17658

21415

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.

(8) Preferably, write the answers in sequential order.

Marks

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

(i) List various SFRs needed for serial communication using microcontroller 89C51. Also list various standard baud rates for serial communication.

(ii) List various software development tools available in IDE. Explain any one in brief.

(iii) List the features of 12C bus.

(iv) Draw labelled diagram to interface 16 × 2 LCD with 89C51. State the function of pins:

1) RS

2) R/W

3) EN

Marks

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

(i) State various types of embedded systems. Explain any two in brief. State four applications of embedded systems.

(ii) State various task scheduling algorithms in RTOS. Explain any one in brief.

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

a) Compare RISC and CISC architecture.

b) Write 'C' program for 89C51 to read data from port P1 and P2. Compare the data and send the bigger data on port 3 continuously.

c) Distinguish between CAN and 12C bus protocols with respect to:

(i) Data transfer rate

(ii) Number of fields

(iii) Addressing bit

(iv) Applications

d) Draw labelled diagram to interface 4 × 4 matrix keyboard to microcontroller 89C51.

e) Compare general purpose operating system and RTOS.

f) Explain any four characteristics of embedded systems.

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

a) Draw the pinout diagram of RS-232 (DB9). State the function of all pins.

b) Write 89C51 'C' program to receive data serially from RX pin and send the data on port 1 continuously. Assume baud rate to be 9600 and crystal frequency as 11.0592 MHz.

c) What is deadlock in an embedded system? State the schemes to avoid deadlock.

d) Draw the block diagram of embedded system. Explain any one subsystem.

e) Draw labelled diagram to interface DC motor with 89C51. Write 'C' program to rotate the motor continuously.

Marks

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

(i) Explain DSP in brief. State any two applications.

(ii) Compare synchronous and asynchronous serial communication.

(iii) List advantages and disadvantages of embedded system.

(iv) Explain inter process communication in brief. State various inter process communication methods.

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

(i) Write 89C51 'C' language program to generate square wave of 10 KHz on pin P2-7 using timer 0. Assume crystal frequency as 12 MHz.

(ii) Draw the diagram to interface DAC 0808 to microcontroller 89C51. Write 'C' language program to generate saw tooth wave continuously.

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

a) If the content of ACC = 0 × 02 and P1 = 0 × F3. State the result after execution of following statements independently:

(i) result = ACC & P1

(ii) result = ACC | P1

(iii) result = ACC ^ P1

(iv) result = ~ P1

b) State the features of Zigbee. State four applications.

c) Draw labelled diagram to interface ADC 0808 with microcontroller 89C51.

d) State and explain any four key specifications of RTOS.

e) Compare assembly language program and embedded 'C' programming (any four points).

f) Write 'C' program to rotate the stepper motor by two complete rotations and then stop. Assume step angle as 1.8°.

Marks

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

a) Explain JTAG in brief.

b) Compare Wi-fi (IEEE 802.11) with Bluetooth.

c) Draw the labelled diagram to interface a switch to pin P0.0 and a relay to pin P2.0 of 89C51.

d) Draw the diagram to interface LED to pin P1.7 of 89C51. Write 'C' program to blink the LED.

e) List various data types in embedded C with their data range.

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