VIT
Vellore Institute of Technology

REG.NO.:

SCHOOL OF ELECTRONICS ENGINEERING
CONTINUOUS ASSESSMENT TEST - 2
WINTER SEMESTER 2025-2026

SLOT: C2+TC2

Programme Name & Branch : B.TECH CSE
Course Code and Course Name : BECE204L- MICROPROCESSORS & MICRCONTROLLERS
Faculty Name(s) : DR. VETRIVEERAN RAJAMANI (COURSE COORDINATOR)
Class Number(s) : VL2025260501054/1016/1021/1019/1023/1056/1025/1058/103/1041/1029/1060/1044/1031/1047/1062/1065/1034/1069/1071/1073/1067/1075/1077/1051
Date of Examination : 17/3/2026
Exam Duration : 90 minutes
Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)

CO4: Demonstrate the functionality and interfacing of peripherals.

Q. No	Question	M	CO	BL
1.	In a portable patient heart rate monitor using AT89C51 microcontroller, design and justify an 8051 Assembly Language Program (ALP) using Timer 0 in Mode 1 to create a precise 50 ms delay function (D). Apply this delay to generate a 50% duty cycle square wave of frequency F = 1/(4D) on pin P1.0 driving an IR LED for PPG sensor. Justify all timer calculations for 12 MHz crystal frequency.	10	4	3
2.	In a real-time embedded system, two switches are connected to the MSB and LSB of Port 1 of an 8051 microcontroller. Analyze the input combinations and develop an Assembly Language Program (ALP) that continuously monitors these pins and performs the required operations as follows: • When MSB = 0 and LSB = 1, write a program for counter 1 in mode 2 to count the pulses fed into pin T1. • When MSB = 1 and LSB = 0, continuously receive the character "MPMC" at a baud rate of 4800. Assume XTAL = 11.0592 MHz, 8-bit data, and 1 stop bit.	10	4	4
3.	Design and write an 8051 Assembly Language Program (ALP) to perform multiple tasks simultaneously using interrupts. The program should continuously read data from P1.0 and send it to P1.7. Whenever data is received through the serial port, the microcontroller should send the received data to Port P0. In addition, use Timer 0 interrupt to generate a 10 kHz square waveform on P0.1. The serial communication interrupt must be configured with higher priority than the Timer 0 interrupt to ensure that incoming serial data is serviced immediately. Assume a crystal frequency of 11.0592 MHz, configure the serial communication with a baud rate of 19200 and ensuring that the program does not directly access the TL0 or TL1 registers during program execution.	10	4	4

4.	Design and analyze an 8051 Assembly Language Program (ALP) for a smart classroom real-time display system at SCOPE, VIT Vellore. Port 1 is connected to a common anode 7-segment display that must continuously show the characters "SCOPE2026" during lab sessions. Use Timer 1 in Mode 1 to generate an accurate 0.5 second delay between successive character displays. The sequence should repeat continuously in real time. Assume a 12 MHz crystal frequency.	10	4	3
5.	In a real-time hospital patient queue monitoring system using an 8051 microcontroller, a 16×2 LCD display is interfaced such that Port 1 is connected to the LCD data lines and Port 2 is connected to the LCD control lines. Design an 8051 Assembly Language Program (ALP) to display first five odd numbers sequentially starting from the 1st row, 8th position of the LCD for nurse verification. Each number should be displayed with a fraction of delay between consecutive updates. Assume XTAL = 22 MHz, digits 0 to 9 are stored in program memory starting at ROM address 200H.	10	4	3

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