

17509

21819

3 Hours / 100 Marks

Seat No.

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- 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 FIVE :

20

- (a) List any four features of 8051 microcontroller.
- (b) Draw the format of PSW of 8051 and state the function of each bit.
- (c) Describe the following assembler directive with one example each :
 - (i) ORG
 - (ii) DB
 - (iii) EQU
 - (iv) END
- (d) State any four data types in 'C' with their value range.
- (e) Draw the pin diagram of 20×4 LCD display and state the function of RS, EN & R/W pins.

- (f) List the alternate pin functions of Port 3.
- (g) Describe the function of following instructions :
 - (i) `MOVC A, @ A + D PTR`
 - (ii) `DA A`

2. Attempt any FOUR :**16**

- (a) Compare microprocessor and microcontroller (any four points).
- (b) Describe four timer modes of 8051 microcontroller.
- (c) Write an assembly language program to transfer the external memory location content of address 2400 H to internal RAM location 42 H.
- (d) Write instructions to perform following task using 'C' operators :
 - (i) Shift data bitwise 3 times to right
 - (ii) Shift data bitwise 4 times to left
- (e) Draw the format of SCON register and describe each bit.
- (f) Write any four assembly language instructions to make accumulator contents to zero.

3. Attempt any FOUR :**16**

- (a) Convert :
 - (i) $(542)_{10}$ into Hex
 - (ii) $(4FDA)_{16}$ into Binary
- (b) List interrupts in 8051 microcontroller with their priorities and vector address.
- (c) List any four addressing modes of 8051 microcontroller with one example of each.

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- (d) Write a 'C' language program to toggle pin P1.2 continuously with some delay.
- (e) Draw the interfacing diagram for temperature measurement using LM35, ADC 0808 with microcontroller 8051.
- (f) Draw the format of IP register of 8051 microcontroller and state the function of each bit.

4. Attempt any TWO :

16

- (a) Write an assembly language program to find smallest number from the array of ten numbers stored in internal RAM 50 H onwards.
- (b) Write an assembly language program to generate square wave of 5 kHz. on port pin P2.4 using timer 1. Assume XTAL = 12 MHz. (Show delay calculation)
- (c) Draw the interfacing diagram where P2.3 pin of 8051 microcontroller is used to control relay which in turn controls the fan connected to 230 V. Describe operation of this circuit.

5. Attempt any FOUR :

16

- (a) Draw the interfacing diagram of stepper motor to Port 1 pins of 8051. Use ULN 2003 driver IC.
- (b) State the function of following pins of 8051 microcontroller :
 - (i) $\overline{\text{PSEN}}$ (ii) ALE
 - (iii) $\overline{\text{EA}}$ (iv) RST
- (c) Draw the labelled interfacing diagram of ADC 0809 with 8051 microcontroller.
- (d) Describe the dual function of port O in brief.
- (e) Describe any four tools of IDE.

P.T.O.

6. Attempt any FOUR :**16**

- (a) Draw internal RAM organization of 8051 microcontroller.
 - (b) Describe stack and stack pointer of 8051 microcontroller.
 - (c) Draw the interfacing diagram to interface 3×3 key matrix to 8051 microcontroller.
 - (d) Write 'C' language program to transfer the character "A" serially at baud rate 9600, 8 bit data, 1 stop bit. Assume crystal frequency 11.0592 MHz.
 - (e) Draw interfacing diagram to interface relay at P2.0 and opt-isolator at P2.7.
 - (f) Draw the interfacing diagram of 7 segment display to Port P1 of 8051 microcontroller.
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