

CS / B.TECH (EE-NEW) / SEM-8 / EE-802C / 2011 2011

## AI AND SOFT COMPUTING

Time Allotted : 3 Hours
Full Marks : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP - A
( Multiple Choice Type Questions )

1. Choose the correct alternatives for any ten of the following :

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10 \times 1=10
$$

i) Find out the most appropriate predicate representation for "every child like to play game"
a) $\exists x:[\operatorname{CHILD}(x) \rightarrow[\forall y:[\operatorname{GAME}(y) \wedge \operatorname{LIKES}(x, y)]]]$
b) $\forall x:[\operatorname{CHILD}(x) \rightarrow[\exists y:[\operatorname{GAME}(y) \wedge \operatorname{LIKES}(x, y)]]]$
c) $\forall x:[\operatorname{CHILD}(x) \rightarrow[\forall y:[\operatorname{GAME}(y) \wedge \operatorname{LIKES}(x, y)]]]$
d) $\exists x:[\operatorname{CHILD}(x) \rightarrow[\exists y:[\operatorname{GAME}(y) \wedge \operatorname{LIKES}(x, y)]]]$.
ii) AI does not overlap with
a) linguistics
b) psychology \& philosophy
c) both (a) and (b)
d) none of these.

a) Lake
b) Foothilletrap
c) Garden
d) all of these.
iv) The form of heuristic function of $A$ * search is
a) $f^{*}(n)=g *(n) * h *(n)$
b) $f^{*}(n)=g^{*}(n)+h *(n)$
c) $\quad f^{*}(n)=g(n)+h(n)$
d) none of these.
v) Search 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.
vi) Computers are better than human beings in the matter of non-numeric symbolic processing.
a) always
b) sometimes
c) never
d) most of the time.
vii) Knowledge consists of
a) concepts and procedures
b) facts and rules
c) both (a) and (b)
d) none of these.
viii) 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.
ix) The graph of sigmoidal function is
a) V-shaped
b) S -shaped
c) step shaped
d) none of these.
x) Which characteristic is not present in ANN ?
a) Speed
b) Storage
c) Fault tolerance
d) Software dependency.
xi) Perceptron was developed by
a) Kohonen
b)
d) Frank Rosenblelt.
xii) Single layer perceptron is used for
a) linear separability
b) nonlinear separability
c) error minimization
d) annealing.
GROUP - B
( Short Answer Type Questions )

Answer any three of the following.
2. a) What is Artificial Intelligence ?
b) What are the different branches of AI ? Explain any three of them in detail.
$1+1+3$
3. Write down the most appropriate predicate logic representation of the following facts : $5 \times 1$
i) all men are mortal
ii) $\quad x$ is greater than $y$
iii) $\quad a$ is friend of $b$
iv) computer is not a mechanical device
v) adult citizen have voting right.
4. What is artificial neuron ? Describe mathematical model of a neuron. $1+4$
5. Implement a back propagation algorithm to solve XOR problem. Is it a linearly separable problem ? $1+4$
6. Explain the functioning of an MLP.

## GROUP - C

## ( Long Answer Type Questions )

Answer any three of the following. $3 \times 15=45$
7. List two distinguishing features of procedural knowledge and declarative knowledge. Distinguish between informed and uninformed search. Discuss a heuristic search algorithm. Write short notes on Fuzzy Sets and Fuzzy Logic. Write down the differences between forward and backward reasoning.

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2+1+5+2+2+3
$$

8. What do you mean by soft computing ? What is knowledge representation in AI ? Describe different types of activation functions in ANN. What is the role of hidden layer in the training process in ANN ? Distinguish between biological neural network and ANN. $2+3+4+2+4$
9. Point out any four characteristics of an AI system. Explain the characteristics. Explain the equivalence relationship in predicate logic. Give an example of equivalence relationship. Can a system engaged in purely numeric computation be called a non-intelligent system ? Explain with suitable arguments. $\quad 4+4+3+1+3$
10. a) Distinguish between supervised learning and unsupervised learning techniques.
b) How is the speed of convergence increased in Black Propagation learning technique ?
11. Write short notes on any three of the following :
a) Activation Function
b) Classification Problem
c) Kohonen's self organising map
d) Hill Climbing Search
e) Unsupervised Training
f) ART-I.
