

314328

25226

3 Hours / 70 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.

Marks

1. Attempt any FIVE of the following :

10

- (a) State two points of comparison between microcontroller and microprocessor with respect to memory and input output ports.
- (b) Find out the number of address line required to access 4KB of RAM.
- (c) Define stack pointer. Write size of stack pointer.
- (d) Draw format of TCON, SFR.
- (e) Enlist any two instructions which make accumulator zero.
- (f) Draw interfacing diagram of 4×4 keyboard matrix with 8051 microcontroller.
- (g) Give any two applications of stepper motor.

2. Attempt any THREE of the following :

12

- (a) Draw the interfacing diagram of stepper motor with 8051 microcontroller and write an ALP to rotate stepper motor in clockwise direction.
- (b) Explain power saving mode in 8051 with circuit diagram. Which SFR is used to set these modes and draw the same ?



- (c) State any 4 LCD commands with hex code.
- (d) Write an assembly language program to generate square wave on port pin 1.5 of 8051 microcontroller using Timer 0 in mode 1. Assume clock frequency as 12 MHz.

3. Attempt any THREE of the following :

12

- (a) State and explain software development cycle used for application development with microcontroller.
- (b) Draw and explain I/O port structure of Port 0 of 8051 microcontroller.
- (c) Draw the format of IE and IP, SFR.
- (d) Draw interfacing diagram of LCD with microcontroller 8051. Explain the function of following pins (i) RS (ii) V_{EE} .

4. Attempt any THREE of the following :

12

- (a) Interface ADC 0809 with 8051 and write a program to read data from the device and convert to digital data.
- (b) Describe the function of following instruction of 8051 :
 - (i) SWAP A
 - (ii) MOVC A, @ DPTR
 - (iii) ADD A, @ Ro
 - (iv) INC @ Ro
- (c) Compare Harvard and Vonneuman Architecture.
- (d) Develop an ALP to transmit message "MSBTE" serially at baud rate 4800, 8 bit data, 1 stop bit. Assume crystal frequency of 11.0592 MHz.
- (e) Draw water level controller design using 8051. Write program for the same.

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

- (a) Sketch 8051 interfacing diagram to interface 4 LED's and 4 switches interface switches to Port 0 and LED to Port 8051 upper ripple. Develop an ALP to read status of switches and operates LED's as per switch status.
- (b) Write an ALP to find largest number from given array of 10 bytes in external RAM 3000 H onward.
- (c) Sketch memory organization of 8051 and label it showing register banks bit addressable location, SFR area, external data and code memory.

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

- (a) Explain different addressing modes of 8051 with suitable example of each.
 - (b) List the software and hardware interrupts used in 8051 with their vector address and priorities.
 - (c) Write ALP for generation of triangular waveform using DAC. Draw interfacing diagram for same.
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