



**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. <i>HC-SR04</i>	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 <u>block diagram</u> , Software Design and Conclusion.	7	CO3

