22434

23124

3 Hours / 70 Marks   Seat No. ☐☐☐☐☐☐☐☐

Instructions –   (1) All Questions are *Compulsory.*

(2) Illustrate your answers with neat sketches wherever necessary.

(3) Figures to the right indicate full marks.

(4) Assume suitable data, if necessary.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1.   Attempt any <u>FIVE</u> of the following: **10**

a) List four features of 89C51 Microcontroller.

b) List four characteristics of embedded system.

c) Draw the format of TMOD register.

d) State four applications of embedded system.

e) Draw interfacing diagram of 4 × 4 matrix keyboard with 89C51 Microcontroller.

f) State four features of I2C serial communication protocol.

g) State the function of RS, EN Pin of 16 × 2 LCD display.

Marks

2. Attempt any THREE of the following: **12**

a) Differentiate between assembly language program and embedded C language. (Any four points)

b) Develop an 89C51 C-program to transfer or send "MSBTE" on serial port with 9600 baudrate. The XTAL frequency is 11.0592 MHz.

c) List alternate function of PORT 3 of 89C51 microcontroller.

d) Develop 89C51 C-program to generate triangular waveform on DAC0808 output which is interfaced with PORT 1 of 89C51.

3. Attempt any THREE of the following: **12**

a) Define :–
    i)   Editor
    ii) Assembler
    iii) Compiler
    iv) Debugger.

b) Develop an embedded C-language program for 89C51 to display "8" on 7-segment display.

c) Explain selection factors of Microcontroller.

d) State two application each of –
    i)   Bluetooth
    ii) IrDA
    iii) USB
    iv) SPI.

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

a) Differentiate between general operating system and realtime operating system.

b) Explain logical operator used in embedded - C with one example.

c) Describe the function of the following pins of 89C51 microcontroller –
    i) $\overline{EA}$
    ii) PSEN
    iii) RST
    iv) TXD

d) If ACC = Ox55, find content of it after execution of –

    i)   ACC = ACC >> 4;

    ii)   ACC = ACC << 2;

    iii) ACC = ACC and OxOF;

    iv) ACC = ACC ∧ OxFO;

e) Explain need of multitasking and intertask communication in real time operating system.

5. **Attempt any TWO of the following:**   **12**

a) Draw the interfacing diagram of 16 × 2 LCD display with 89C51 microcontroller. List four initialization commands of 16 × 2 LCD.

b) State six features of

    i)   USB

    ii)   Bluetooth.

c) Give detail classification of embedded system. State need of RTOS in embedded system.

6. **Attempt any TWO of the following:**   **12**

a) Draw interfacing diagram of stepper motor to 89C51. Write a program in an embedded - C to rotate stepper motor in anticlockwise direction with half step pulse sequence.

b) Develop 89C51 an embedded - C program to generate square wave of 5 KHz on PI.O. Use timer 0, mode-2 to generate delay. The XTAL frequency is 12 MHz. Calculate value of count to be loaded in timer register.

c) State how baudrate of serial communication changed? Calculate the value of count to be loaded in timer register for 4800 baudrate. Find the values of SFR TMOD, SCON.

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