

17626

21819

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. Attempt any FIVE of the following :

20

- (a) Draw the format of TMOD SFR. Explain the function of each bit.
- (b) State various addressing modes available in 8051 with two examples each.
- (c) List alternate functions of port 3 of 8051 microcontroller.
- (d) Draw labelled diagram to interface 4×4 keyboard to 8051.
- (e) State four features of embedded systems and state any four applications.
- (f) Differentiate between RTOS and Desktop Operating System.
- (g) Explain system on chip (SOC) in embedded system.

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

- (a) Describe any four assembler directives used in assembly language programming.
- (b) Draw the format of IE SFR. Explain the function of each bit.
- (c) Draw the diagram to interface DAC 0808 to 8051. Write the program in assembly or “C” to generate ramp wave.
- (d) Draw and explain the format of TCON register.
- (e) Explain interprocess communication in RTOS.
- (f) State the function of the following :
 - (i) In Circuit Emulator (ICE)
 - (ii) Integrated Development Environment (IDE)
 - (iii) Target Board
 - (iv) Device Programmer

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

- (a) Explain task synchronisation and mutual exclusion in RTOS.
- (b) State various steps in software development cycle of an embedded system.
- (c) Draw and explain the RAM structure of 8051.
- (d) Explain the following 8051 instructions :
 - (i) SET B C
 - (ii) SWAP A
 - (iii) MOV 80H, 90H
 - (iv) MUL AB
- (e) Write program in “C” or assembly language to generate a square wave of 50% duty cycle on bit “0” of port 1.
- (f) Draw labelled diagram to interface Analog to Digital converter (ADC) 0808 to 8051.

4. Attempt any FOUR of the following :**16**

- (a) With suitable example, describe the concept of device driver.
- (b) Write an assembly language program or C program for rotating stepper motor in clockwise direction continuously using four step sequence.
- (c) Explain the need and requirement of RTOS in an embedded system.
- (d) State the features of microcontroller 8051.
- (e) Write an assembly language program for the 8051 microcontroller to multiply two 8 bits numbers stored at memory location 20H and 21H. Store the product at 22H (LSB) and 23H (MSB).
- (f) Describe the functions of part 1 of 8051 microcontroller and also draw the internal structure of part 1.

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

- (a) Draw the labelled diagram to interface 16×2 LCD to microcontroller 8051.
- (b) What is serial interface ? Explain interrupts present in microcontroller 8051 for it.
- (c) Draw the block diagram of embedded system. Explain various Hardware units.
- (d) What is a task in an embedded system ? What are various states of a task ?
- (e) Draw the format of PSW. Explain the function of each bit.
- (f) Write a program to unpack the 8 bit number using 8051 microcontroller instructions using C or assembly language.

P.T.O.

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

- (a) Write a program to toggle the LED connected to P1.7 on every occurrence of external interrupt INTO.
 - (b) Explain Deadlock. How it can be avoided ?
 - (c) Why 8051 is known as Boolean processor ? Explain with suitable instructions.
 - (d) State various advantages and disadvantages of embedded systems.
 - (e) Draw the interfacing diagram of seven segment multiplexed display with 8051 microcontroller.
 - (f) State the difference between microprocessor and microcontroller. (Any 4 points)
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