16172

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) Draw the architecture of 8051.

   ii) Identify the addressing mode used in following instruction.

     a) MOV A, # 55H   b) ADD A, B

     c) MOV @ Ri, 35H   d) MOVC A, @ A + DPTR

   iii) Enlist any 8 features of 8051 μC.

   iv) State difference between microprocessor and microcontroller (4 points).

  B) Attempt **any one** of the following :   **6**

   i) Explain deadlock . How it can be avoided ?

   ii) Draw the labelled diagram to interface 16 × 2 LCD to microcontroller 8051 and state the function of RS, R/W and EN pin of 16 × 2 LCD.

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

   i) Draw PSW of 8051 and state function of each bit.

   ii) Enlist any four addressing modes with one example each.

   iii) State function of pin $\overline{EA}$, $\overline{PSEN}$, RESET, $\overline{ALE}$.

   iv) State the functions of following 8051 instruction

     a) MOV C A, @ A + DPTR   b) SWAP A

     c) MOV 80H, 90H   d) MUL AB

   v) Explain Task synchronization. How it is achieved ?

   vi) Write 'C' or assembly language program for 8051 to transfer letter 'M' serially at 4800 baud rate.

Marks

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

   i) Draw and describe the format of IE SFR of 8051.

   ii) Draw the block diagram of embedded system. Explain various hardware units.

   iii) List the interrupts used in 8051. Give their priorities and vector address.

   iv) Explain the features of RTOS. State how it differs from general operating system.

   v) Draw labelled diagram to interface analog to digital converter ADC 0808 to 8051.

   vi) Explain the starvation with example.

4. A) Attempt **any three** of the following :   **12**

   i) Draw internal RAM and ROM memory organization of 8051 microcontroller.

   ii) Explain in brief :

     a) Device programmer   b) Target board.

   iii) Draw labelled diagram to interface 4 × 4 keyboard to 8051.

   iv) State various software tools available in IDE. Explain any one in brief.

  B) Attempt **any one** of the following :   **6**

   i) Draw the format of TMOD SFR. Explain Timer modes with diagram.

   ii) Draw the interfacing of stepper motor with 8051 and write program in assembly or 'C' language to rotate it continuously in clockwise direction.

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

   i) State any four logical instructions of 8051 microcontroller.

   ii) List alternate functions of port 3 of 8051 microcontroller.

   iii) Draw the interfacing of DAC with microcontroller 8051.

   iv) Draw the format TCON and SCON in 8051 microcontroller.

   v) State various steps in software development cycle of an embedded system.

   vi) State eight applications of embedded system.

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

   i) Explain the following assembler directives with one example of each :

     i) ORG   ii) END

     iii) DB   iv) EQU.

   ii) Draw the format PCON in 8051 microcontroller. Explain function of each bit.

   iii) State two features of simulator and two features of debugger.

   iv) Explain the concept of inter process communication in Real Time Operating System (RTOS).

   v) Explain System-On-Chip (SOC) in embedded system.

   vi) State the need of RTOS in embedded system and describe the specification of RTOS.

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