PRACTICE PAPER 3

Artificial Intelligence

Paper / Subject Code: 48893

Time: 3 hours **Max. Marks: 80**

Note: (1) Question 1 is compulsory.
(2) Answer any three out of remaining questions.
(3) Assume suitable data where required.

Q. 1 - Solve any 4 [20 marks]

a) Describe an Intelligent Agent with a neat diagram. **[05]**

b) Write the Environment properties of the Pacman Game. **[05]**

c) Write first order statements for: (i) Every dolphin is Mammal (ii) No purple mushroom is poisonous (iii) Every gardener loves sun. **[05]**

d) What are the different types of learning in AI? **[05]**

e) Write a Prolog program to calculate Fibonacci of a given number. **[05]**

Q. 2 [20 marks]

a) Represent each of the following sentences in first-order logic:
(i) Every student smiles.
(ii) No one talks.
(iii) At least one student failed History.
(iv) Every person who buys an insurance policy is smart.
(v) No person buys an expensive policy. **[10]**

b) Explain the steps involved in converting propositional logic statement into CNF (Conjunctive Normal Form) with suitable example. **[10]**

Q. 3 [20 marks]

a) Define the initial and goal state of three missionaries and cannibals problem. Describe the set of operators using if-then rules. Draw the entire state space graph (include only legal states). State best searching algorithm for it. **[10]**

b) What do you understand by MinMax Search and Alpha Beta Search? Explain in detail with example. **[10]**

Q. 4 [20 marks]

a) Consider the following statements:
(a) Prakash likes all kind of food.
(b) Mango and Fish are food.
(c) Anything anyone eats and is not killed is food.

(d) Jay eats peanuts and still alive.
(e) Meena eats everything that Jay eats.

Prove that "Prakash likes Peanuts" using Resolution. **[10]**

b) Explain various methods of knowledge representation techniques in AI. **[10]**

Q. 5 [20 marks]

a) Epidemiologists claim that the probability of breast cancer among Caucasian women in their mid-50s is 0.005. A new mammography test has a probability of 0.85 for detecting cancer correctly. In women without breast cancer, it has a chance of 0.925 for a negative result. If a 55-year-old Caucasian woman tests positive for breast cancer, what is the probability that she, in fact, has breast cancer? **[10]**

b) Explain Reinforcement Learning with example. Discuss reward, policy, and value function. **[10]**

Q. 6 [20 marks]

a) Explain Learning agent with diagram. How is it different from Goal based agent? **[10]**

b) Explain Total Order Planning and Partial Order Planning in detail with examples. Compare both approaches. **[10]**
