of the characteristics of Intelligence. Also mention some of the tasks which require intelligence. (8)

- b. Explain a test which can identify whether a machine given to you is intelligent. Is there any machine which has qualified this “Intelligence Test”. Discuss. (6)

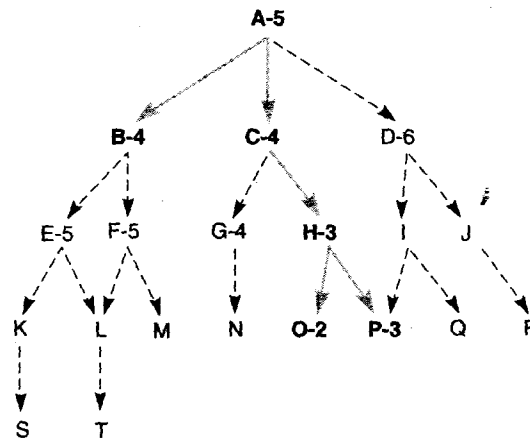
- Q.4** a. Mention four different types of representational schemes. (4)  
 b. Explain the procedure of knowledge acquisition with the help of a diagram. (8)  
 c. Create a semantic net for the following data:

Tom is a cat.  
 Tom caught a bird.  
 Tom is owned by John.  
 Tom is ginger in colour.  
 Cats like cream.  
 The cat sat on the mat.  
 A cat is a mammal.  
 A bird is an animal.  
 All mammals are animals.  
 Mammals have fur.

- Q.5** a. What do you mean by forward chaining? Explain with the help of examples taken from real-world. Can you use forward-chaining in ancestor-tree classification. why/why not? (8)  
 b. What is the basic idea behind Bayesian Network? Draw a Bayesian N/W that represent car fixing. (6)  
 c. Define Certainty Factor (CF). What does a negative CF suggest? (2)
- Q.6** a. Write the Minimax Algorithm for Game-tree searching. Perform the algorithm on the following tree. (8)



- b. Write a function for **Best-First Search** of a tree. Consider the following tree where the integers written against the node represent the value of the heuristic function for the Goal "P". Execute your function on this tree. (8)



- Q.7** a. What do you mean by Rule-based expert systems? Explain its architecture. (8)
- b. What are the guidelines to choose whether a problem is appropriate for expert system solutions? (8)
- Q.8** a. What is a neural network? Compare neural networks with Rule based methods. (8)
- b. Create an AND network with extra input neuron. (4)
- c. Create a general two-layered feed-forward network. (4)
- Q.9** Discuss the application of Artificial Intelligence in the following domains: (16)
- Online Negotiation
  - Online Auctions
  - Solving real-world problems with a focus on enhancing scalability
  - Generating Automated responses
  - Automated Bundling and pricing goods