16117

3 Hours / 100 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.

Marks

1. (A) Attempt any THREE : **12**

(a) Compare Von-Neumann and Harvard architecture. (any four points)

(b) List the elements of Microcomputer. Explain any two in detail.

(c) Draw the architecture of 8051 μc.

(d) Write the operation of the following instructions of 8051 :

(i) CJNE A, direct, rel

(ii) MUL AB

(iii) XCHD A, @ Ri

(iv) MOVX A, @ DPTR

(e) Draw the control word format of 8255 for I/O mode. Write a control word to configure 8255 as below :

(i) Port A as an input port in mode 0

(ii) Port B as an output port in mode 1

(iii) Port C as an input port in mode 0

(B) Attempt any ONE : **6**

(a) Write an assembly language program for 8051 microcontroller to add five 8 bit numbers stored in internal RAM from 50 H onwards store the result at 60 H.

(b) Draw the interfacing diagram of stepper motor with 8051 microcontroller. Write an assembly language program to rotate the stepper motor continuously in anticlockwise direction. Assume step angle is 0.9°/step.

2. Attempt any FOUR : **16**

(a) Explain Boolean processor of 8051 microcontroller with two instructions.

(b) Explain four timer modes of 8051 μc.

(c) Write an assembly language program to add two BCD numbers 66H and 95 H which are stored at external memory location 3000 H and 3001 H respectively. Store the result at memory location 3002 H.

(d) Explain the function of following registers of 8051.

(i) Stack pointer

(ii) DPTR

(iii) Program counter

(iv) Accumulator

(e) Give the address of the SFRS T_{CON}, T_{MOD}, IE, S_{CON}, TL_0, TL_1, SBUF & IP.

(f) Draw the general block diagram of microprocessor. Explain the function of each block.

3. Attempt any FOUR : **16**

(a) State the need of directives used in assembly language programming. Explain any two directives with examples.

(b) Draw the software development cycle. State the function of editor, assembler and cross compiler.

(c) If the initial contents of ACC = OFH. State the accumulator contents after execution of the following instructions independently.

(i) CPLA

(ii) RRA

(iii) ANLA, #OFOH

(iv) SWAPA

(d) List any four important features of 8051 microcontroller.

(e) State the alternate function of port 3 pins of 8051 microcontroller.

4. (A) Attempt any THREE : 12

(a) Explain the following addressing modes with the help of ADD instruction in

(i) Direct addressing mode

(ii) Indirect addressing mode

(iii) Register addressing mode

(iv) Immediate addressing mode

(b) Draw the port O pin circuit and describe the operation.

(c) Explain the four operating modes of serial communication of 8051 microcontroller.

(d) Write an assembly language program for 8051 microcontroller to transfer letter 'A' serially at 4800 baud rate continuously.

(B) Attempt any ONE : 6

(a) Write an ASL program in 8051 μC to find largest number from the array of ten numbers stored in external RAM memory. Starting at 3000 H.

(b) Draw interfacing diagram of 4k byte EPROM and 4k byte RAM to 8051 microcontroller. Draw memory map.

P.T.O.

5. Attempt any FOUR : **16**

(a) List the interrupts used in 8051. Give their priorities and addresses.

(b) Describe the function of following pins of 8051 microcontroller.

(i) $\overline{EA}$/VPP

(ii) ALE/$\overline{PROG}$

(c) Draw the format of IE register and describe it.

(d) Write an assembly language program to get a byte of data from port 0. If it is greater than 99 H, send it to port 1 ; otherwise send it to port 2.

(e) Draw the format of PCON SFR. How is it used to double the baud rate in serial communication ?

6. Attempt any FOUR : **16**

(a) Write an assembly language program to generate continuous square wave of 2kHz on pin $P_{1.3}$. Using mode 1 of timer 0. Assume crystal frequency as 11.0592 MHz.

(b) Draw and explain the format of IP register of 8051 microcontroller.

(c) Describe the function of following handshaking signals of 8255.

(i) IBF

(ii) $\overline{STB}$

(iii) $\overline{ACK}$

(iv) $\overline{OBF}$

(d) Explain T_{CON} register of 8051 with its format.

(e) Describe any four selection factors of microcontroller.

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