17626

15116

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. Attempt any FIVE of the following: **20**

a) Describe the power down mode operation in 8051 microcontroller.

b) Enlist different Special Function Register (SFR) with their functions and addresses.

c) Explain the following assembler directives giving one example of each:

(i) ORG

(ii) END

(iii) DB

(iv) DW

(v) EQU

Marks

d) Explain the syntax for an assembly language instruction.

e) Assume XTAL = 12 MHz. Write a program to generate a square wave on P 1.2 pin. Find the lowest frequency that can be generated using mode 1. (ALP or C)

f) State four features of embedded systems and state any four applications.

g) What do you mean by starvation?

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

a) Draw the power ON reset circuit of 8051 microcontroller. Give its content of port P_0 - P_3 and SP register on reset.

b) Write an assembly language program for the 8051 microcontroller to multiply two 8 bit numbers stored at memory location 20 H and 21 H. Store the product at 22 H and 23 H.

c) Indicate which timer and mode is selected for each of the following instructions:

(i) MOV . TMOD, # 01 H

(ii) MOV TMOD, # 12 H

d) Draw the interfacing of seven segment multiplexed display with 8051 microcontroller.

e) State the function of the following:

(i) In circuit emulator (ICE)

(ii) Integrated Development Environment (IDE)

(iii) Target board

(iv) Device programmer

f) Describe the meaning of deadlock with suitable example.

Marks

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

a) Enlist the ports of 8051 microcontroller and write which port has alternate function.

b) Describe the function of the following instructions of 8051:

(i) JZ radd

(ii) DAA

c) State the interrupts of 8051 microcontrollers in descending order of priority.

d) Write an assembly language program or C program for rotating stepper motor in clockwise direction continuously using four step sequence.

e) State any four salient features of an embedded system.

f) Describe Hard real time and Soft real time systems in an embedded system with one suitable example of each.

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

a) Draw architecture of 8051 microcontroller.

b) Write a program to unpack the 8 bit number using 8051 microcontroller instructions using C or assembly language.

c) What is serial interface? Explain interrupts present in microcontroller 8051.

d) Draw labelled diagram of stepper motor connections to 8051 microcontroller. State two specifications of stepper motor.

e) State two features of simulator and two features of Integrated Development Environment (IDE).

f) Describe the concept of inter process communication in Real Time Operating System (RTOS)

Marks

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

a) Explain why 8051 microcontroller is provided with a frequency of 11.0592 MHz on odd value.

b) Write an assembly language program to count number of 1's in a byte stored in register B. Store the count of Ram location 10H.

c) State the priorities of 8051 microcontroller interrupts if interrupt priority (IP) register = 1AH.

d) Draw the circuit diagram to interface matrix keyboard with 8051 microcontroller.

e) Give the classification of embedded system in brief.

f) Describe the concept of Multitasking in Real Time Operating System (RTOS)

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

a) Describe the functions of port 1 of 8051 microcontroller and also draw the structure of port 1.

b) Write instructions to divide R_4 by R_3 and store quotient and remainder from 5000H external RAM.

c) Give data of interrupt priority (IP) register to assign priorities as under:

(i) Highest priority to $\overline{\text{INT1}}$

(ii) Highest to timer 0 and next to serial port.

d) Write an assembly language program to interface DAC with 8051 microcontroller and to generate a triangular wave.

e) With suitable example describe the concept of device driver.

f) Describe soft real time systems in an embedded system with one suitable example.