

Time: 3 Hours

Marks: 80

(11)

N.B.: 1) Question No. 1 is compulsory.**2) Answer any three out of remaining questions.****3) Assume suitable data if necessary.****4) Figures to the right indicate full marks.**

- Q1. (a) Explain why AI is considered a multifaceted discipline. Provide examples from different domains. (5)
- Q1. (b) Demonstrate how conversational AI can assist in patient engagement and monitoring in digital health systems. (5)
- Q1. (c) What are the key stages in the AI/ML model development workflow? (5)
- Q1. (d) Explain the concepts of personalized medicine and connected medicine. (5)
- Q2. (a) Define Knowledge Discovery in Databases (KDD) and explain how it relates to Data Mining and Machine Learning. (10)
- Q2. (b) Critically discuss the ethical concerns related to the use of Artificial Intelligence, particularly in sensitive fields like healthcare and finance. How can bias in models be identified and mitigated? (10)
- Q3. (a) Explain Ensemble Learning and how does it differ from Multi-classifier Decision Fusion? (10)
- Q3. (b) How can AI techniques be applied in drug discovery and follow-up care? Give a real-world healthcare use case. (10)
- Q4. (a) List and briefly explain the NLP methods commonly used in healthcare data analysis. (10)
- Q4. (b) Discuss dimensionality reduction techniques used to handle high-dimensional medical data? (10)
- Q5. (a) An AI-based diagnostic tool is tested to detect COVID-19 in patients. A dataset of 120 patients is used for testing, and the confusion matrix is given below:

Table 1: Confusion Matrix

	Predicted Positive	Predicted Negative
Actual Positive	50	10
Actual Negative	15	45

Based on this confusion matrix, define and calculate the following:

Accuracy, Precision, Recall (Sensitivity), F1-score (10)

- Q5. (b) Explain the concept of guided search for disease information in iPHR systems. Why is it important for patients? (10)

Q6. Explain any Two: (20)

- Blockchain in healthcare
- Genetic Algorithm
- Augmented Reality (AR)
- Deep Learning