2021

COMPUTER SCIENCE — HONOURS

Paper : DSE-A-3

(Embedded Systems)

Full Marks : 50

The figures in the margin indicate full marks.

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

Answer **question no. 1** and **any four** from the rest.

1. Answer **any five** questions : 2×5

   (a) What are program lock bits?

   (b) Draw the Power On Reset Circuit. What is the purpose of it?

   (c) What is the purpose of port registers?

   (d) What is the difference between CY and OV flags of PSW related to MCS-51?

   (e) Which part of the internal RAM is related with PUSH and POP instructions?

   (f) What would be the content of DPH after execution of MOV DPTR, #1234H instruction? Justify your answer.

   (g) How many bytes of forward jump are possible for any DJNZ instruction?

   (h) Highlight the main differences between PAL and FPGA.

2. (a) Explain the operation of LCALL instruction of MCS-51 with suitable example.

   (b) What is the purpose of SETB instruction? 7+3

3. (a) Implement the following using a PLD circuit. Where O1, O2, O3 and O4 are outputs.

   $O1 = A.B + A.B$
   $O2 = A.B$
   $O3 = 0$
   $O4 = 1$

   Explain it with suitable circuit diagram.

   (b) What is VHDL? 7+3

4. (a) Write a short note on SFRs (Special Function Registers) of MCS-51.

   (b) Write an Assembly language program with algorithm for MCS-51 to shift a block of 8 bytes of data, presently located from 60H to 67H, 1-byte up, so that the data is available from 61H to 68H. 5+5

Please Turn Over

5. (a) Explain the working of Port - 0 of MCS-51 with suitable diagram.

   (b) What is SBUF? Explain its function. 6+4

6. (a) What are the different types of Unconditional jumps in MCS-51? Explain in brief with suitable example and diagram.

   (b) What is an interrupt? Which SFRs are directly related to external interrupts of MCS-51? 7+3

7. (a) Show with a simple circuit to interface a LED to port 1.0 of a MCS-51 and make it to blink using an assembly language program.

   (b) What is function of RET? 8+2

8. (a) What is the difference between Timer and a Counter?

   (b) Explain with the help of simple hardware interfacing circuit with port 1.0 and P1.1 of MCS-51 connected to DC motor through a controlling module for direction control through software for a DC motor. 2+8