




### Continuous Assessment Test(CAT) – I - AUG 2024

Programme	:	B.Tech(CSE)	Semester	:	Fall 2024-25
Course Code & Course Title	:	BCSE305L & Embedded Systems	Class Number	:	CH2024250100410 CH2024250100411 CH2024250100412 CH2024250100413 CH2024250100414 CH2024250100415 CH2024250100416 CH2024250100417 CH2024250100418 CH2024250100419 CH2024250100420
Faculty	:	SRITAMA ROY SINDHUJA M DHANUSH R SRIDHAR C MANMOHAN SHARMA KRITHIKA ALIAS ANBU DEVI M LATHA P SHARON GIFTSY A L SATHEESH KUMAR T VIJAYAKUMAR P KIRAN KUMAR M	Slot	:	CI+TC1
Time	:	90 Minutes	Max. Mark	:	50

**General Instructions:** < Use this space to provide additional information such as graph sheet, data book etc. >

- Write only your registration number on the question paper in the box provided and do not write other information.
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

**Answer all questions**

Q. No	Sub Sec.	Description	Marks	Blooms Taxonomy Level
I.		<p>Design a digital blood pressure monitor with the following requirements.</p>  <p>i. A blood pressure sensor in BP monitoring machine such as the MPS 3117, which provides accurate readings of systolic and diastolic pressures.</p>	10	L2

	<p>ii. Few input buttons are available to start and stop the measurements.</p> <p>iii. Display the readings, battery status in LCD display.</p> <p>iv. An inflatable cuff that fits snugly around the upper arm, ensuring proper occlusion of the artery during measurement. A mini air pump to inflate the cuff, typically operating at 6V with a flow rate between 1 to 2.2 liters per minute.</p> <p>With a neat block diagram, explain the hardware and software architecture and also explain the different phases involved in the above design.</p>		
2.	Explain a Harvard architecture-based microcontroller with a reduced instruction set, optimized for managing peripherals and control-oriented tasks in embedded systems.	10	L1
3.	<p>Write an Arduino program to develop an animal alert system using an ultrasonic sensor. The system should detect the presence of an animal, measures the distance to the animal, and triggers a buzzer if the animal is within a specified range.</p> <p>i) Threshold distance should be 50 cm. Ensure that the buzzer should be OFF initially.</p> <p>ii) Calculate distance and duration. Display the distance in 'Centimetre (cm)' in the serial monitor.</p>	15	L3
4.	<p>Create an Arduino-based party mode system where the brightness of an LED changes dynamically based on the beats of a song, and a blower (simulated by a motor or fan) is activated using a potentiometer. The system should allow the user to control the overall brightness of the LED with a knob (potentiometer) and activate the blower to blow papers in sync with the music.</p> <p>i) The brightness of the LED should vary based on the beats of the song, simulated by a microphone or analog signal input.</p> <p>ii) The potentiometer should allow the user to adjust the overall brightness level of the LED, which will modulate the beat-driven brightness changes.</p> <p>iii) The blower should be activated using a second potentiometer (e.g., connected to A1) to control the speed, simulating the intensity of the papers being blown in sync with the music.</p> <p>iv) When a "beat" is detected (simulated by a varying analog signal), the LED should pulse with increased brightness, and the blower should activate momentarily.</p>	15	L3

\*\*\*\*\* All the best \*\*\*\*\*