

Department of CSIT

MCA Semester: III, Year:2015 Paper Title: Artificial Intelligence and Expert Systems Max Marks: 60

Section A: (All 10 questions are compulsory)

10X2=20

Model Answers:

Note Pl. see Lecture notes LN ([http://www.ggu.ac.in/CSIT\\_LectureNotes14-15.html](http://www.ggu.ac.in/CSIT_LectureNotes14-15.html)) for details. These are expected answers.

**Very Short Answer Questions:** Write very short answers to following questions. Please attempt questions of Section A, together and write proper question number for each answer.

1. What are intelligent agents?

IN our social life, agent is a person who can manage our work on our instructions. The agent which works intelligently (software or hardware) with minimum damage but maximum output is called intelligent agent. (Can draw figure with action, percept, environment and action)

2. What was the aim of Turing test towards understanding intelligence?

If someone speaks at one end of a wall (behind a room) and asks a question, he/she receives answer from the other side of the wall, the person ca not know whether the answer was from a person or a machine this situation is tested using a Turing machine devised by A. Turing in 1950.

3. Write in brief about a state space search.

State space refers to a set of states (moves) to solve a problem. Like in a tic tack toe game, various moves are required to finally decide a game. The state space search is looking for a best search which could produce best result.

4. What is the role of a heuristic function in a Best First Search?

In a Best first search, heuristic is to take a parameter which can decide direction for the next state. A straight line distance to destination is used to represent the heuristic function in a Best first search. Based on this heuristic, the complete path is travelled to destination.

5. Convert into predicate logic: (a) No mortal lives more than 150 years (b) If someone dies then he is dead at all later times.

See Page 56-57 of LN.

6. Convert into clause form (i)  $\neg(a \wedge b)$  (ii)  $A \rightarrow B$

(i)  $\neg(a \wedge b) = \neg a \vee \neg b$

(ii)  $A \rightarrow B = \neg A \vee B$

7. Draw k-nn figure with values of k=1 and 5.

Draw figures with one and five nearest neighbors of the test pattern class respectively.

8. What is a semantic net?

See Page 72-75 of LN.

9. Write in brief about any two advantages of an expert system.

See Page 91 of LN.

10. What is an inference engine?

An inference engine provides an inference (conclusion / decision) about some question. It is made of rules using fuzzy, neural and other similar techniques which can work under uncertainties. It is a component of expert system.

**Section B: (Attempt any 4 questions out of 7 questions)**

**4X10=40**

**Descriptive Questions:**

1. Describe the term knowledge representation with various tools used to represent knowledge.

Knowledge is a very vague term and highly difficult to express. The whole effort of AI is to represent knowledge using different approaches. Production rules, semantic networks, propositional and predicate logic are some of the common approaches. The knowledge representation means show we can express our purpose (task) to a machine. The sentences need to be standardized. Write briefs about topics in Page 44-76 of LN.

2. Describe a water jug problem, its production rules and solution.

See Page 20-22 of LN.

3. Discuss the Best first search with example of cities network of your choice.

Refer page 32-33 of LN or take any problem of your choice.

4. What do you mean by resolution? What is a clause form? Write with example how you will convert a predicate and propositional logic sentence to clause form.

See Page 59-69 of LN.

5. Explain k-means algorithm with example.

See Page 87-88 of LN.

6. Discuss expert systems with their importance.

See Page 89-94 of LN.

7. Given sentences (a) Marcus was a man (b) Marcus was a Pompeian (c) All Pompeians were Romans (d) Caesar was a ruler (e) All Romans were either loyal to Caesar or hated him (f) Everyone is loyal to someone (g) People only try to assassinate rulers they are not loyal to (h) Marcus tried to assassinate Caesar. Prove using resolution that Marcus hated Caesar.

See Page 68-69 of LN.