2007

ELECTRONICS.

PAPER-X

Full Marks : 75

Time : 3 hours

*The figures **in the right-hand margin indicate** full marks.*

Candidates are required to give their answers in their own *words as far as practicable.*

Illustrate the answers *wherever necessary:*

Write the. **answers** *questions of each Group* **in *separate* books**.

Answer *Q. No. 1* and any *three* from the rest in each group.

Group = A

(Marks : 40)

(a) The address capability of 8085 µp is 64 kB. Explain.

(b) Make a comparison between memory mapped I/O and I/O mapped I/O.

(c) In an interrupt driven system, El instruction should be incorporated at the beginning of the program. Why?

(d) Why DMA mode of data transfer scheme is very fast ?

(e) What is the basic difference between 8085 and 8088 up?   2x5

2. (a) Briefly describe Memory Read and Write machine cycles of 8085 **microprocessors** and show the **waveforms.**

   (b) Design a 32X4 memory module by using two 16X4 memory chips. (3+2+2)+3

3. (a) 2 kB RAM, **2kB ROM**, **one input and one output devices are to be interfaced with 8085 uP. Employ memory mapped I/O and I/O mapped I/O schemes to execute it respectively.**

   (b) A set of three readings is stored in memory starting at XX50H Write a program for an 8085 µP to arrange the readings in ascending order.

   Data (H) : 25, .87, 56. (3+3)+4

4. (a) What is 8255A ? **Draw its block diagram.**

   (b) Explain how the different ports and control words are selected for 8255A.

   (c) Show the control word format of 8255A . (1+3)+3+3

5. (a) Write down the main features of 8259.

   (b) Mention different types of Rotating Priority Mode of interrupt and Explain.

   (c) On which registers status read operations can be done ? Mention when status read operation is not possible. 3+(1+4)+(1+1)

6. (a) What is meant by serial and parallel interface standards ?

   (bj Why are current loops used with teletypes ? What are logic levels in the 20-mA and 60-mA current loops ?

   (c) Mention in which cases RS 232C are used. How RS 232C is interfaced with TTL?

   (d) Distinguish between the IEEE 488 standard and IEEE 488 bus.   2+(2+ 2 + 2)+(1 +2)+2

Group - B

(Marks ; 35)

1. (a) **What do you** mean by VLSI ; **and mention its advantage over LSI.**

   (b) Name in order the basic processing steps used in the fabrication of VLSI circuits.

   (c) What is the bird's beak structure ?

   (d) What do you mean by anisotropic etching ?

   (e) Write Rent's rule in packaging of VLSI.   1X5

2. (a) Explain a two-step diffusion process commonly used in IC processing.

   (b) What is ion implantation ? Describe with a schematic diagram an ion implantation system.

   (c) What are the problems involved in ion implantation ? How can they be solved ?   3+(1+3)+(l 2 + 1 2)

3. (a) What is the purpose of etching in VLSI technology ?

   (b) What are the different methods of etching? Make a .comparison among them.

   (c) How can Si02 layers, and Al and Al-alloy films be etched out?

      Calculate the Al average etch rate and etch rate uniformity on a 200 mm diameter silicon wafer, assuming the etch rates at the centre, left, right, top, and bottom of the wafer are 750, 812, 765, 743, and 798 nm min-1, respectively.   1+(1+2)+(2+2+1+1)

4. (a) What are the advantages of polysilicon in VLSI technology ? How is polysilicon deposited ?

   (b) What is the salicide process ? Mention its advantage.

   (c) Explain the process P-glass. flow'.   .(2+3)+(2+1)+2

5. (a) What is CMOS ? Mention its advantage:

   (b) Discuss the fabrication steps for a twin-tub CMOS with neat **diagrams**. Write the purpose of the twin tub process.   1+1+(7+1)

6. (a) Discuss the basic principle of operation of CCDs. What is the dark-current effect in relation to CCDs ?

   (b) Explain clearly the limitations of VLSI.   (6+1)+3