

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2024-2025

SLOT: E2+TE2

Programme Name & Branch : B.Tech- Information Technology
Course Code and Course Name : BITE403L&Embedded Systems and IoT
Faculty Name(s) : Dr. SwarnaPriya R M, Dr. Nithya S, Dr. Jerart Julius L
Class Number(s) : VL2024250103425, 3428,3452
Date of Examination : 17.10.2024
Exam Duration : 90 minutes **Maximum Marks:50**

- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- CO2-Build a hardware platform encompassing microcontrollers, sensors and peripherals.
- CO3-Make use of modern real-time operating systems in embedded systems for engineering practices.
- CO4-Analyze complex real-world problems through challenges posed by IoT leading to new low-cost architectural models

Answer All Questions

Q.No	Question	M	CO	BL
1.	Design: a simple electronic voting system for a local community. The system will: • Allow users to vote using a keypad. • Display voting options and results on an LCD screen. • Store votes securely in non-volatile memory. • Provide real-time feedback on the voting process to ensure that each vote is counted once. • Operate in a standalone environment without internet connectivity, as it will be deployed in remote areas with limited power and communication infrastructure. Task: Based on these requirements, which of the following would be the most appropriate choice for the project: (a) PIC Microcontroller, or Intel Galileo Board, or Raspberry Pi? Justify your selection by considering the following factors: • Power consumption and portability. • User interface capabilities (e.g., interfacing with keypad and LCD). • Data security and storage requirements. • Ease of deployment in remote areas. • Cost-effectiveness and simplicity. Illustrate the architecture of the suitable board and also Justify your selection.	10	CO4	BL6
2.	You are developing a digital temperature control system for an industrial oven using the 8051 microcontroller. The system will: • Continuously monitor the oven's temperature using a temperature sensor connected to an analog-to-digital converter (ADC). • Control a heating element, turning it on or off based on the temperature readings. • Display the current temperature on a 7-segment display. • Include a push button to allow the user to set a new target temperature.	10	CO2	BL4





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	- A timer will be used to periodically read the temperature every 1 second, and the system should update the display and adjust the heating element accordingly. - The button press should be handled immediately through an interrupt to avoid missing user inputs. Task: Explain how you would implement this system using the 8051's interrupts. Specifically, describe: - How you would use timer and external interrupts in this system. - How you would configure the interrupt vector table for each interrupt. - How you would ensure that both the button input and the periodic temperature readings are handled efficiently without causing delays or conflicts. Consider sensors are connected to Ports and write the code for the same.			
3.	You have been assigned to design an IoT-based automated animal watering and feeding system for a remote farm. The system will: - Utilize a soil moisture sensor to monitor the moisture level of the ground near a drinking trough to detect spills or overflows. - Use a water level sensor to measure the water level in the animal drinking trough to ensure it remains filled for the animals. - Use the ultrasonic sensor to monitor the food container's level, ensuring that it is refilled when low. - Employ a servo motor to control a valve for refilling the trough with water when levels are low and a second servo to open a food dispenser when the food level is low. - Utilize a NodeMCU to connect all components, allowing for remote monitoring via the ThingSpeak platform.	10	CO3	BL4
4.	You are tasked with designing a traffic light control system using an 8051 microcontroller. The system operates three traffic lights: red, yellow, and green, with the following timing: - The green light should stay on for 5 seconds. - The yellow light should stay on for 2 seconds. - The red light should stay on for 7 seconds. Additionally, the system must include a pedestrian crossing button. When the button is pressed, the system should immediately interrupt the current light sequence, turn the red light on, and allow pedestrians to cross for 10 seconds before resuming the normal traffic light sequence. The system should utilize Timer 1 to control the timing of the traffic lights and External Interrupt 1 (INT1) for the pedestrian crossing button.	10	CO2	BL4
5.	Design a smart irrigation system using IoT technology in all the six different IoT deployment levels. Draw the architecture with the key components and key differences at each level. In addition, justify the usage of IoT enabling technologies from IoT deployment level 3 to level 6.	10	CO4	BL 2

