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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Final Semester Examination, Fall 2024

Course Code: CSE233, Course Title: Embedded Systems and IoT

Level: 3 Term: 2 Batch: 62

Time: 2:00 Hrs **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)*	**Illustrate** any wireless module used in an IoT system.	[2]	CO1
	b)	**Distinguish** BJT and MOSFET with proper application.	[2]	
	c)	**Explain** RISC and CISC with proper application.	[2]	
	d)	**Describe** the interrupt controller in the microcontroller unit.	[2]	
	e)	**Recall** the main differences between Von Neumann and Harvard architecture.	[2]	
2.	*a)*	**Differentiate** STM32 microcontroller from 8051 unit in terms of interfacing sensors, actuators or other networks.	[4]	CO2
	b)	**Develop** an embedded C program for an Automatic Pet Feeder using an Arduino and a servo motor. The servo must open a flap for 5 seconds to dispense food, then close it. Demonstrate understanding of system requirements through accurate implementation.	[5]	
3.	*a)*	For a microcontroller-based project, which type of Flash memory would you prefer among PROM, EPROM, and EEPROM? **Justify** your choice based on the specific needs and requirements of the project.	[4]	CO3
	b)	**Demonstrate** the process of developing a warehouse monitoring system that utilizes I2C to interface with sensors (such as temperature and humidity sensors) and SPI to control actuators (like fans and lights). Provide a comprehensive list of components required for the system and present a detailed design for implementation.	[5]	
4.	*a)*	**Construct** a general block diagram of the Cortex-M processor core and explain the fundamental components of it.	[5]	CO4
	b)	**Design** a smart city environmental monitoring system tailored for Daffodil Smart City using an STM32 microcontroller. The system should measure air quality, noise levels, and weather conditions. Implement LoRa WAN for long-range communication, Ethernet for high-speed data upload, and Bluetooth for on-site maintenance. Provide a detailed system schematic, block diagram with proper explanation.	[7]	