



17509

15162

3 Hours / 100 Marks

Seat No.

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- 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** : **12**
- a) Compare microprocessor and microcontroller (any four points).
 - b) Draw and explain format of SCON register of microcontroller 8051.
 - c) Write 'C' language program to toggle all bits of Port 1 of 8051 continuously with some delay.
 - d) State alternate pin functions of Port 3 of microcontroller 8051.
- B) Attempt **any one** : **6**
- a) Explain memory organization of 8051.
 - b) Explain following assembler directives :
 - i) DB
 - ii) ORG
 - iii) EQU
 - iv) ENDWith suitable examples.
2. Attempt **any two** : **16**
- a) Write an assembly language program to generate square wave of frequency 2 KHz on port pin P3.0, using timer 1 of 8051. Assume oscillator frequency as 11.0592 MHz.
 - b) Interface 8 bit DAC 0808 to 8051 and write 'C' language program to generate staircase waveform.
 - c) Draw and explain interfacing diagram for DC motor speed control using 8051. Also develop flowchart for the same operation.

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- 3. Attempt any four :** **16**
- a) Draw internal architecture diagram of 8051.
 - b) State the function of Program Counter (PC) and Data Pointer (DPTR) registers of 8051.
 - c) State any four 'C' data types with their range of values.
 - d) Give four important features of 8051.
 - e) Draw neat interfacing diagram of 20× 4 LCD display with 8051 in 8 bit mode.
- 4. A) Attempt any three :** **12**
- a) Draw interfacing diagram for temperature measurement using LM 35 temperature sensor with 8051 microcontroller.
 - b) Write 'C' language program to send out the value 44H serially one bit at a time via P1.0 pin of 8051. The LSB should go out first.
 - c) Compare Von-neumann and Harvard architecture.
 - d) List interrupts of 8051 microcontroller with their vector address and priority upon reset and explain SFR used to enable interrupts of 8051.
- B) Attempt any one :** **6**
- a) Explain the operation of following instructions of 8051 with suitable example each :
 - i) MOVXA, @ DPTR
 - ii) SWAPA
 - iii) SETB bit
 - b) Draw and explain format of TMOD and TCON registers of microcontroller 8051.
- 5. Attempt any two :** **16**
- a) Draw interfacing diagram of 3 × 3 matrix keyboard with 8051 and write 'C' language program to read key status.
 - b) Write algorithm and assembly language program to add two BCD numbers stored at internal RAM locations 40H and 41H store the 8 bit result at internal RAM location 42H.
 - c) Draw the diagram to interface 8 switches to Port 1 and 8 LED's to Port 2 of 8051. Write 'C' language program to display switch status on LED's.
- 6. Attempt any four :** **16**
- a) Explain timer modes of 8051.
 - b) Draw circuit diagram to interface common anode 7 segment display to 8051 and write 'C' language program to display number 0.
 - c) List any four addressing modes of 8051 with one example each.
 - d) Draw the format of PSW register of 8051 and state the conditions to set the flags.
 - e) Draw interfacing diagram to interface relay to port pin P3.0 and opto isolator to port pin P3.7 of 8051 microcontroller.
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