Name: **Enrolment No:**	

UPES

End Semester Examination, May 2025

Course: Artificial Intelligence and Machine Learning in Healthcare **Semester: VI**

Program: INT-BMSC-CLINICAL-RESEARCH, INT-BMSC-ND **Time: 03 Hrs.**

Course Code: HSCC3018 **Max. Marks: 100**

Instructions: No Calculators are Allowed.

SECTION A
(20Qx1.5M= 30 Marks)

S. No.		Marks	CO
Q 1	The _____ loop is used to iterate over a sequence in Python.	**1.5**	**CO1**
Q 2	To check if a number is **greater than 10** in any if condition, we write: if num _____ 10:	**1.5**	**CO1**
Q 3	What are the common applications of **NLP**? (Select all that apply) a) Sentiment Analysis b) Image Recognition c) Machine Translation d) Speech Recognition	**1.5**	**CO3**
Q 4	Select all the key components of a machine learning model. a) Training Data b) Algorithm c) Prediction d) Web Browser	**1.5**	**CO2**
Q 5	Identify which of the following are examples of **supervised learning**. A) Email Spam Detection B) K-means Clustering C) Handwriting Recognition D) Customer Grouping	**1.5**	**CO3**
Q 6	**Fill in the blanks:** Artificial Intelligence involves creating machines that can perform tasks typically requiring _____ intelligence.	**1.5**	**CO1**
Q 7	State the task to which classification belongs. A) Predicting house prices B) Predicting temperature C) Categorizing emails as spam or not D) Identifying color patterns	**1.5**	**CO2**
Q 8	State the main purpose of training a machine learning model. A) Increase storage B) Improve hardware performance C) Learn patterns from data	**1.5**	**CO2**

	D) Design user interfaces		
Q 9	**Fill in the blank:** In linear regression, the output is a _____ value.	**1.5**	**CO2**
Q 10	A model that separates images into "cat" or "dog" is performing: A) Regression B) Clustering C) Classification D) Reinforcement learning	**1.5**	**CO3**
Q 11	In image processing, a grayscale image is made up of: A) RGB pixels B) One channel of intensity values C) Random noise D) Filters	**1.5**	**CO4**
Q 12	Choose the correct application of **NLP**: A) Tumor detection B) Object recognition C) Voice-to-text conversion D) Data cleaning	**1.5**	**CO3**
Q 13	Mention the operator used to check equality. A) = B) == C) != D) :=	**1.5**	**CO2**
Q 14	**Fill in the blank:** The process of breaking a sentence into words is called _____ in NLP.	**1.5**	**CO3**
Q 15	Identify the model type suitable for predicting prices. A) Classification B) Linear Regression C) Clustering D) Reinforcement	**1.5**	**CO3**
Q 16	Identify the option that best describes clustering. A) Dividing labeled data B) Separating items into fixed classes C) Grouping similar data without known labels D) Predicting continuous values	**1.5**	**CO4**
Q 17	**True or False:** An AI system trained on historical X-ray images can assist doctors in diagnosis.	**1.5**	**CO2**
Q 18	Identify the most suitable task for linear regression. A) Predicting gender	**1.5**	**CO3**

	B) Predicting blood pressure C) Classifying digits D) Clustering documents		
Q 19	Identify the NLP task that involves finding emotion in a sentence. A) Part-of-speech tagging B) Lemmatization C) Sentiment analysis D) Named Entity Recognition	**1.5**	**CO3**
Q 20	What is the result of this code? **x = 3** **print (x > 2 and x < 5)** A) True B) False C) Error D) None	**1.5**	**CO2**
SECTION B (4Qx5M=20Marks)			
S. No.		**Marks**	**CO**
Q 1	Differentiate between Artificial Intelligence and Machine Learning with suitable examples.	**5**	**CO1**
Q 2	Define a model in machine learning and explain its relationship with input features and output predictions.	**5**	**CO1**
Q 3	Define Natural Language Processing (NLP). Mention two healthcare applications of NLP.	**5**	**CO3**
Q 4	Explain the concept of an Expert System with an example from the healthcare domain.	**5**	**CO2**
SECTION C (2Qx15M= 30 Marks)			
Q 1	An AI team is developing an image classification model to detect lung infections from X-ray images. • (a) What steps would you take to prepare image data for training? • (b) Explain the role of feature extraction in this task.	**15**	**CO4**
Q 2	**A.** A radiology center uses an AI system to detect tumors in X-ray images. The system uses image processing to identify dark spots and analyze shapes, and it's trained using linear regression to estimate tumor size. **Question**: (a). Explain how image processing contributes to the detection of tumors. (b). Provide an example to explain the difference between prediction and classification. Also, mention two benefits and two challenges of using AI in medical imaging.	**15**	**CO3**

	OR **B.** AI-powered virtual assistants are being integrated into healthcare apps to help patients manage medications and track symptoms. • (a) Discuss how Natural Language Processing (NLP) is used to understand patient input in such apps. • (b) Describe how sentiment analysis can be incorporated to detect patient mood or emotional state. (c) Suggest how data from this system can be used to alert doctors about high-risk patients. Also, mention any ethical concerns	**15**	**CO4**
SECTION-D **(2Qx10M=20 Marks)**			
Q 1	Explain the role of training and test datasets in model evaluation with an example.	**10**	**CO4**
Q 2	**A.** Linear regression is used to predict numerical outcomes. How can it be applied to forecast hospital bed occupancy over a month? **OR** **B.** Discuss the application of AI and ML in healthcare with two real-life examples.	**10** **10**	**CO3** **CO4**