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** :   **12**

     i) Compare between microprocessor and microcontroller on any four points.

     ii) Draw the interfacing diagram of four 7-segment display with 8051 microcontroller.

     iii) What are the different data types used in 'C' ? Give their value range.

     iv) State alternate pin functions of port 3 of 8051 microcontroller.

B) Attempt **any one** :   **6**

     a) Draw the organisation of internal RAM of 8051 and describe in brief.

     b) Explain any four assembler directives with suitable examples.

2. Attempt **any two** :   **16**

     a) Describe the addressing modes of 8051 microcontroller with 2 example of each.

     b) Draw neat diagram to interface 8 bit DAC 0808 with 8051. Write 'C' language program to generate staircase waveform.

     c) Assuming temperature control system using LM35 as temperature sensor and ADC 0809. Draw flow chart of this system to maintain the temperature within 25°C to 30°C.

3. Attempt **any four** :   **16**

     a) Draw the format of PSW SFR and describe the function of each bit.

     b) Draw the block diagram of internal architecture of 8051 microcontroller.

c) Write the instructions for following operations using 'C' operators
   i) Bitwise shift data left 4 times   ii) Bitwise shift data right 3 times.

d) Compare between RISC and CISC machines.

e) Draw the interfacing diagram to connect 8 LEDs to port 2 of 8051 microcontroller. Also write 'C' language program to turn ON and OFF LEDs with some delay.

4. A) Attempt **any three** :   **12**

   a) Draw the interfacing of stepper motor with 8051 microcontroller. Also draw flow chart to rotate the motor through 360° in clockwise direction.

   b) Write 'C' language program for 8051 microcontroller to toggle part 1.0 with some delay.

   c) Compare between Von-Neumann and Harvard architecture with neat diagram.

   d) List the interrupts of 8051 microcontroller with their vector address and priority upon reset. Explain SFR used to enable interrupts.

B) Attempt **any one** :   **6**

   a) Write an assembly language program for 8051 microcontroller to find the average of ten 8 bit numbers stored in internal RAM location 20 H onwards. Store the result at 31 H.

   b) Compare bet^n 8051 and 8052 microcontroller on the following points
      i) Onchip ROM   ii) Onchip RAM   iii) No. of timers   iv) Interrupts

5. Attempt **any two** :   **16**

   a) Draw the interfacing diagram to interface 8 switches to port 0 and 8 LEDs to port 1. Write 'C' language program to read switch status and display the same on the LEDs.

   b) Write an assembly language program to transfer array of ten numbers stored in memory location 50 H to memory location 60 H.

   c) Write an assembly language program for 8051 to generate square ware of 1 KHz on port pin P1.1. Use timer 1 and assume crystal frequency to be 12 MHz. Clearly show the necessary calculation with comments.

6. Attempt **any four** :   **16**

   a) Draw the internal structures of port 0 of 8051. Label the same. Describe the process to read port 0 pin status.

   b) Write 'C' language program for 8051 to transmit message "MSBTE" serially at 9600 baud, 8 bit data, 1 stop bit, assuming crystal frequency to be 11.0592 MHz.

   c) With neat algorithm, write an assembly language program to add two BCD numbers stored at internal RAM locations 30 H and 31 H. Store the result in internal RAM location 40 H.

   d) Draw and describe the format of IP SFR of 8051.

   e) Draw interfacing diagram to interface relay at P1.0 and opto-isolator at P1.7 of 8051 microcontroller.

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