

17509

14115

3 Hours / 100 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.
- (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
- (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. a) Attempt any **THREE** of the following: **12**
- (i) Compare between microprocessor and microcontroller (any four points).
- (ii) Draw the pin diagram of  $20 \times 4$  LCD display. What is the function of RS, EN and R/W pins.
- (iii) What are the various data types used in C? Also give their value range.
- (iv) Draw and explain reset circuit used for 8051 microcontroller.
- b) Attempt any **ONE** of the following: **06**
- (i) Describe the timer modes of 8051 microcontroller.
- (ii) List the addressing modes of 8051 microcontroller with one example each.

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**Marks**

- 2. Attempt any TWO of the following:** **16**
- a) Classify the instruction set of microcontroller 8051. Give one example of each.
  - b) Draw the interfacing diagram of ADC 0809 with microcontroller 8051. Write 'C' language program to generate 50Hz sq. wave with crystal freq = 12MHz.
  - c) Draw the interfacing diagram of stepper motor with 8051 microcontroller. Draw the flowchart for rotating stepper motor in clockwise direction. (Program not expected).
- 3. Attempt any FOUR of the following:** **16**
- a) Draw the format of PSW SFR and describe function of each bit.
  - b) Compare between 8051 and 8052 microcontroller.
  - c) Write C program to continuously toggle all bits of port O with same delay.
  - d) Compare between RISC and CISC machines.
  - e) Draw the interfacing diagram of four common cathode 7 segment display connected in multiplexed mode with 8051 microcontroller.
- 4. a) Attempt any THREE of the following:** **12**
- (i) Draw the interfacing diagram for temperature measurement using LM35, ADC0808 with microcontroller 8051.
  - (ii) Write instruction to perform following task using C operators:
    - 1) Shift data bit wise 4 times to right
    - 2) Shift data bit wise 4 times to left.
  - (iii) Compare between EPROM and flash memory.
  - (iv) List the alternate functions of port 3.

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**Marks****b) Attempt any ONE of the following:****06**

- (i) Describe the function of following instructions of 8051 microcontroller:
- 1) SWAP A
  - 2) DIV AB
  - 3) RLA
  - 4) XCH A, RO
  - 5) SETB C
  - 6) DA A
- (ii) With suitable diagram describe the memory organisation of internal program and data memory.

**5. Attempt any TWO of the following:****16**

- a) Write C program to transfer the message "INDIA" serially at baud rate 4800 bps, 8 bit data, 1 stop bit. Assume crystal frequency 11.0592 MHz.
- b) Write assembly language program to transfer array of ten numbers stored in memory location 50 H to memory location 70 H.
- c) Draw interfacing diagram to connect 8 LEDs on port 2 and 8 switches on port 0. Write C program to read the status of switches and send to port 2.

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**Marks****6. Attempt any FOUR of the following:****16**

- a) Draw and describe the IP SFR format for 8051 microcontroller.
  - b) Draw interfacing diagram to interface  $3 \times 3$  key matrix to 8051 microcontroller.
  - c) Describe the following assembler directives with one example:
    - (i) ORG
    - (ii) DB
    - (iii) EQU
    - (iv) END
  - d) Describe the dual role of port O of microcontroller 8051.
  - e) Draw the interfacing diagram to interface relay with 8051 microcontroller.
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