

Code: AC74/AT74/AC123/AT123

Subject: ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS

AMIETE – CS/IT (Current & New Scheme)

Time: 3 Hours

June 2019

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

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 45 minutes 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. How to enter addition of 5+2 in LISP
 (A) 5 + 2 (B) 5 add 2
 (C) 5 + 2 = (D) (+ 5 2)
- b. The example of the intelligent agent is
 (A) Human (B) Robot
 (C) Autonomous Spacecraft (D) All of these
- c. What Alpha and beta value to be assigned in the alpha-beta pruning?
 (A) Alpha = max and Beta = min (B) Alpha = min and Beta = max
 (C) No value (D) Alpha = min & Beta = min
- d. An expert system component
 (A) inference engine (B) knowledge base
 (C) user interface (D) All of these
- e. _____ learning is known as error correction learning.
 (A) supervised (B) unsupervised
 (C) Both (A) & (B) (D) None of these
- f. Which of the following neural networks uses supervised learning?
 (i) Multilayer perceptron
 (ii) Self organizing feature map
 (iii) Hopfield network
 (A) (i) (B) (ii)
 (C) (i) and (ii) (D) (i) and (iii)
- g. Neuron can send _____ signal at a time.
 (A) multiple (B) one
 (C) none (D) any number of

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- h. Perceptron can learn
 (A) AND (B) XOR
 (C) Both (A) & (B) (D) None of these
- i. How the Fuzzy Logic is different from conventional control methods?
 (A) FOR Approach (B) WHILE Approach
 (C) Else If approach. (D) None of these
- j. A* is _____ of searching?
 (A) Linear approach (B) Random approach
 (C) Optimal approach (D) Heuristic approach

Answer any FIVE Questions out of EIGHT Questions.

Each question carries 16 marks.

- Q.2** a. What is AI? How AI helps in betterment of society? Explain why AI is beneficial even though computers cannot really think. (8)
- b. What is agent? What are the tasks of the agent in AI? Explain different types of agents with suitable diagram. (8)
- Q.3** a. Explain Knowledge Representation Reasoning (KRR) system based on Semantic network and brief the properties of KR language as well. (8)
- b. Rewrite the following propositional sentence to be in conjunctive normal form:
 $(P \rightarrow Q) \vee \neg(Q \vee \neg R)$ (8)
- Q.4** a. Represent the following sentences in first-order logic, using a consistent vocabulary (which you must define): (10)
- i. Not all students take both History and Biology.
 - ii. Only one student failed History
 - iii. Only one student failed both History and Biology.
 - iv. The best score in History was better than the best score in Biology.
 - v. Every person who dislikes all vegetarians is smart.
 - vi. No person likes a smart vegetarian.
 - vii. There is a woman who likes all men who are not vegetarians.
 - viii. There is a barber who shaves all men in town who do not shave themselves.
 - ix. No person likes a professor unless the professor is smart.
 - x. Politicians can fool some of the people all of the time, and they can fool all of the people some of the time, but they can't fool all of the people all of the time

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- b. Why knowledge acquisition is considered as most difficult step in knowledge Engineering? (6)
- Q.5** a. How an expert system gives benefits to our society? Explain in brief. (10)
- b. Sketch and solve the 8-puzzle problem from initial state 14235678 by A* search algorithm. Heuristic function for single state is given by (6)
- (i) the number of incorrectly placed tiles,
(ii) the Manhattan distance
Compare and justify the result.
- Q.6** a. Find a new application of Case-Based reasoning system on some process or problem that exists. Write software to implement it, generate some data and show it working. (10)
- b. What are the special features of conceptual dependency? (6)
- Q.7** a. What is neuron? How it works? Explain with schematic diagram from human Neurons to Artificial neurons. How neural Networks learn? (8)
- b. What is activation function and its use in Neural network. Explain at least two activation functions. (2+2+4)
- Q.8** a. Explain the applications of Backpropagation training algorithm with suitable example. (8)
- b. What are the advantages of sigmoid function as an activation function over other activation function? (8)
- Q.9** a. When you think of AI what sort of challenges come to mind? (5)
- b. Discuss about the procedure of Knowledge Acquisition. (5)
- c. Explain Hybrid Representation systems. Give any example with diagram. (6)