17-06-2026 BE SEM-VII C SCHEME (H/M) AIML IN HEALTHCARE QP CODE: 20011949

(Time: 3 Hours) **[Total Marks: 80]**

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 key stages in the AI/ML model development workflow? **(05)**
Q1. (b) What is evidence-based medicine, and how can AI and ML enhance its effectiveness? **(05)**
Q1. (c) Differentiate between model parameters and hyperparameters. How does each influence the performance of prediction models in healthcare applications? **(05)**
Q1. (d) Write a short note on "Multi classifier Decision fusion". **(05)**

Q2. (a) Illustrate with examples how AI is applied in healthcare for prediction, diagnosis, and personalized treatment. **(10)**
Q2. (b) 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) List and briefly explain the NLP methods commonly used in healthcare data analysis. **(10)**
Q3. (b) Explain the concept of guided search for disease information in IPHR systems. Why is it important for patients? **(10)**

Q4. (a) A machine learning model is designed to detect Heart Disease in patients. The model is evaluated on a dataset of 1500 patients, where the disease is either present (Positive) or absent (Negative). The confusion matrix is given below. When would you prefer F1-score over accuracy? **(10)**

	Predicted Positive	Predicted Negative
Actual Positive	720	180
Actual Negative	150	450

Explain all the terms and calculate the following performance metrics:
(i) Accuracy (ii) Precision (iii) Specificity (iv) Recall (v) F-measure

Q4. (b) Explain with example how blockchain technology be applied in healthcare for verifying the supply chain and securing patient record access. **(10)**

Q5. (a) Analyze the benefits and challenges of implementing IPHR in modern healthcare systems. How does it support both patients and healthcare providers? **(10)**
Q5. (b) Explain dimensionality reduction methods and why they are essential for handling healthcare data? **(10)**

Q6. (a) Discuss the future impact of digital therapeutics and connected medicine on preventive healthcare. What ethical concerns need to be addressed? **(10)**
Q6. (b) How does Robot-assisted surgery improve precision and patient outcomes? **(10)**

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