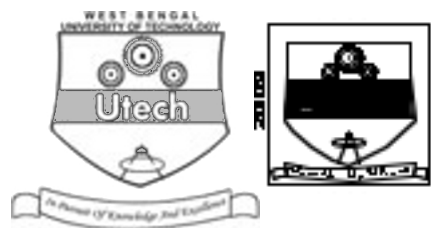


ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS (SEMESTER - 8)

CS/B.TECH(EE)/SEM-8/CS-802D/09



1.
Signature of Invigilator

2.
Signature of the Officer-in-Charge

Reg. No.

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Roll No. of the
Candidate

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CS/B.TECH(EE)/SEM-8/CS-802D/09

ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL – 2009

ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS (SEMESTER - 8)

Time : 3 Hours]

[Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
b) For **Groups – B & C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

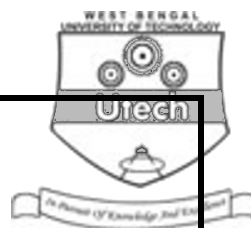
FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B					Group – C					Total Marks	Examiner's Signature
Question Number																						
Marks Obtained																						

.....
Head-Examiner/Co-Ordinator/Scrutineer

8879-D/F (27/04)



DO NOT WRITE ON THIS PAGE



ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL - 2009
ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS
SEMESTER - 8



Time : 3 Hours]

[Full Marks : 70

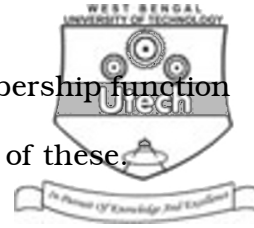
GROUP – A**(Multiple Choice Type Questions)**

1. Choose the correct answer for the following : 10 × 1 = 10
- i) Computers are better than human beings in the matter of non-numeric symbolic processing
- a) always b) sometimes
 c) never d) most of the times.
- ii) AI does not overlap with
- a) linguistics b) psychology & philosophy
 c) both (a) and (b) d) none of these.
- iii) Which of the following is appropriate ?
- a) $\forall P : (x) \rightarrow Q(x)$ is a valid wff
 b) Man (John) is a valid wff
 c) both (a) & (b) are valid wff
 d) none of (a) & (b).
- iv) Knowledge consists of
- a) concepts and procedures b) facts and rules
 c) all of these d) none of these.
- v) Find out the most appropriate representation for "Alive means not dead".
- a) $\forall x : \exists y : [\text{alive}(x, y) \rightarrow \neg \text{dead}(x, y)]$
 b) $\forall x : \forall y : [\text{alive}(x, y) \rightarrow \neg \text{dead}(x, y)]$
 c) $\forall x : \forall y : [\text{alive}(x, y) \rightarrow \neg \text{dead}(x, y)] \wedge [\neg \text{dead}(x, y) \rightarrow \text{alive}(x, y)]$
 d) $\exists x : \forall y : [\text{alive}(x, y) \rightarrow \neg \text{dead}(x, y)] \wedge [\neg \text{dead}(x, y) \rightarrow \text{alive}(x, y)]$



vi) Fuzzy Set associates

- | | |
|-------------------------|------------------------|
| a) Heuristic function | b) Membership function |
| c) Statistical function | d) none of these. |



vii) Searching techniques are used for

- a) goal node searching
- b) optimization of search space
- c) finding goal distance of the goal node from start node
- d) all of these.

viii) "P \leftrightarrow Q" can be represented by

- | | |
|---|---|
| a) $\sim P \vee Q$ | b) $\sim Q \vee P$ |
| c) $(\sim P \vee Q) \wedge (\sim Q \vee P)$ | d) $(\sim P \wedge Q) \vee (\sim Q \wedge P)$ |

ix) "Plateau" is

- a) a state that is better than all its neighbors but is not better than some other states farther away.
- b) a flat area of the search space in which a whole set of neighboring states have the same value.
- c) an area of the search space that is higher than surrounding areas and that itself has a slope (which one would like to climb).
- d) none of these.

x) The major components of neuron are

- a) Dendrites, Cell body and Axon
- b) Cell body and Axon
- c) Dendrites and Axon
- d) Frontal & temporal lobe.

**GROUP – B****(Short Answer Type Questions)**Answer any *three* of the following.

3 × 5 = 15

2. Implement a back-propagation algorithm to solve XOR problem. Is it a linearly separable problem ? 5
3. a) Write the full form of EBL. 1 + 4
 b) Briefly explain turing test with example. 1 + 4
4. a) Why is middle layer in a multi-layer neural network called a hidden layer ?
 b) What does this layer hide ?
 c) Can a neural network include more than two hidden layer ? 2 + 1 + 2
5. a) Can neural network learn without a teacher ?
 b) What is self-organizing feature map ? 2 + 3
6. a) What is the function of artificial neuron ?
 b) Draw and explain the picture of a biological neuron. 2 + 3

GROUP – C**(Long Answer Type Questions)**Answer any *three* questions.

3 × 15 = 45

7. What are the differences between rule-based search and heuristic search ? Simplify the following expression $(P \vee Q) \wedge (\sim Q \vee R)$ using Propositional Logic. Write down the Best First Search algorithm. Give one example of each of the following operators : \exists, \forall . 4 + 3 + 4 + (2 × 2)
8. a) Convert the following statement into a well-formed-formula (wff) :
 "Any person who is respected by every person is a truly respected person."
 b) Write down the difference between the following :
 i) Semantic Network Representation and Conceptual Dependency Representation
 ii) Inductive and Deductive Learning
 iii) Forward and Backward Reasoning
 c) Can a system engaged in purely numeric computation be called a non-intelligent system ? Explain with suitable arguments. 3 + 9 + 3



9. a) Discuss the MLP model for Artificial Neural Network. How does an MLP learn ?
b) How is the speed of convergence increased ?
c) What are the main problems with back-propagation learning ? 6 + 3 + 3 + 3
10. What do you mean by self-organised map ? Discuss Kohonen's self-organized learning method. 5 + 10
11. a) What is adaptive resonance theory ?
b) An ART-1 network with four input unit at three cluster units. Discuss the procedure in update the weights when the samples $V(1)$, $V(2)$, $V(3)$ and $V(4)$ are $(1, 1, 0, 0)$, $(0, 0, 1, 1)$, $(1, 0, 1, 1)$, $(0, 0, 0, 1)$. Assume the vigilance parameter as 0.3. 5 + 10

END