

BE sem VII / IT / C-scheme / NOV 25 / 10.11.25

qp code - 84098
(MAX. MARKS : 80)

(03 HOURS)

1/1

- Note:** 1. Question No. 1 is compulsory.
2. Attempt **any three** questions out of remaining **five** questions.
3. Assume suitable data wherever necessary.
4. Figures to right indicate full marks.

- Q.1 Answer the following (Any four)
- Describe the role of utility and expected utility in decision theory with example. 05
 - Discuss the limitations of deterministic approaches and how probabilistic reasoning addresses these limitations with example. 05
 - How does Bayes Theorem determines the probability of an event with uncertain knowledge? Give one example of it 05
 - Compare between ANN and RNN. 05
 - Explain Markov Decision Process Model (MDP). List two applications of it 05
 - A medical test for a disease is 99% accurate (i.e., it gives correct results 99% of the time). The disease is rare and affects 1 in 10,000 people. Use **Bayes' Theorem** to calculate the probability that a person who tests positive actually has the disease. Interpret your result. 05
- Q.2
- List Design Principles' of Cognitive system and justify the role of NLP in enabling adaptability, contextual understanding, and user interaction within cognitive architectures. 10
 - Explain the role of representing knowledge in taxonomies and ontologies, and how advanced analytics can be applied to cognitive systems. 10
- Q.3
- Explain different types of membership functions used in fuzzy logic with suitable examples. Differentiate between crisp sets and fuzzy sets in terms of their structure, interpretation, and applicability in real-world scenarios. 10
 - Using Mamdani fuzzy model design a fuzzy model controller to determine the wash time of domestic washing machine. Assume the inputs are dirt & grease on cloths. Use three descriptors for each input variable & five descriptors for output variables. Derive necessary membership functions & required fuzzy rules for the application. 10
- Q.4
- Explain Architecture of CNN in detail. List any two applications of it 10
 - What are all the objective of using LSTM? Explain its architecture. 10
- Q.5
- Explain any 4 Metrics for evaluating classifier performance. Discuss on Hold out method and random sampling. 10
 - How Bagging and Boosting handle bias-variance trade-off differently, and analyze their effectiveness in dealing with noisy data and overfitting. Explain with algorithmic such as Random Forest and AdaBoost." 10
- Q.6
- Explain the role of machine learning in multimodal applications. Discuss how different data modalities (text, audio, image, and video) are integrated to improve the performance and user experience of these systems with real time applications. 10
 - Explain Metrics for Evaluating Classifier Performance. 10