17658

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

(i) List ports of 89C51 microcontroller and list alternative functions of port-3 pins.

(ii) List any four different hardware units in embedded system. Write function of any two of them.

(iii) Draw and explain CAN bus protocol.

(iv) Draw the pin diagram of 14 pin LCD display. State any function of each pin.

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

(i) Explain the classification of an embedded system.

(ii) State the scheduling algorithms of RTOS and describe the concept of round robin scheduling.

Marks

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

a) Draw the internal data memory structure of 89C51 and describe register banks.

b) Write the steps for programming 8051 micorcontroller to receive data serially.

c) Draw the pin-out of RS232C and describe the function of TXD, RXD, DTE and DCE.

d) Draw the interfacing diagram of 4 × 4 matrix keyboard with 89C51 microcontroller.

e) State the methods of task synchronization and explain any one in detail.

f) Describe any four applications of an embedded system.

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

a) Compare between CAN and I2C protocols on following points:

(i) Data transfer rate

(ii) Number of fields

(iii) Addressing bit

(iv) Application

b) What are different logical operators in 'C' for 89C51? Give one example each (any four).

c) State any four functions of RTOS.

d) Classify an embedded system. Describe any two points.

e) Draw labelled interfacing diagram to interface DC motor with 8051 microcontroller.

Marks

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

(i) List the interrupts of 89C51 microcontroller with their vector locations and order of priority.

(ii) State any four features of Bluetooth Technology.

(iii) Describe any four specifications of RTOS. Give any four examples of RTOS.

(iv) Explain the meaning of following terms with reference to embedded system:

1) Inter task communication

2) Multi-tasking

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

(i) Write 89C51 'C' program to transfer the message "INDIA", serially at 9600 band rate continuously. Use 8 bit data and 1 stop bit.

(ii) Draw the interfacing diagram of DAC with 89C51 micorcontroller. Write a program in 'C' language to generate positive ramp voltage.

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

a) Describe how assembly language instructions can be included in 89C51 'C' program.

b) Differentiate synchronous and asynchronous communication (any four points).

c) Draw labelled interface diagram to interface LED to P2.1 of 89C51. Write 89C51 'C' program turn ON and OFF this LED after some delay.

d) Explain the concept of starvation and deadlock in RTOS.

e) Describe the program down-loading tools ISP/IAP.

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

Marks

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

a) Compare between assembly language program with an embedded 'C' with reference to following points:

(i) Execution time

(ii) Time for coding

(iii) Hex file size

(iv) Debugging

b) Draw and explain USB protocol.

c) Draw the interfacing diagram of stepper motor with 8051 microcontroller.

d) Draw the interfacing diagram of LCD display with 8051 microcontroller.

e) Write 89C51 'C' program to toggle bits of port Pϕ continuously with a 200 millisecond delay.