



Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Mid Semester Examination, Fall 2024

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

Level: 3 Term: 1 Batch: 62

Time: 01:30 Hrs

Marks: 25

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)	Characterize fixed and variable resistance with applications.	[1]	CO1
	b)	State and Explain Ohm's law.	[2]	
	c)	Compare BJT and MOSFET with proper examples.	[2]	
	d)	You want to interface a 5V development board with a 3.3V sensor/actuator. Elaborate the appropriate technique.	[1]	
2.	a)	If 40 V are applied across a 4.7 mF capacitor, Compute the charge on the plates. Also, Approximate the charging time if a 1 kΩ resistor is connected in series with capacitor.	[4]	CO1
	b)	Calculate the base current (I_B) if the transistor is in active mode and the collector current (I_C) is 222 mA. The transistor has a common-base current gain (α) of 0.99 .	[3]	
	c)	Demonstrate the applications of basic electronics components in IoT systems.	[3]	
3.	a)	How would you design an automated system using appropriate microcontrollers, sensors, and actuators to monitor and maintain temperature and humidity levels in a storage area for perishable goods, triggering alerts if conditions move beyond acceptable limits? Develop a detailed schematic of the system and Provide a list of required components.	[4]	CO3
	b)	Design a smart lighting control system for an energy-efficient building that adjusts the lighting automatically based on ambient light levels, occupancy detection, and user preferences. The system should integrate various sensors, support wireless communication, and ensure robust error handling. Provide a detailed design plan, including hardware components, software architecture, communication protocols, and error management strategies. Evaluate the design against performance, scalability, and safety criteria.	[5]	