[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 1497 **F-7** **Your Roll No.....**

Unique Paper Code : 2511701

Name of the Paper : ELI-DC-I-701, 8051 and Advanced Microcontrollers

Name of the Course : **B.Tech. Instrumentation**

Semester : VII

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on the receipt of this question paper.
2. Use of non programmable scientific calculator is allowed.
3. Attempt **5** questions in all.
4. Question No. **1** is compulsory.

1. (a) Write a program to generate a signal of frequency 5 KHz and 50% duty cycle at Port pin P1.0 of 8051 microcontroller using crystal frequency of 12 MHz. (3)

   (b) Differentiate between XCH, XCHD & SWAP instructions as available in 8051 microcontrollers. (3)

   (c) Write total number of register banks available in 8051 microcontrollers with their respective RAM addresses. (3)

   (d) Discuss differences between I2C and CAN bus. (3)

   (e) Explain working of Model of timers in 8051 microcontrollers. (3)

2. (a) Draw and explain architectural block diagram of 8051 microcontrollers. (7)

   (b) Write a program to receive a byte from serial port and transmit it again using the serial port pins of 8051 microcontrollers. (4)

   (c) Explain PSW (Program Status Word) and IE (Interrupt Enable) registers of 8051 microcontrollers. (4)

P.T.O.

3. (a) For 8051 microcontrollers, explain what is Interrupt priority ? What are the registers that are used to set interrupt priorities ? If IP=00001100B, what will be the sequence of interrupt service ? (5)

(b) Write a program to generate a pulse train of 2 seconds period on pin P1.4 using timer in model. Use crystal frequency of 24 MHz for 8051 microcontrollers. (5)

(c) Draw pin diagram of 8051 microcontrollers and define EA, PSEN and ALE pin functions. (5)

4. (a) Write a program to rotate the stepper motor continuously. Use Pins P1.0 to P1.3 of 8051 microcontrollers to connect 4 wires of a stepper motor. Also draw the interfacing diagram between 8051 and stepper motor. (7)

(b) Differentiate between Von-Newman and Hardvard architecture. (4)

(c) Explain Stack Pointer. How it changes for PUSH & POP instructions ? (4)

5. (a) Draw and explain architectural block diagram of AVR controller. (8)

(b) How does the LCD distinguish between data and command ? Explain. (4)

(c) If a switch is connected to pin P3.2, what will happen if the switch is pressed and a low is received on the pin ? (3)

6. (a) Two switches are connected to pins P0.1 and P0.2. They are also vectored to interrupt location 0003H, i.e. INT0. Write a program to test which key is pressed and verify if both keys are pressed. (7)

(b) In the ADC 808/809, assume $V_{ref}(-)$ = GND. Find the step size if $V_{ref}(+)$ is 1.28V. (3)

(c) Write a program to multiply two 16 bit unsigned numbers. (5)

7. (a) Differentiate between 8051 and 80196 microcontrollers. (5)

(b) Write addressing modes available in 80196 controller with at-least one example of each. (6)

(c) Write a program to count the numbers of zeros in any number in register R3 and put the count in register R5 for 8051 microcontrollers. (4)