17534

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

Marks

1. a) **Attempt any <u>THREE</u> of the following:** **12**

(i) Compare between microprocessor and microcontroller wrt.

1) Instruction set

2) Applications

3) Memory organization

4) I/O compatibility

(ii) Describe the bus structure in microcomputer.

(iii) List and explain the important features of 8051 microcontroller. (any four)

(iv) What are assembler directives? Give any three examples with use.

(v) Differentiate between linear and absolute decoding techniques (any four points)

P.T.O.

Marks

b) **Attempt any ONE of the following:** **6**

(i) Write an assembly language program for 8051 microcontroller for finding the largest number in a given set of 05 number (Assume suitable data/memory addresses)

(ii) Draw a diagram to interface 4K byte EPROM and 4K Byte RAM to 8051 microcontroller. Draw the memory map.

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

a) Define the program status word of 8051 microcontroller and state its functions with examples.

b) List the pins used for accessing the external memory / devices and demultiplexing the lower address / data bus alongwith their description.

c) The fit addressable feature in 8051 microcontroller makes it more powerful than microprocessor, justify your answer.

d) List the register banks used for in 8051 microcontroller. Give their ranges.

e) State and describe the alternate functions of port 3 pins of 8051.

f) Compare between Harvard and Von-Neumann architecture (4 points)

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

a) State the function of compiler, linker, assembler and editor in S/W development.

b) Describe the function of following instructions of 8051 microcontroller:

(i) XCH A, R1

(ii) RRA

(iii) MOV A, # 40H

(iv) SWAP A

c) Write an ALP for 8051 microcontroller to multiply two 8-bit numbers 23H and 15H. (Assume suitable memory addresses to store the result)

d) List the addressing modes of 8051 microcontroller. Describe the indexed addressing mode with an example.

e) List and describe the modes of serial communication used in 8051.

Marks

4. a) **Attempt any <u>THREE</u> of the following:** **12**

(i) Describe the following 8051 microcontroller instructions:

1) MOVX A, DPTR

2) DIV A B

3) SET B C

4) SJMP addr.

(ii) State and explain the use of SCON and SBVF register of 8051.

(iii) Write an assembly language program to send message ''HELLO'' serially at 4800 band rate continuously (Crystal frequency = 11.0592 MHz)

(iv) Write an assembly language program to toggle all the bits of port 2 of 8051 continuously.

b) **Attempt any <u>ONE</u> of the following:** **6**

(i) Write an ALP to arrange the given data in ascending order in 8051 microcontroller:

Data: (40 H) = 09 H
(41 H) = 07 H
(42 H) = 12 H
(43 H) = 25 H
(44 H) = 01 H

Store the result in, (50 H) to (54 H)

(ii) Draw the interfacing diagram of 8 LED's to port 2 of 8051 microcontroller. Write an ALP to make LED ON and OFF after 100 ms delay.

(iii) Draw interfacing diagram of relay with 8051 microcontroller. Write ALP to turn ON and OFF relay.

Marks

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

a) Draw the format of IP register of 8051 microcontroller. Describe the function of each bit in it.

b) Draw the format of TMOD register of μC 8051 and describe function of each bit in it.

c) Describe the interrupts in 8051 microcontroller with their priorities.

d) Write an ALP for 8051 microcontroller to generate square wave on port pin P2.1 using delay subroutine.

e) Describe the alternative functions of port '0' and port 2 in 8051.

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

a) Draw the format of IE register of μc 8051 and describe function of each bit in it.

b) Differentiate between the uses of 8051 as timer and counter.

c) Write an ALP for 8051 microcontroller to generate a delay of 500 ms by using timer 1. Assume crystal frequency = 12 MHz.

d) Draw the block diagram of IC 8255 and describe its operating mode.

e) Give any four addressing modes of μc 8051 with examples of each.