

SUBJECT: - PROGRAMMABLE LOGIC AND MICROCONTROLLER

Time: Three hours

Full Marks: 100

Answer any five questions.

20×5

1. a. Using a diode-based AND matrix and transistorized OR matrix, draw a complete circuit to implement a full-adder block. Explain your solution. 10
b. What is antifuse? Explain its working principle, merits and demerits of its use. 10
2. a. Describe the working principle of an EPROM device. 7
b. How does a transistorized switch driven by SRAM Cell work to interconnect row and column wires? 7
c. What are the merits and demerits of SRAM cell used in a programmable switch? 6
3. a. Describe with neat circuit diagram, the functionality of a commercially available FPGA chip. 10
b. Develop and show the programmed structure of a PLA implementing an odd parity generator of 3-bit input. 5
c. Why has *In-System Programming* become popular over *out-of-board programming*? 5
4. a. What are the various bit-shift operations and commands available in VHDL? What is the data-format for using the commands? 10
b. Write a program in VHDL to implement one 12-bit up/down counter. The counter will be triggered by negative edge of a clock. The down-count command will have higher priority over up-count. 10
5. Write the complete format of the following instructions with at least one example for each of the instructions and mention the effects of these instructions on flags. 4×5
(i) CJNE,
(ii) MUL,
(iii)XCHD,
(iv)ADDC.
6. a. Assume that RAM locations 60H – 66H have following values: 46H, A2H, EFH, 8DH, ABH and D9H, C3H. Write a program to find sum of values. A and R6 should contain lower and higher byte, respectively. 10
b. Write a program to blink LED every 100ms using timer-1 in mode-1 using interrupt driven method. Assume that the LED is connected to P1.5 of the microcontroller. 10

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BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) EXAMINATION, 2019

3rd Year, 2nd Semester

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7. a. Write the name of flags and the way they are affected after the following instructions are executed. 10
i) DIV ii) CJNE iii) SUBB iv) MOV v) MUL
- b. What do you mean by overflow? How does the overflow flag indicate the occurrence of an overflow? In what way is it different from the carry flag? 10
8. Write short notes on any FOUR: 4×5
- Interrupts of Intel 8051 microcontroller;
 - Branching instructions of 8051;
 - Special Function Registers of 8051.
 - LAB in CPLD;
 - Macrocell and its implementation;
 - SFRs for timer-counter.