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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: III**

Branch: CSE (IoT & Cybersecurity including Blockchain) **Duration: 3 hrs.**

Course Code: 23IC3PCEDS **Max Marks: 100**

Course: EMBEDDED SYSTEMS

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Explain the importance of IoT protocols in shaping the connectivity and functionality of IoT devices?	CO2	PO2	**10**
	b)	Illustrate how IoT Level 1 and Level 2 operate with the help of specific examples and a comparative diagram.	CO2	PO2	**10**
		OR			
2	a)	Describe the different communication models used in IoT logical designs, and how do they function	CO2	PO2	**10**
	b)	Compare REST based Communication API and WebSocket based comunication API with the help of digram.	CO2	PO2	**10**
		UNIT - II			
3	a)	Develop the concept of Arduino prototyping by creating a program for a traffic signal system that controls three LEDs, turning each LED on and off sequentially with a 1-second delay between each action.	CO1	PO 1,3	**10**
	b)	Explain the concept of sensors, the factors to consider when selecting them, and outline any five types of sensors.	CO1	PO1	**10**
		OR			
4	a)	Outline the concept of sketches. Write an Arduino program for fading in and out of an LED in analog output.	CO1	PO 1,3	**10**
	b)	Describe actuators, the criteria for selecting them, and explain the different types of actuators.	CO1	PO1	**10**

			UNIT - III			
	5	a)	Utilize the concepts of PIR sensors to design a motion detection system and write a program that outputs the sensor's status to a serial monitor for testing purposes.	*CO1*	*PO 1,3*	**10**
		b)	Identify the principles of a servo motor and design a program that controls the servo's position based on input from a potentiometer.	*CO1*	*PO 1,3*	**10**
			OR			
	6	a)	What are relays? Apply the concept of relays to construct a program that reads the state of a push button and controls a relay based on whether the button is pressed or not	*CO1*	*PO 1,3*	**10**
		b)	Apply the principles of ultrasonic sensing and create a Arduino program that uses an ultrasonic distance sensor and an LCD to display the measured distance.	*CO1*	*PO 1,3*	**10**
			UNIT - IV			
	7	a)	Dissect the boot process of the Raspberry Pi, focusing on how its architecture enables the loading of the operating system and initialization of peripherals.	*CO3*	*PO1*	**10**
		b)	Examine the process of developing a simple app to interact with Raspberry Pi GPIO pins, using three LEDs.Furthermore, implement a sequence to turn the LEDs on and off in order.	*CO3*	*PO 3,5*	**10**
			OR			
	8	a)	Compare the functionalities in different interfaces of Raspberry Pi.	*CO3*	*PO1,2*	**08**
		b)	Analyze the difference between BOARD and BCM GPIO pin numbering modes in a Raspberry Pi. How would you implement and use these pin numbering schemes in a Python program to control an LED?	*CO3*	*PO2*	**12**
			UNIT - V			
	9	a)	A residential building uses IoT-enabled smart locks and cameras for all entry points. One day, a tenant reports unauthorized access to their apartment due to a compromised smart lock. Evaluate the security implications of integrating IoT-enabled smart security system in a residential building to solve this issue.	*CO3*	*PO1.2, 3*	**10**
		b)	Assess the effectiveness of IoT-enabled soil moisture sensors and automated irrigation systems in optimizing water usage on a drought-prone farm.	*CO3*	*PO1,2*	**10**
			OR			

	10	a)	Justify the impact of wearable IoT devices, such as fitness trackers and smartwatches, on improving the lifestyle of individuals with chronic health condition and explain their reliability and accuracy in monitoring vital signs over time?	*CO3*	*PO1,2, 3*	**10**
		b)	Defend the integration of IoT-based wildlife tracking systems in conserving endangered species. How would you justify their effectiveness in data-driven conservation efforts and decision-making.	*CO3*	*PO1,2*	**10**

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