23124

3 Hours / 70 Marks   Seat No. ☐☐☐☐☐☐☐☐

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)   Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1.   **Attempt any FIVE of the following :**   **5 × 2 = 10**

(a)   Draw :

(i)   Harvard architecture

(ii)   von Neumann architecture

(b)   Give significance of RI and TI interrupt used in serial communication.

(c)   Write a C program to read the number 1 from P1, number 2 from P2, add them and send result to P3.

(d)   Explain the function of SOC and EOC pin of ADC.

(e)   List any four features of ATmega 328 microcontroller.

(f)   List the pins of microcontroller used for external memory interfacing.

(g)   Justify Thumb mode bit function of ARM7TDMI processor.

2. Attempt any FOUR of the following : 4 × 3 = 12

(a) Define bus. Describe address bus, data bus and control bus.

(b) Describe Editor, Compiler, Debugger.

(c) Draw format of IE and IP register.

(d) Sketch interfacing diagram of 8K RAM to 8051.

(e) Explain C++ function.

    (i) setup( )

    (ii) loop( )

    (iii) pin mode( )

3. Attempt any FOUR of the following : 4 × 3 = 12

(a) Distinguish 8051, PIC, AVR microcontrollers on the basis of memory and communication protocols.

(b) List alternate functions of Port 3 of 8051 microcontroller.

(c) Draw and explain PCON SFR in microcontroller.

(d) Write a C program to rotate the stepper motor in clockwise direction to 180° with step angle 1.8° to generate 4 step sequence.

(e) Draw interfacing diagram of relay with Arduino.

4. **Attempt any THREE of the following :** **3 × 4 = 12**

(a) Draw the interfacing diagram of key and LED to 8051 to pins P1.0 and P2.0. Write a C program to read the status of key and display on LED.

(Key open = LED Off, Key close = LED On)

(b) List any four data types for 8051 with their size in bits and data range.

(c) Write a C program to send character 'A' serially at 9600 baud rate, 8 bit data and 1 stop bit continuously.

(d) Explain pin mode setting function in Arduino with example.

(e) Draw interfacing diagram of 8051 with RS232 and MAX232.

5. **Attempt any THREE of the following :** **3 × 4 = 12**

(a) Write a C program to toggle only bit P1.2 continuously every 60 ms. Use Timer 0, Mode 1 to create the delay. The XTAL frequency is 11.0592 MHz.

(b) Write a C program that display the count from 00h to FFh on the LED's connected to Port 1 with delay of 200 ms.

(c) Draw interfacing diagram of 4 × 4 matrix keyboard with microcontroller 8051.

(d) Compare 8031, 8951 and 8751 on the basis of RAM, Port and interrupt.

(e) Draw architecture of 8051.

6. **Attempt any TWO of the following :** **2 × 6 = 12**

(a) Draw the format of TMOD register. Explain each bit of it.

(b) Draw interfacing diagram of Arduino with DC motor. Write a 'C' program to rotate dc motor continuously.

(c) Draw interfacing diagram of 8051 with DAC 0808. Write a C program to generate a square wave from DAC 0808.

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