Total No. of Questions : 12]

SEAT No. :

P2015

[Total No. of Pages : 4

[4759] -189

B.E. (Information Technology)

ARTIFICIAL INTELLIGENCE

(2008 Course) (Elective - I) (Semester - I) (414443)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate sheet.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of logarithmic tables, slide rules and electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

SECTION - I

Q1) a) Explain Turing test. Machine can be made intelligent artificially but ultimately human make the machines. So who is more intelligent -the artificial machine or the person? Discuss. **[8]**

b) Differentiate between an agent and an object. List down the characteristics of intelligent agent. **[8]**

OR

Q2) a) Explain Minimax search procedure with suitable example. **[8]**

b) What is Swarm Intelligent? Where swarm intelligence is used? **[8]**

Q3) a) Explain production systems with the help of 8-puzzle example. **[8]**

b) In a crypto-arithmetic puzzle, the variable A,B,C,D, E and F can take values from 1 to 7. The variables must all be different and, when taken as digits, they must satisfy the following sum. Solve the following problem as CSP:- **[8]**

AB +CD = EF

OR

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Q4) a) What is meaning of word heuristics in the context of search strategies? What conditions on A* search is required to guarantee completeness and optimality. **[8]**

b) What are the problems that may arise in hill climbing searching? How they can be handled? Explain. **[8]**

Q5) a) Explain with Example, how first order logic sentences are converted into conjunctive normal form (CNF). **[6]**

b) Discuss with examples the scope and limitations of knowledge representation using Propositional logic and First Order Predicate logic. **[6]**

c) Prove that "sarthak is happy" with the help of following facts expressed in CNF. **[6]**

¬pass (X, history) V ¬ win(X,lottery) V happy (X)

¬study (X) V pass (Y,Z)¬lucky (W) V pass (W,U)

¬study(sarthak) lucky (sarthak)

¬lucky (U) V win (U,lottery)

OR

Q6) a) What do you understand by unification in Predicate logic? Give an example to illustrate. **[6]**

b) Express the following sentences in predicate logic formulae. **[6]**

i) Fragile things break if they fall

ii) Tennis balls are not fragile

iii) Tennis balls don't break if they fall.

c) Draw a conceptual dependency graph for the sentence "A dog is greedily eating a bone". **[6]**

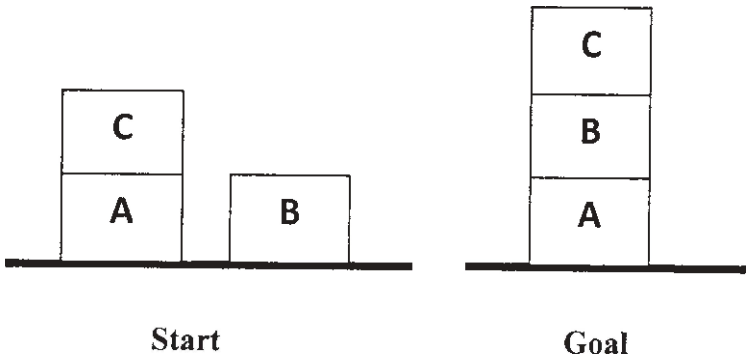
SECTION - II

Q7) a) Explain how vision is used for manipulation and navigation. Give suitable examples to justify your answer. **[9]**

b) What is planning? Explain the main components of a planning system. **[9]**

OR

Q8) a) Consider the following block world problem where we wish to proceed from the *start to goal* state. **[9]**



Describe the *start* and *goal* states for the above problem using STRIPS types of the operator. Also specify the precondition of the first operator used for solving the first goal of the goal stack planning.

b) Write short notes on (ANY TWO). **[9]**

i) Image formation

ii) Object Recognition

iii) Hierarchical planning

iv) Extracting 3D information

Q9) a) Explain the basic components of expert system. How can we make expert system knowledge base reusable? **[8]**

b) What is a Hopfield Network? How is it used in learning a network? **[8]**

OR

Q10)a) Give a simple mathematical model for a neuron. What are the two choices for activation function? **[8]**

b) Describe in detail the steps involved in the knowledge Engineering process. **[8]**

Q11)a) Explain the structure of Prolog program. Also write the features of Prolog language? **[8]**

b) Write brief notes on following with respect to prolog. **[8]**

i) Cuts

ii) Recursion

OR

Q12)a) Explain the data types in prolog programming language also write the areas in which prolog programming language is used. **[8]**

b) Write brief notes on following. (ANY TWO). **[8]**

i) Genetic Algorithms.

ii) Distributed AI.

iii) Backtracking In Prolog.

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