17534

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) 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 microprocessor and microcontroller. (Any four points)

   (ii) Explain RISC and CISC.

   (iii) List alternate functions of port 3 of 8051 microcontroller.

   (iv) Explain software development cycle in microcontroller programing.

   (v) Compare absolute decoding and linear decoding.

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

   (i) Write an assembly language program to find largest number from the array of five numbers stored in internal RAM memory.

   (ii) Draw interfacing diagram of stepper motor with 8051 microcontroller. Write assembly language program to rotate stepper motor clockwise.

Marks

2. **Attempt any <u>FOUR</u> of the following:** **16**

a) Draw the architecture of 8051 microcontroller.

b) State the features of 8051 micro-controller.

c) Draw the format of TMOD register and explain.

d) Explain Boolean processor of 8051 μc.

e) Draw the internal memory organization of 8051 and explain.

f) Explain : -

   (i) Harvard Architecture

   (ii) Von. Neumman Architecture

3. **Attempt any <u>FOUR</u> of the following:** **16**

a) List and explain addressing modes of 8051 with example.

b) Explain the function of following instructions -

   (i) DAA

   (ii) ANL

   (iii) RET

   (iv) Swap A

c) Explain any four directives with examples.

d) Write assembly language program to multiply two 8 bit numbers store result at 55 H.

e) Draw the format of SCON register and explain.

4. a) **Attempt any <u>THREE</u> of the following:** **12**

   (i) Explain the function of following instructions -

   (1) MOV A, @ RO

   (2) MOVX A, @ DPTR

   (3) INC

   (4) MOV A, B

Marks

    (ii)   Describe the serial communication modes of 8051.

    (iii) Draw and explain format of PCON register.

    (iv) Write assembly language program to send message 'WELCOME" serially at 9600 baud rate continuously.

b) **Attempt any <u>ONE</u> of the following:**   **6**

    (i)   Write a program to arrange 8 numbers in array stores in internal RAM in ascending order.

    (ii) Draw interfacing diagram of 4 KB EPROM & 4 KB RAM of 8051. Draw memory map.

    (iii) Draw and explain control word register of 8255.

5.   **Attempt any <u>FOUR</u> of the following:**   **16**

a) Explain timer modes of 8051.

b) List the interrupts of 8051. Give their priorities and vector address.

c) Draw and explain IE register.

d) Draw port 0 pin circuit & explain bit function.

e) Write an assembly language program to check bit P2.3. If it is high send 55 H to P1 else send AAH to P3.

6.   **Attempt any <u>FOUR</u> of the following:**   **16**

a) Write a program to generate square wave of $5 kH_2$ on P3.7 using timer1, model, XTAL = 11.0592 MHz.

b) Draw and format of TCON register.

c) Draw and explain block diagram of 8255 PPI.

d) Draw the format of IP register and explain.

e) Explain any four selection factors of microcontroller.

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