3 (Sem–6/CBCS) CSC HC 1

2022

COMPUTER SCIENCE

(Honours)

Paper : CSC–HC–6016

(Artificial Intelligence)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions as directed : ***(any seven)*** 1×7=7

   (a) Which of the following is not an application of artificial intelligence ?

   (i) Robotics

   (ii) Computer vision

   (iii) Database management system

   (iv) Natural language processing

   (Choose the correct option)

Contd.

(b) _____ is an informed search algorithm. *(Fill in the blank)*

(c) _____ is an heuristic search algorithm. (Fill in the blank)

(d) The correct way to solve a problem of state-space search is

(i) forward from the initial state

(ii) backward from the goal state

(iii) Both *(i)* and *(ii)*

(iv) None of the above

(Choose the correct option)

(e) AI agents are composed of

(i) architecture

(ii) program

(iii) Both *(i)* and *(ii)*

(iv) None of the above

(Choose the correct option)

(f) Knowledge in AI can be represented as

(i) predicate logic

(ii) propositional logic

(iii) Both *(i)* and *(ii)*

(iv) None of the above

(Choose the correct option)

(g) State space in AI is

(i) a specific problem state

(ii) collection of all problem states

(iii) initial state and goal state

(iv) None of the above

(Choose the correct option)

(h) First order logic for the statement 'for every x, if x is a scientist, then x is intelligent' is

(i) $\forall$ a scientist (x) scholar (x)

(ii) $\exists$ a scientist (x) scholar (x)

(iii) All of the above

(iv) None of the above

(Choose the correct option)

(i) In first order logic, $\exists x \forall y$ is not similar to $\forall y \exists x$. *(State True **or** False)*

(j) In first order logic, $\exists x \exists y$ is not similar to $\exists y \exists x$. *(State True **or** False)*

2. Define the following terms : ***(any four)*** 2×4=8

(a) Intelligent agent

(b) Heuristic search

(c) Frames

(d) Quantifier

(e) Default reasoning

(f) Path cost

(g) Goal state

(h) Parsing

3. Answer ***any three*** of the following questions : 5×3=15

(a) What are the capabilities, computer should possess to pass Turing test ?

(b) List down the characteristics of intelligent agent.

(c) What are the categories of intelligent agents ? Describe briefly.

(d) What are the advantages of breadth-first search ?

(e) Define constraint satisfaction problem with the help of an example.

(f) Give brief introduction of basic elements of first-order predicate logic.

(g) Assume the following facts :

- Diganta only likes easy courses
- Computer Science courses are hard
- All the courses in the History department are easy
- HIS301 is a history course

Use resolution to answer the question, 'What course should Diganta like ?'

(h) What is probabilistic reasoning ? Explain.

4. Answer ***any three*** of the following questions : 10×3=30

(a) Explain the rational agent approach of AI.

(b) What is production system ? Write down the features of production system in artificial intelligence.

(c) Write A^* algorithm and discuss briefly the advantages and disadvantages of it.

(d) What are the problems encountered during hill climbing and what are the ways available to deal with these problems ?

(e) What is meant by means-ends analysis ? Explain alpha-beta pruning. 4+6=10

(f) Write a prolog program to implement two predicates evenlength (List) and oddlength (List) so that they are true if their argument is a list of even or odd length respectively.

(g) Define natural language processing. Briefly explain top-down and bottom-up parsing.
