17626

15162

3 Hours / 100 Marks   Seat No.

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) State the alternative function of port 3 of 8051 microcontroller.

   (ii) Explain the assembler direction DB, END, EQU and ORG of 8051 microcontroller.

   (iii) Draw the format of SCON register and explain the function of each bit.

   (iv) State any four application of embedded system.

   (v) List the interrupts used in 8051 microcontroller. Give their priorities and vector addresses.

Marks

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

(i) Draw the interfacing diagram of DAC with 8051 microcontroller. Write a program to generate triangular wave.

(ii) State the size of internal RAM of 8051 µc. Draw the internal RAM structure and describes it.

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

a) Explain the following instructions of 8051 µc

(i) SWAPA

(ii) MOVC A, @ A+DPTR

(iii) RRC A

(iv) RETI

b) Draw the labelled architecture of 8051 µc.

c) Write an assembly language programme to multiply two 8 bit numbers stored in internal RAM locations 20H and 21H. Store the result at 22H and 23H.

d) Describe round robin scheduling algorithm with suitable diagram.

e) Draw the format of TMOD register of 8051 microcontroller and state function of each bit.

f) State the advantages of embedded system.

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

a) Draw an interfacing diagram of stepper motor with 8051 microcontroller. Write a programme to rotate it in clockwise direction.

b) List the software development tools used in embedded system. State the function of any two.

c) Write a programme to send message "WELCOME" serially at 9600 boud rate continuously using assembly or C language.

d) State any four features of 8051 µc.

e) Describe the concept of starvation.

Marks

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

    (i) Describe the addressing modes of 8051 microcontroller with suitable examples.

    (ii) Describe the power saving mode of 8051 microcontroller.

    (iii) Write a programme to transfer five bytes from source to destination in assembly or C language. Assume source address is 20H onwards and destination address 30H onwards.

    (iv) Explain in brief the concept of device driver.

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

    (i) Draw the pin diagram of 16×2 LCD display and state the function of following pins:

       1) RS

       2) R/W

       3) EN

    (ii) State the method of task synchronization. Describe semaphore with suitable example.

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

  a) With the help of flow chart explain the different files created while execution of programme using keil compiler.

  b) Draw the format of IE and IP register of 8051 µc and describe function of each bit.

  c) Draw the interfacing of 4×4 keyboard with 8051 µc.

  d) With suitable flow chart list the steps involved in the embedded software development cycle.

  e) Describe any four specification of RTOS.

Marks

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

a) Write an assembly or C language programme to generate a square wave of 1 kH$_2$ on Pin P1.5 using Timer 0 in mode 1. Assume crystal frequency as 12 MHz.

b) Draw the interfacing diagram of ADC with 8051 microcontroller.

c) Draw the block diagram of embedded system and describe the hardware units of an embedded system.

d) Describe the concept of mutual exclusion and deadblock.

e) Explain the classification of embedded system.

————