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Total Number of Pages: 03

B.Tech  
PCS3D001

3<sup>rd</sup> Semester Regular/Back Examination 2017-18

Artificial Intelligence

BRANCH: CSE

Time: 3 Hours

Max Marks: 100

Q.CODE: B1212

Answer Question No.1 and 2 which are compulsory and any four from the rest.

The figures in the right hand margin indicate marks.

**Q1** Answer the following questions: *multiple type or dash fill up type* (2 x 10)

a) The first view of AI is about duplicating what the human brain does is\_\_\_\_\_.

- i. Cognitive science
- ii. Simulation
- iii. Emulation
- iv. Reasoning

- a) Only i
- b) Both i & ii
- c) iii & iv
- d) i, ii, iii & iv

b) The second view of AI is about duplicating what human brain should do is doing things\_\_\_\_\_.

- i. Cognitive science
- ii. Simulation
- iii. Rationally
- iv. Reasoning

- a) Only i
- b) Both i & ii
- c) Only iii
- d) Both iii & iv

c) \_\_\_\_\_ networks were used to stimulate brain functioning.

d) A\* algorithm is based on

- a) Breadth-First-Search
- b) Depth-First –Search
- c) Best-First-Search
- d) Hill climbing.

e) What are taken into account of state-space search?

- a) Postconditions
- b) Preconditions
- c) Effects
- d) Both b & c

f) Which form is called as conjunction of disjunction of literals?

- a) Conjunctive normal form
- b) Disjunctive normal form
- c) Normal form
- d) All of the mentioned

g) What is probability density function?

- a) Probability distributions
- b) Continuous variable
- c) Discrete variable
- d) Probability distributions for Continuous variables

- h) The room temperature is hot. Here the hot (use of linguistic variable is used) can be represented by \_\_\_\_\_ .
- Fuzzy Set
  - Crisp Set
  - both a and b
  - none of the above
- i) Which of the following is the model used for learning?
- Decision trees
  - Neural networks
  - Propositional and FOL rules
  - All of the mentioned
- j) Morphological Segmentation
- Does Discourse Analysis
  - Separate words into individual morphemes and identify the class of the morphemes
  - Is an extension of propositional logic
  - None of the mentioned

**Q2 Answer the following questions: Short answer type (2 x 10)**

- Differentiate forward chaining and backward chaining.
- Mention the criteria for the evaluation of search strategy. List the various search strategies.
- Define Depth First Search (DFS). Write the drawbacks of DFS.
- Define the term procedural knowledge. State any one application where procedural knowledge be used.
- Find the property of the Proposition  $((A \rightarrow B) \wedge (A \wedge \neg B))$ ?
- Write the conceptual dependency structure for the statement "Rajni is eating her soup with a spoon"
- Differentiate Supervised and Unsupervised learning.
- What are the different types of planning?
- List any two NLP systems.
- List the characteristic features of an expert system.

**Q3 a) Represent the following sentences in FOPL (10)**

- Some students took French in spring 2010.
- Every student who takes French passes it.
- Only one student took Greek in spring 2010.
- The best score in Greek is always higher than the best score in French.
- Every person who buys a policy is smart.

- b) Verify each of the following pairs of equivalent formulas by transforming formulas on both sides into the same normal form. (5)

$$i) (A \rightarrow B) \rightarrow (A \wedge B) = (\neg A \rightarrow B) \wedge (B \rightarrow A)$$

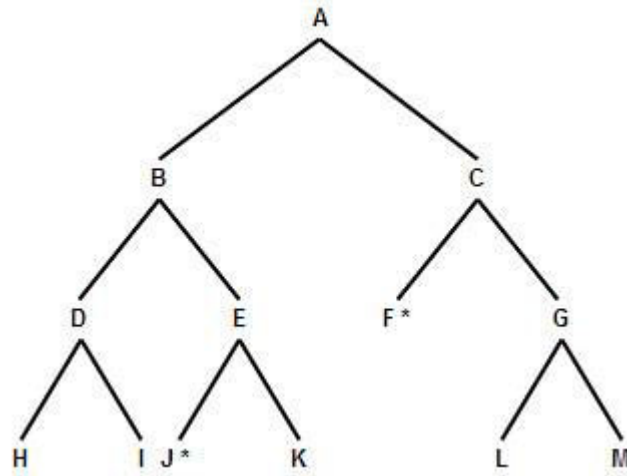
$$ii) A \wedge B \wedge (\neg A \vee \neg B) = \neg A \wedge \neg B \wedge (A \vee B)$$

- Q4 a) Explain any two Informed Search strategies. (10)**  
**b) Discuss about Constraint satisfaction problem. (5)**

**Q5 a) Express the following concepts as Semantic nets structure with interconnected nodes and labelled arcs. (10)**

"Company XYZ is a software development company. Three departments within the company are Sales, Administration and programming. Ram is the manager of programming department. Mohan and Shyam are programmers. Shyam is married to Leela. Leela is an editor of weekly news magazine. They have two children and they live in Delhi. Leela wears glasses and is very tall."

- b) For the search tree given below, use depth-first search and list the elements of the queue just before selecting and expanding each next state until a goal node is reached. (Goal node designated with \*) (5)



- Q6** a) Explain the concept of planning with state space search using suitable example. (10)  
b) Explain Min-Max Algorithm and Alpha-Beta pruning. (5)
- Q7** a) Explain the use of planning graph in providing better heuristic estimation with suitable example. (10)  
b) Discuss in detail the syntactic analysis (PARSING). (5)
- Q8** a) Give the advantages of expert system architecture based on decision tree over those of production rules. What are the main disadvantages? (10)  
b) Explain the Chomsky's Hierarchy of Languages with suitable example. (5)
- Q9** a) Explain with an example learning in decision trees. (10)  
b) Describe multilayer feed-forward networks. (5)