

B. E. IN ELECTRICAL ENGINEERING (EVENING) EXAMINATION, 2017

3rd Year, 2nd Semester

SUBJECT: - PROGRAMMABLE LOGIC AND MICROCONTROLLER

Time: Three hours

Full Marks: 100

- Answer any five questions.** 20×5
1. a. Describe the working principle of an EPROM device. 7+7+6
 b. How does a transistorized switch driven by SRAM Cell work to interconnect row and column wires?
 c. Why has *In-System Programming* become popular over *out-of-board programming*?
 2. a. Describe in brief the switching technologies adopted in constructing FPGA. 10+10
 b. Give a complete circuit of PAL and explain the working principle of each part.
 3. 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+10
 b. What is antifuse? Explain its working principle, merits and demerits of its use.
 4. a. Write a program in VHDL to generate a clock of 5KHz frequency from an existing on-board clock of 50MHz. 10+10
 b. Write a program in VHDL to implement a n -to- 2^n decoder.
 5. a. What are the different addressing modes of 8051? Explain with necessary examples. 10+10
 b. Draw an appropriate hardware diagram showing the interface of a 7-segment display module with microcontroller and write a program to display the character 'A'.
 6. a. Write a program to receive a block of 20 data through the serial port and store them in internal memory starting from the address 40h onwards. Assume 9-bit data and a baud rate of 4800. Write appropriate comment in favour of your solution. 10+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.

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7. a. Write the name of flags and the way they are affected after the following instructions are executed. 10+10
i) DIV ii) CJNE iii) SUBB iv) MOV v) MUL
- b. Write the commands of various branching instructions available in 8051 microcontroller. Mention their complete formats, range of jumps and associated constraints.
8. Write short notes on any FOUR: 4×5
- JTAG cable;
 - LAB in CPLD;
 - LUT and its application;
 - Macrocell and its implementation;
 - SFRs for timer-counter;
 - Program counter in branching instructions (8051).