

# 22537

**11920**

**3 Hours / 70 Marks**

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data, if necessary.
- (5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

- 1. Attempt any FIVE of the following: 10**
- a) State the need of power saving options in 8051  $\mu$ c.
- b) Define Baud Rate in UART. List the factors affecting Baud Rate.
- c) State the function of following assembler directives
- (i) EQU
- (ii) ORG
- d) Find out the number of address lines required to access 4KB of RAM.
- e) Describe the function of following pins of 8051  $\mu$ c
- (i)  $\overline{\text{PSEN}}$
- (ii) ALE
- f) Draw the format of SCON register.
- g) Draw flowchart to detect a pressed key of 4 X 4 matrix keyboard which is interfaced with 8051  $\mu$ c.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Explain the following instructions
    - (i) XCH A, @R0
    - (ii) DJNZ R3, UP
    - (iii) CPL P1.1
    - (iv) MOVX A, @DPTR
  - b) Explain 8051 as Boolean processor.
  - c) Draw circuit diagram of port 1 pin and explain i/p & o/p pin function.
  - d) Draw the architecture of 8051  $\mu$ c.
- 3. Attempt any THREE of the following:** **12**
- a) Draw interfacing diagram of DAC to 8051 $\mu$ c and write an ALP to generate a Triangular wave from DAC 0808.
  - b) Draw the internal RAM and internal ROM organization in 8051  $\mu$ c.
  - c) Differentiate between polling and interrupt approach to generate a time delay by using 8051  $\mu$ c.
  - d) Develop an ALP to receive bytes of data serially and put them in port 1. Assume baud rate 4800, 8 bit data, 1 stop bit. Draw flowchart for the same program.
- 4. Attempt any THREE of the following:** **12**
- a) Compare Harvard and Von-neuman architecture.
  - b) Develop an ALP to add two BCD numbers which are stored at external memory location 3000H and 3001H. Also write comments for the instructions in the programs.
  - c) Draw the interfacing diagram, where P2.3 pin of 8051  $\mu$ c is used to control relay which in turn controls the fan connected to 230V.
  - d) Draw software development cycle and list different files required during assembly language program.
  - e) Draw and explain reset circuit used for 8051  $\mu$ c.

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

- a) Draw the interfacing diagram of 8 Kbyte of EPROM and 8 Kbyte of RAM to 8051  $\mu$ c. Calculate the number of address lines required to interface and draw address map table for the same.
- b) Write single instruction to perform the following operations
  - (i) To copy the contents of Register R0 to Accumulator.
  - (ii) To rotate the contents of Accumulator left by one bit.
  - (iii) Jump to relative address if bit P1.3 is '0'.
  - (iv) To set the carry flag bit.
  - (v) Increment 16 bit data pointer by 1.
  - (vi) Addition of byte with Accumulator.
- c) Develop an ALP to read temperature from LM35 sensor. Draw the interfacing diagram with 8051 $\mu$ c.

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

- a) Draw labeled diagram to interface 16 X 2 LCD with 8051 $\mu$ c. State the function of pins.
    - (i) RS
    - (ii) R/W
    - (iii) EN
    - (iv) D0 to D7
  - b) Draw the interfacing diagram of stepper motor and write an ALP to rotate in clockwise direction. Write 4 step sequence and stepper motor winding structure for the same.
  - c) Write an ALP to generate continuous square wave of 2 KHz on P1.4 using Mode 1 of Timer 0. Given crystal frequency is 11.0592 MHz.
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