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Daffodil International University

Faculty of Science & Information Technology
Department of Computing and Information System
Final Examination, Summer-2026
Course Code: IOT429, Course Title: Machine Learning for IOT
Level: 4 Term: 2

Exam Duration: 2 Hours **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All ***portions of each question must be answered sequentially.]***

1.	A smart dairy farm records a cow's muzzle temperature, humidity, movement, and feeding duration every five minutes. The raw sensor stream contains missing readings, noise, and measurements recorded on different scales.		
	a) Identify three important features of a machine-learning-enabled IoT system in this scenario and briefly state the role of each feature. [3] b) Explain how you would preprocess the sensor stream before model training, addressing missing values, noise, and feature scaling. [3] c) Propose a statistical pattern-recognition approach for separating normal and potentially unhealthy behavior. Specify suitable features, the decision process, and one performance measure. [4]	10	CO1
2.	A smart building has 300 rooms equipped with temperature, humidity, CO_2, light, and occupancy sensors. The manager wants to discover groups of rooms with similar environmental and usage patterns without using labelled data.	10	
	a) Explain why clustering is appropriate for this task and distinguish it from supervised classification. [3] b) Select a suitable clustering algorithm and describe the main steps for applying it to the IoT dataset. [3] c) Construct a simple neural-network-based clustering architecture or workflow for the same task, and explain how cluster quality would be evaluated. [4]		CO3
3.	An irrigation network collects soil moisture, temperature, rainfall, pump-current, and water-flow data. The operator needs to (i) predict the next day's water requirement and (ii) detect whether a pump is normal or faulty.	10	
	a) Classify each task as regression or classification and justify your choices. [3] b) Recommend one machine learning algorithm for each task and explain why it is suitable for the data and required output. [3] c) Analyze how class imbalance, sensor drift, and data leakage could affect the fault-detection model, and propose one control measure for each problem. [4]		CO4
4.	A city authority plans an edge-enabled air-quality monitoring system. Each station produces time-series readings ($PM_{2.5}$, CO_2, temperature, and humidity) and periodic sky images. The system must forecast pollution levels and issue reliable local alerts even when internet connectivity is unstable.	10	
	a) Propose a deep learning architecture that can combine time-series sensor data and image data. Identify the major model components and their purposes. [4] b) Design the end-to-end IoT–ML solution from data acquisition to edge/cloud inference and alert delivery. Include data handling, training, deployment, and model-update stages. [4] c) State two criteria for evaluating the proposed system, including at least one model-performance criterion and one deployment-performance criterion. [2]		CO5