

First Semester 2022-2023 COMPREHENSIVE EXAMINATION

Course No. : CS ZG512 **Course Title** : Artificial Intelligence & Machine Learning **Nature of Exam** : Open Book **Weightage** : 40% **Duration** : 2½ Hours **Date of Exam** : Sunday, 27/11/2022 (FN) **No. of Pages** = 2 **No. of Questions** = 3

Note:

Please follow all the Instructions to Candidates given on the cover page of the answer book.

All parts of a question should be answered consecutively. Each answer should start from a fresh page.

Assumptions made if any, should be stated clearly at the beginning of your answer.

Q.1 Answer the following questions regarding Machine Learning models: (a)

Compare and contrast supervised and unsupervised learning. Provide examples for each. (b) How does feature selection impact model performance? Justify with examples. (c) Explain the working of the Gradient Descent algorithm in neural networks. (d) Why is regularization important in machine learning? Compare L1 and L2 regularization. (e) Discuss the significance of explainability in AI models. Provide methods to improve explainability. [15]

Q.2 Answer the following questions on AI ethics and applications: (a) What are the key ethical concerns in AI decision-making systems? Cite examples. (b) Discuss the role of bias in AI models. How can we mitigate it? (c) Explain how reinforcement learning is used in robotics. Provide a practical example. (d) AI is being increasingly used in healthcare. Discuss its benefits and potential risks. (e) Autonomous vehicles rely heavily on AI. What are the primary challenges they face? [15]

Q.3 State True or False providing due justification for your answers: (a) AI models will eventually replace human judgment in all fields. (b) Increasing the number of layers in a neural network always improves accuracy. (c) Deep learning models do not require feature engineering. (d) AI can be used to generate deepfake videos that are indistinguishable from reality. (e) AI should always be open-source to ensure transparency. [10]