

## BE2-R4: ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS

### NOTE:

1. Answer question 1 and any FOUR from questions 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.

- a) Differentiate between blind search & heuristic search.
- b) What is default reasoning? Explain with example.
- c) Find the meaning of the statement  
 $(\sim PVQ) \& R \rightarrow SV(\sim R \& Q)$  for the interpretation given below:  
P is true, Q is true, R is false, S is true.
- d) Define Biological Neuron.
- e) What are the limitations of propositional logic as compared to predicate logic?
- f) What do you mean by knowledge based system?
- g) Explain Delta rule.

(7x4)

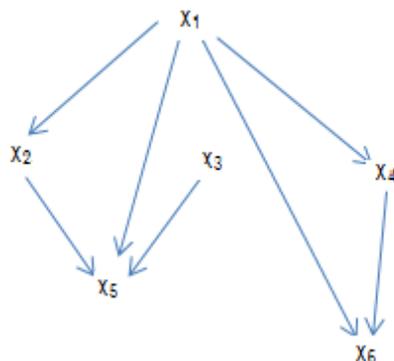
2.

- a) Consider the following sentences:
  - i) If x is on top of y, y supports x.
  - ii) If x is above y and they are touching each other, x is on top of y.
  - iii) A cup is above a book.
  - iv) A cup is touching a book.Translate the statements i) to iv) into clausal form and show that supports(book,cup) is true using resolution.
- b) Translate each of the following sentences in to Conjunctive Normal Form (CNF):
  - i)  $(P \rightarrow Q) \rightarrow R$
  - ii)  $PV(\sim P \& Q \& R)$

([8+4]+6)

3.

- a) "A\* algorithm is admissible". Write a comment on this statement.
- b) Define state space representation. What is the benefit of representing a problem using a state space?
- c) Write the joint distribution of  $x_1, x_2, x_3, x_4, x_5$  and  $x_6$  as a product of the chain conditional probabilities for the following casual network:



(7+8+3)

- 4.**
- a) Write a PROLOG program to concatenate two given lists.
  - b) Discuss two situations when both Hill climbing and Steepest ascent Hill climbing may fail to find a solution.
  - c) Differentiate between Formal Task and Expert Task.

**(6+8+4)**

- 5.**
- a) When would Best first search be worse than simple breadth first search? Explain with example.
  - b) Write the conceptual dependency representation for the following sentences:
    - i) John pushed the bicycle.
    - ii) Ram gave a book to Sita.
  - c) What is the output of the following lisp program statement:-  
->(cadadr'(a(b c)d))

**(8+8+2)**

- 6.**
- a) What are the main differences between scripts and frame structures? Explain with example.
  - b) What is context free grammar?
  - c) Define Fuzzy Logic.

**(10+4+4)**

- 7.**
- a) Discuss architecture of Artificial Neural Network.
  - b) Explain Back propagation Learning.

**(9+9)**