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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Midterm Examination, Summer 2025

Course Code: CSE233 Course Title: Embedded System and IoT

Level: 4 Term: 2 Batch: 61

Time: 1:30 Hrs **Full Marks: 25**

Answer all the following Three questions

[All portions of each question must be answered sequentially]

Q1.	*a.*	The Arduino board provides 5V and 3.3V outputs. **Explain** their purpose using Ohm's Law.	**5x2 =10**	**CO1**
	b.	**Explain** how placing a capacitor with a MOSFET can increase the delay in operation of embedded systems.		
	c.	**Why** is a Zener diode often placed across the power input of an embedded device?		
	d.	**Explain** how a transistor acts as a switch in embedded circuits such as LED blinking or motor control.		
	e.	**Illustrate** the various components of a generalized microcontroller architecture using a block diagram.		
Q2.	*a.*	**Develop** an Arduino-based automatic obstacle detection system to measure the distance using only a single sensor. Provide the full Arduino code along with a clearly labeled circuit diagram showing all connections.	**2x4 =8**	**CO2**
	b.	**Develop** an Arduino-based system to control the operation of a DC motor using a regulated power supply. The system should allow the Arduino to control the DC motor through an H-bridge motor driver (such as L298N or L293D), enabling forward and reverse motion. Ensure that the DC motor draws regulated power supply from the Arduino board. Include a complete circuit diagram and Arduino code.		
Q3.		**Design** an Arduino-based automatic alarm system inspired by real-world military or defense applications, such as those potentially used in the recent Iran-Israel conflict. The prototype system should automatically open a door when a siren or buzzer sound is detected. Additionally, an LED should be used as a visual indicator to signal when the system has detected the alarm and triggered the door mechanism. Your answer should include the following sections: Problem Overview, System Requirements, Components Required, System Design with complete block diagram, Software Design and Conclusion.	**7**	**CO3**