

# 17534

**11718**

**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) Draw the basic block diagram of microcomputer and state the function of each elements in a microcomputer.
  - (ii) Distinguish between Microprocessor and Microcontroller (any four points).
  - (iii) What is PSW? Draw the format of PSW register in 8051 and state the functions of each bit.
  - (iv) State the function of
    - 1) Editor
    - 2) Assembler
    - 3) Compiler
    - 4) Linker
  - (v) Draw and describe the control word format of 8255.

P.T.O.

b) **Attempt any ONE of the following:****6**

- (i) Write an ALP to find the largest number from a block of ten bytes of data stored in RAM location starting from 40 H. Store the largest number at 50H.
- (ii) Draw the interfacing diagram of 8 k byte of EPROM and 8 k byte of RAM to 8051 microcontroller. Draw address map table for the same.

**2. Attempt any FOUR of the following:****16**

- a) Draw the internal RAM organization of 8051 with the address location.
- b) Compare 8031, 8051 and 8751 (four points)
- c) Draw a neatly labelled Architectural block diagram of 8051 microcontroller.
- d) State the alternate function of port 3 of 8051 microcontroller.
- e) Describe the function of following pins of 8051 microcontroller
  - (i) TO
  - (ii)  $\overline{\text{INT0}}$
  - (iii)  $\overline{\text{PSEN}}$
  - (iv) RST
- f) Compare Von-Neumann and Harvard architecture. (Four points)

**3. Attempt any FOUR of the following:****16**

- a) What are assembler directives? State and describe any three directives with one example each.
- b) Write an ALP to multiply two 8 bit numbers stored at 20H and 21H in internal RAM. Store result in 22H and 23H.
- c) Describe the function of following instruction of 8051 microcontroller
  - (i) RLC A
  - (ii) XRL A, 15h
  - (iii) DIV A B
  - (iv) MOVX @ DPTR, A
- d) State the addressing modes of 8051 microcontroller. Describe any three with one example each.
- e) Write an assembly language program to send continuously. Message "HELLO" serially at 9600 band rate.

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

- (i) Write an ALP to calculate the sum of five consecutive numbers stored from memory location starting at 20H. Store the lower byte at memory location 25 H and higher byte at 26 H.
- (ii) Write an ALP to receive serial data bytes and put them in Port P1. Assume baud rate of 4800, 8 bit data, 1 Stop Bit.
- (iii) Draw the format of SCON register of 8051 and explain the function of each bit.
- (iv) With the help of suitable diagram describe the modes of serial communication in 8051.

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

6

- (i) Describe the following instructions of 8051
- 1) XCHD A, O R<sub>1</sub>
  - 2) ORL A, R<sub>O</sub>
  - 3) SETB ooh
  - 4) INC DPTR
- (ii) Draw the interfacing diagram of 8 LEDs to port 2 of 8051 microcontroller. Write an ALP to turn these LEDs ON and OFF after a certain delay.
- (iii) Draw the interfacing diagram of stepper motor with 8051 microcontroller. Write an ALP to motor continuously in clockwise direction.

5. **Attempt any FOUR of the following:**

16

- a) State the different timer modes of 8051. Describe mode-2 in detail.
- b) Write a program to generate a square wave of 50% duty cycle on Pl. 5 bit. Timer 0 is used to generate the time delay.
- c) Draw and explain each bit of TMOD register of 8051.
- d) With crystal frequency of  $f = 11.0592$  MHz, what value should be loaded into TH1 to have a 4800 baud rate? Give the answer in both decimal and hex.
- e) Draw the circuit diagram of port 2 and describe its function.

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

- a) Draw the format of TCON register and describe the function of each bit.
  - b) State the different types of interrupts in 8051 with their priorities and vector address.
  - c) Differentiate between linear and absolute address decoding techniques (four points)
  - d) Draw the format of IE register and describe the function of each bit.
  - e) Describe any four factors on which the selection of microcontroller depends.
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