1. a) What is artificial intelligence? What are the goals?
b) Why Prolog is declarative language?
c) What is state space search? Give some example.
d) What is the difference between crisp and fuzzy logic?
e) Why game tree is called an AND-OR tree?
f) Define Biological Neuron.
g) What type of problems are solvable by soft computing?

2. a) What are the advantages and disadvantages of BFS and DFS?
b) Why DFS and BFS are called blind search method?
c) Apply A on the following graph. Find the solution path from the source node s to the goal node r.

3. a) Explain fuzzy membership function. How to design fuzzy rule base system?
b) What is Constant Satisfaction Problem?
c) What is N-Queens Problem? Find the solution for 4-Queens problem by back tracking with explanation of each step.
4.  
   a) 2 Jugs of capacity 8 and 5 Ltr. with no markings. Problem is to measure out exactly 4 Ltr. from a Jug containing 20 Ltr. or more water 
   Possible operations are: - 
      i) Filling of a Jug to its capacity. (fill) 
      ii) Emptying the Jug into the other Jug. (empty) 
      iii) Transfer the content of one Jug to the other until the other Jug is filled to its capacity or the pouring Jug becomes empty. 
      (8+10) 

5.  
   a) Define Artificial Neural Network. What is stability-plasticity dilemma of a neural network? 
   b) Describe a structure of an artificial neuron network. 
   c) Explain activation function of ANIX.  
      (6+6+6) 

6.  
   a) Explain Back Propagation Learning of ANN. 
   b) Explain Kohonen Network. 
   c) Differentiate between Supervised and Non-Supervised Learning.  
      (6+6+6) 

7.  
   a) Given fact clauses 
      parent(tom,bob) 
      parent(pam,bob) 
      parent(tom,lif) 
      parent(bob,ann) 
      parent(bob,pat) 
      parent(pat,jim) 
      male(tom) 
      male(bob) 
      female(lif) 
      female(ann) 
      female(pat) 
      female(jim) 
   Write a rule clause to find who is the sister of whom? 
   b) Explain how cut and fail predicates are used in PROLOG to change the execution of program. 
   c) What do you mean by unification in PROLOG? Explain with an example. 
   d) Write a PROLOG program to implement factorial of a number.  
      (4+6+4+4)