

Registration No. :

--	--	--	--	--	--	--	--	--	--

Total number of printed pages – 2

B. Tech
PECS 5401

Seventh Semester Examination – 2011

ARTIFICIAL INTELLIGENCE

Full Marks – 70

Time : 3 - Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10
- (a) What do you understand by the term 'Artificial Intelligence' ? Give an example.
- (b) Why Hebbian net is called most primitive net ? Explain.
- (c) Mention two 'classical' dissimilarities of 'unsupervised' and 'semi-supervised' learning.
- (d) State two demerits of back propagation net.
- (e) What is 'inferential knowledge' ? Give one example.
- (f) What is 'nearest neighbor' heuristic search ? Give one example.
- (g) Why 'evolutionary techniques' are better search techniques than traditional techniques ? Give two reasons.
- (h) 'Backward representation mapping is mandatory for fact representation', why ?
- (i) What is logic programming ? Explain with one example.
- (j) What is a directed acyclic graph of semantic Baye's net ? Give an example.
2. Considering the following input dataset (X) :

No.	x1	x2	x3	x4
1.	0.21	0.51	0.32	-0.1
2.	0.34	0.42	0.4	-0.1
3.	0.29	0.61	0.7	0.65

- (a) Compute the output (assume having single neuron) with the following information : 4
- (i) Uniform weights of all the nodal connectors as 0.5

P.T.O.

- (ii) Log-sigmoidal kernel function in the hidden nodes, and
 (iii) Tan-sigmoidal function in the output node.
- (b) Compute the mean-squared error assuming the TARGET = 1.5 1
- (c) Update connector weights (for one iteration) with : 5
- (i) Learning rate = 0.25 and
 (ii) Momentum constant = 0.15.
3. (a) What is optimization ? 1
 (b) Describe the steps of Gradient descent search. 9
4. Write short notes on any **two** : 5x2
- (a) Elman neural net
 (b) A* search
 (c) Working principle of an Expert system.
5. (a) Describe the working principle of a Hopfield network. 5
 (b) State two merits and two demerits of such a net. 5
6. (a) Describe the working principle of a binary-coded GA. 5
 (b) What is schema theory ? Describe with steps. 5
7. (a) What is Semantic Baye's net ? Describe with an example. 3
 (b) For a given table of information classify the tuple **X=(age=youth, income=medium, employed=yes, credit-rating=fair)** using the concept of Naïve Baye's classifier : 7

Tuple	Age	Income	Employed	Credit-rating	Class: Buys car
1	Youth	Low	No	Fair	no
2	Middle-aged	High	No	Fair	yes
3	Senior	Low	Yes	Fair	yes
4	Youth	High	Yes	Excellent	yes
5	Senior	Low	No	Fair	no
6	Middle-aged	High	Yes	Excellent	no
7	Middle-aged	Low	No	Fair	no
8	Senior	Low	No	Excellent	yes
9	Youth	Low	Yes	Fair	yes
10	Youth	High	No	Fair	yes
11	Senior	Low	Yes	Excellent	no

8. (a) What is heuristic search ? Describe with an example. 5
 (b) Consider the following problem and decompose it using Heuristic search. 5

$$\int x^3 + 3x^2 + 2x * \sin^2 x * \cos^2 x dx$$