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 **PRESIDENCY UNIVERSITY**

  **Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 11 – 01- 2025 **Time:** 09:30 am –12:30 pm |

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| **School:** SOE | **Program:** B.Tech-ECE |
| **Course Code :**ECE3070 | **Course Name :**AI and Digital Health |
| **Semester**:VII | **Max Marks**:100 | **Weightage**:50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **26** | **64** | **46** | **64** |  |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** |
| **1** | AI bias is the underlying prejudice in data that’s used to create AI algorithms. Name the type of AI BIAS and give the suitable in healthcare | **2 Marks** | **L1** | **CO3** |
| **2** | Discuss the role of genetic information in precision medicine and its impact on personalized treatment | **2 Marks** | **L1** | **CO3** |
| **3** | Discuss how patient values and preferences are incorporated into Evidence Based Medicine in decision-making | **2 Marks** | **L1** | **CO4** |
| **4** | List some common challenges faced during the data annotation process | **2 Marks** | **L1** | **CO3** |
| **5** | Why data security is a critical concern when dealing with Big Data | **2 Marks** | **L1** | **CO1** |
| **6** | What are the risks of AI technology to personal privacy | **2 Marks** | **L1** | **CO4** |
| **7** | What is Gini Impurity in Decision tree technique of classification problems. | **2 Marks** | **L1** | **CO1** |
| **8** | Which activation function do you choose when the input is bipolar.  | **2 Marks** | **L1** | **CO2** |
| **9** | What is the difference between Natural AI and General AI. | **2 Marks** | **L1** | **CO2** |
| **10** | What are the challenges of using Big Data in real-time AI applications? | **2 Marks** | **L1** | **CO1** |

**Part B**

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| **Answer the Questions Total 80 Marks.** |
| **11.** | **a.** | Based on the probability functions, the Naive Bayes algorithm is used to classify and categorize the dataset. Predict whetheryou run if the given weather condition is Outlook: RainyHumidity: NormalWind: WeakRun: ?2022_01_Collect-raw-data.jpg | **10 Marks** | **L1** | **CO1** |
|  | **b.** | Consider a project where a company is developing an AI-powered self-driving car. Discuss how annotated data is critical in enabling the car to recognize pedestrians, traffic signs, and obstacles | **10 Marks** | **L2** | **CO4** |
| **or** |
| **12.** | **a.** | Last weekend I was excited to hang out with my friends and watch a movie, but the problem was that it was just too hard to find a good movie. Identify and Illustrate a specific ML algorithm to solve the given problem. | **10 Marks** | **L1** | **CO1** |
|  | **b.** | A healthcare institution hesitates to share anonymized patient data for cancer research due to privacy concerns. Discuss how this affects medical advancements and propose a balanced approach | **10 Marks** | **L2** | **CO4** |
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| **13.** | **a.** | Chandra loves playing tennis but is unsure whether to play based on the weather conditions. The goal is to build a decision tree that helps Chandra decide whether to play tennis or not based. Construct Decision tree when Outlook is Sunny, Temperature is Mild and Humidity is High to predict whether Chandra will go for playing Tennis.  | **20 Marks** | **L1** | **CO2** |
| **or** |
| **14.** | **14a.** | Discuss the structure and function of the MCP model, highlighting its importance as the first mathematical model of a neuron and how it paved the way for implementing two input OR gate. | **10 Marks** | **L2** | **CO2** |
| **14b.** | A hiring platform uses AI to screen candidates, but it consistently favors male candidates for technical roles. Identify the biases involved and recommend strategies to make the system fair and unbiased. |  **10 Marks** | **L1** | **CO2** |

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| **15.** | **15a** | Discuss how the FDA evaluates the safety, efficacy, and risk factors of AI-driven medical applications, and highlight key differences in the approval process for AI software compared to conventional medical devices | **10 Marks** | **L3** | **CO3** |
| **15b.** | An elderly care facility uses wearable devices to monitor patients’ vital signs and provide timely alerts to caregivers. Evaluate how connected medicines improve care quality and patient safety. | **10 Marks** | **L3** | **CO3** |
| **Or** |
| **16.** | **a.** | Convolutional neural networks are distinguished from other neural networks by their superior performance with image, speech, or audio signal inputs. Implement a Convolutional Neural Network for the given input image. The pixel value for 5x5 image with the kernel filter is given below. Assume the stride value to be two.**C:\Users\Admin\AppData\Local\Packages\5319275A.WhatsAppDesktop_cv1g1gvanyjgm\TempState\7DADCEC96773D2754B2750F1E8635227\WhatsApp Image 2024-12-23 at 12.03.54_199cea54.jpgC:\Users\Admin\AppData\Local\Packages\5319275A.WhatsAppDesktop_cv1g1gvanyjgm\TempState\F973FD2A7257916F15A0D43EF23CF307\WhatsApp Image 2024-12-23 at 12.05.44_d08e253a.jpg** | **20 Marks** | **L2** | **CO3** |

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| **17.** | **17a.** | A healthcare algorithm prioritizes white patients for advanced care due to biased training data that underrepresents Black individuals. Identify the sources of bias and suggest mitigation strategies | **10 Marks** | **L2** | **CO4** |
|  | **17b.**  | A social media company uses user data to train AI algorithms for targeted advertising without obtaining explicit consent. EXPLAN the ethical issues and recommend a compliant data usage policy | **10 Marks** | **L2** | **CO4** |
| **Or** |
| **18.** | **18a** | Explain how Artificial Intelligence (AI) is used to support Precision Medicine. Discuss specific AI techniques and their role in tailoring patient treatments. | **10 Marks** | **L3** | **CO4** |
|  | **18b** | Explain how EHR data contributes to clinical research, best practices, and personalized treatment plans, enabling healthcare providers to make informed decisions. | **10 Marks** | **L2** | **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***