



# VIT

Vellore Institute of Technology  
(Approved as the University under section 3 of UGC Act, 1956)

REG.NO.: 23BC10261

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING  
CONTINUOUS ASSESSMENT TEST - 1  
WINTER SEMESTER 2025-2026

SLOT: G2+TG2

Programme Name & Branch : B.Tech (CSE)  
Course Code and Course Name : BCSE305L and Embedded Systems  
Faculty Name(s) : Prof. YOKESH BABU S, Prof. PONNAMBALAM P, Prof. NARESH K, Prof. ABHISHEK G, Prof. Ajitha. D, Prof. ANUSHA N, Prof. KOPPERUNDEVI N, Prof. MARIAPPAN R, Prof. PUSHPA GOTHWAL, Prof. KALAISELVAN N, Prof. NITHYA K, Prof. GAYATHRI S, Prof. SHARMILA C, Prof. JOICE J ANISH and Prof. SIVARANJANI A  
Class Number(s) : ALL  
Date of Examination : 02-02-2026 (2 to 3.30PM)  
Exam Duration : 90 minutes  
Maximum Marks: 50

General instruction(s): Answer All Questions

CO1. Identify the challenges in designing an embedded system using various microcontrollers and interfaces.

Q. No	Question	M	CO	BL
1/	A city public-transport authority plans to deploy an embedded GPS-based fleet monitoring system for its buses. The system must track real-time location, estimate arrival times, store route history, and periodically upload data to a control center. The tracking unit must work 24x7, withstand temperature, vibration, and dust, minimize power consumption, and maintain location accuracy in dense urban areas with tall buildings. A) Identify and analyze the major embedded system design challenges involved in developing the above GPS-based bus monitoring system. B) Design a high-level embedded system architecture for the GPS-based bus tracking unit and explain how your design addresses the identified challenges.	10	CO1	BL4
2/	Classify embedded processors. For each type, discuss its significance, describe its internal architecture, and explain how the required functionality can be implemented. Furthermore, justify why microcontrollers are more suitable than general-purpose processors for specific real-time embedded environments.	10	CO1	BL2
3/	Design a microcontroller system using the 8051 with 8K bytes of program ROM and 8K bytes of data RAM. Interface the memory such that the ROM starts at address 0000H and the RAM starts at address E000H. Explain the interfacing process step by step.	10	CO1	BL4
4/	Assume that XTAL = 12 MHz and that Timer 0 is operating in 13-bit mode. Write a program to generate a square wave with a frequency of 2 kHz on pin P1.5. Justify the TMOD initialization bits used and explain the purpose of each instruction in your program.	10	CO1	BL3
5/	A) Outline the types of DACs. The R-2R ladder is often preferred over the weighted resistor DAC. If this statement is true, briefly justify the reasons and support your answer with relevant diagrams. Also, draw a diagram illustrating the DAC interfacing and conversion process with the 8051 microcontroller.	6	CO1	BL4
	B) Design a "Reverse Parking Assistant" using a suitable sensor interfaced with an 8051 microcontroller (XTAL = 11.0592 MHz). Describe the necessary hardware connections and outline the algorithm/logic used to calculate the distance to an obstacle.	4		

\*\*\*\*\*All the Best\*\*\*\*\*