



**SF-7813**

**B. E. - IV (Sem. VIII) (I.T.) Examination**

**May / June - 2011**

**Artificial Intelligence**

Time : 3 Hours]

[Total Marks : 100

**Instructions :**

(1)

नीचे दृष्टावेक निशानीवाणी विगतो उत्तरवही पर अवश्य कभवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E. - 4 (SEM. 8) (I.T.)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="ARTIFICIAL INTELLIGENCE"/>	<input type="text"/>
Subject Code No. : <input type="text" value="7"/> <input type="text" value="8"/> <input type="text" value="1"/> <input type="text" value="3"/>	Section No. (1, 2,.....) : <input type="text" value="1&amp;2"/>
Student's Signature	

- (2) Answer briefly and to the point.
- (3) Draw diagrams wherever required.
- (4) Make suitable assumptions wherever necessary.

### SECTION - I

- 1 (a) Define the following terms : 10
  - (i) Artificial Intelligence
  - (ii) Game Tree
  - (iii) Ridge
  - (iv) Beta cut-off
  - (v) Backtracking
  
- (b) Convert the following statements into first order predicate logic. 10
  - (i) Artificial Intelligence is a subject. Dancing is not a subject.
  - (ii) Some subjects are easy.
  - (iii) Not all subjects are easy.
  - (iv) Steve is a student. Steve likes easy subjects.
  - (v) Some subjects are liked by all students.

- 2 (a) Consider the following Cryptarithmic Problem : 10

```

  C R O S S
+ R O A D S
-----
  D A N G E R

```

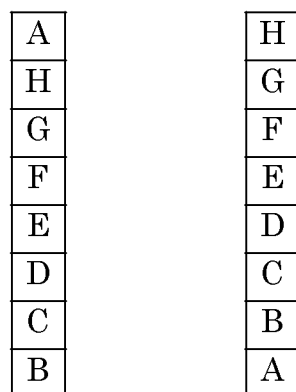
Assign a decimal digit to each of the letters in such a way that the answer to the problem is correct. If the same letter occurs more than once, it must be assigned the same digit each time. No two different letters may be assigned the same digit.

Use the constraints satisfaction procedure to solve the problem, and clearly justify your choice of constraints at every step.

OR

- (a) Consider the situation of 'Fig. A' as the initial state 10  
 in a typical blocks-world problem. The goal state is shown in 'Fig. B'. Devise an appropriate heuristic based on the hill-climbing strategy for the blocks-world problem and change the state of blocks from initial to goal state. (The available operators are: (i) pick up a block and put it on the table; (ii) pick up a block and put it on another block).

Show the evaluation of your heuristic function at each step.



Initial state  
Fig. A

Goal state  
Fig. B

- (b) State differences between Best First Search and 5  
 Depth First Search.

- 3 (a) With the help of a neat diagram and an example, explain the difference between Fuzzy and Conventional Set membership. 7

OR

- (a) Write the steps for converting an arbitrary “wff” into a clause form with suitable example. 7
- (b) Write the algorithm for Steepest Ascent hill climbing and explain how is it different from Simple hill climbing. 8

## SECTION - II

- 4 (a) State with reason whether the following pairs of expressions are Unifiable or not. Show the most general unifier for each unifiable pair. 10
- (i)  $P(x)$  and  $P(x,y)$
  - (ii)  $P(x,y)$  and  $Q(x,y)$
  - (iii)  $P(x,x,y)$  and  $P(y,y,z)$
  - (iv)  $P(y)$  and  $P(f(y))$
  - (v)  $Q(x,z)$  and  $Q(z,f(x))$
- (b) Do as directed : 10
- (i) Derive a suitable heuristic for the “Travelling Salesman Problem”.
  - (ii) Explain the requirements of a good “Control Strategy”.
- 5 (a) Explain the major components of an Expert System. Explain the major problems facing Expert Systems. 8

OR

- (a) Write the A\* Algorithm and explain it with suitable example. 8
- (b) In order to decide a heuristic strategy for solving a problem, which are the seven important Problem Characteristics that should be analyzed ? Analyze the well known “Travelling Salesman Problem” based on these characteristics. 7

**6** Write short notes on : (any **three**)

**15**

- (i) Natural Language Processing
  - (ii) Applications of Bayesian Networks
  - (iii) Contribution of A.I. to Entertainment Industry
  - (iv) Approaches to Knowledge Representation
  - (v) D-Separation.
-