2016/ODD/08/24/MCS–703 (C)/ MS–103 (C)/595

PG Odd Semester (CBCS) Exam., December—2016

COMPUTER SCIENCE

(7th Semester/1st Semester)

Course No. : MCS–703 (C)/MS–103 (C)

(Artificial Intelligence)

Full Marks : 75

Pass Marks : 30 (CBCS Old)/26 (Old)

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, selecting **one** from each Unit

UNIT—I

1. *(a)* Briefly describe the following : 4+4=8

(i) Artificial intelligence

(ii) Control strategies

(b) Briefly describe how AI approaches can be applied to solve the problems in natural language processing. 7

2. *(a)* What is a production rule? List the components of production system. 2+3=5

(b) Three missionaries and three cannibals come to a river. There is a boat on their side of the river that can be used by either 1 or 2 person(s). The problem is to figure out how to use this boat to cross the river in such a way that the cannibals never outnumber the missionaries on either side of the river. Formulate this problem as a search problem : 10

(i) Specify the form of state description, the initial state and the goal state for this problem. Determine how many states are in the state-space.

(ii) Draw the entire state-space graph (include only legal states, where the cannibals do not outnumber missionaries on either side of the river).

UNIT—II

3. *(a)* How does hill climbing ensure greedy local search? What are the problems of hill-climbing technique? 2+3=5

(b) With suitable example, describe the *A* algorithm. 10

4. *(a)* With suitable example, describe the advantages of heuristic search over the traditional search methods. 5

(b) Suppose you have several heuristic functions for a problem. Can you use them to produce a better heuristic? How? 4

(c) Write brief notes on the following : 3+3=6

(i) Problem reduction

(ii) Depth first search technique

UNIT—III

5. *(a)* Describe propositional and predicate logic as knowledge representation schemes. Give suitable examples. 9

(b) Define the following inference rules : 3+3=6

(i) Modus ponens

(ii) Modus tollens

6. *(a)* Assume the following facts :

- Steve only likes easy courses
- Science courses are hard
- All the courses in the basket-weaving department are easy
- BK301 is a basket-weaving course

Use resolution to answer the question—"what course would Steve like?" 7

(b) Write and explain the resolution algorithm for predicate logic. 8

UNIT—IV

7. Discuss in detail the general features, characteristics and architecture of expert systems. 15

8. Describe the following in brief : 5+5+5=15

(a) Rule-based expert systems

(b) Knowledge engineering process

(c) Knowledge acquisition

UNIT—V

9. Write brief notes on the following : 9+6=15

(a) Logic programming languages

(b) Recursion in PROLOG

10. Write a prolog program—

(a) to check wheather a given list is palindrome or not;

(b) for pre-order, in-order and post-order traversal of binary trees. 3+12=15

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