

22426

23124

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) State function of ALE and  $\overline{\text{PSEN}}$  pin of 8051 microcontroller.
- (b) Calculate the number of address lines required to access 8 KB RAM.
- (c) List any two Logical instructions of 8051 microcontroller.
- (d) Define Baud rate in UART. List any two standard baud rates.
- (e) Specify the size of Internal RAM and ROM in 8051 microcontroller.
- (f) State the function of SOC and EOC pin of ADC 0808.
- (g) Draw the format of TCON register.

**2. Attempt any THREE of the following :**

**12**

- (a) Draw the interfacing of stepper motor and write an ALP to rotate in clockwise direction.
- (b) State the alternative functions of Port 3 of 8051 microcontroller.



- (c) Compare Harvard and Von-Neumann architecture. (any 4 points)
- (d) Draw and explain interfacing of DAC with 8051 microcontroller.

**3. Attempt any THREE of the following : 12**

- (a) Explain power saving option of 8051.
- (b) List four addressing modes of 8051 with one example in each.
- (c) Compare three derivatives of 8051 based on RAM size, ROM size, Number of Timers, Number of Interrupts.
- (d) Draw the format of SCON register and state the function of each bit.

**4. Attempt any THREE of the following : 12**

- (a) Write an ALP to generate triangular waveform using DAC.
- (b) Draw the format of PSW register and state the function of each bit.
- (c) Sketch interfacing diagram of 4 KB RAM and 4 KB EPROM to 8051. Draw the memory map.
- (d) Develop an ALP to read temperature from LM35 sensor. Draw the interfacing diagram with 8051.
- (e) Develop an ALP to transmit message 'MSBTE' serially at baud rate of 9600, 8-bit data, 1 stop bit. Assume crystal frequency of 11.0592 MHz.

**5. Attempt any TWO of the following : 12**

- (a) Compare between Microprocessor and Microcontroller on the basis of :
  - (i) RAM memory
  - (ii) ROM memory
  - (iii) Parallel ports
  - (iv) Serial port
  - (v) Timers
  - (vi) Applications

- (b) Develop an ALP to transfer a block of 10 numbers from external memory location 40 H to 50 H.
- (c) Draw interfacing of four common cathode 7 segment display to 8051. Develop an ALP to display 'ABCD' continuously on it.

**6. Attempt any TWO of the following :**

**12**

- (a) Develop an 8051 based system for traffic light controlling. Draw interfacing diagram and write an ALP for the same.
  - (b) Develop an ALP to generate square wave of 2KHz using timer of 8051. Microcontroller on port pin P1.5. (Assume crystal frequency = 12 MHz)
  - (c) Explain the following instructions :
    - (i) XCH A, R<sub>0</sub>
    - (ii) DIV AB
    - (iii) ANL A, add
    - (iv) MOVX A, @ R<sub>0</sub>
    - (v) DJNZ R<sub>Z</sub>, radd
    - (vi) MOVC A, @ A+PC
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