Paper / Subject Code: 90911 / Information Tech.: Applied Artificial Intelligencee (R-2020)

(Time: $2\frac{1}{2}$ hours)

[Total Marks: 60]

N. B.: (1) **All** questions are **compulsory**.
(2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
(3) Answers to the **same question** must be **written together**.
(4) Numbers to the **right** indicate **marks**.
(5) Draw **neat labeled diagrams** wherever **necessary**.
(6) Use of **Non-programmable** calculator is **allowed**.

1. Attempt *any two* of the following: 12

a. What is expert system? Explain the architecture of expert system in detail.
b. What is blackboard system? Explain the architecture of blackboard system in detail.
c. Explain Truth Maintenance System in detail.
d. Explain application areas of expert system in detail.

2. Attempt *any two* of the following: 12

a. What is Bayes' Theorem? Explain it with example.
b. Explain the concept of cumulative probability. Explain OR-combination with the help of example.
c. Given U = {1,2,3,4,5,6,7,8,9}, A= {(2,0.6), (3,1), (6,0.5), (8,0.2)} and B= {(3,0.6), (7,0.2), (8,0.4)}, determine complement of A, intersection of A and B.
d. What is membership function of fuzzy set? Explain different types of membership functions of fuzzy sets with diagram and mathematical function.

3. Attempt *any two* of the following: 12

a. Discuss various basic learning methods in detail.
b. What is clustering? Explain different types of clustering methods in detail.
c. Explain Single-layer and multi-layer feed-forward network.
d. Explain design issues of Artificial Neural Networks.

4. Attempt *any two* of the following: 12

a. Explain the pseudo code for Basic Genetic Algorithm.
b. Explain the concept of Swarm Intelligence. Explain the following Swarm Intelligence algorithms in detail.
   i. Ant Colony Optimization
   ii. Particle Swarm Optimization
c. What is Intelligent Agent? Differentiate between Single-Agent and Multi-Agent system.
d. Explain working cycle of intelligent agent.

5. Attempt *any two* of the following: 12

a. What is Conceptual Dependency theory? Explain various conceptual primitive actions with the help of the examples.
b. Develop Conceptual Dependency (CD) representations for the following sentences.
   i. John took the book
   ii. John took the book from Mary.
   iii. John ate the ice-cream with a spoon
c. What is parsing in Natural Language Processing? Explain top-down and bottom-up parsing in detail with examples.
d. Explain link parser and chart parser in detail.

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