

B. ELE. ENGG. 3RD YR 1ST SEMESTER SUPPLE EXAMINATION, 2017**SUBJECT: - PROGRAMMABLE LOGIC & MICROCONTROLLER**

Time: Three hours

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

PART I*Answer any FIVE:*

5x10

1. Give a complete circuit of PAL and explain the working principle of each part. 10
2. Using a diode-based AND matrix and transistorized OR matrix, draw a complete circuit to implement a full-adder block. Explain your solution. 10
3. Draw a macrocell and show how it is used to implement different types of circuits. What are the disadvantages of SRAM based switch? 7+3
4. Describe with neat circuit diagram, the functionality of a commercially available FPGA chip. 10
5. How can the different functions be implemented using multiplexer? Draw two commercial models using multiplexers and show how they are used for the purpose. 5+5
6. Write a complete program in VHDL to generate a ROM containing one LUT of triangular wave. Size of the LUT is 8-byte. Show the mathematical expression as well as the resulting data used in LUT. 7+3
7. 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 downcount command will have higher priority over upcount. 10
8. Write short notes on any TWO of the following: 2x5
 - a) Antifuse;
 - b) Process flow in VHDL;
 - c) Look-Up Table in FPGA structure;
 - d) JTAG Cable.

B. ELE. ENGG. 3RD YEAR 1ST SEMESTER (SUPPLEMENTARY) EXAMINATION, 2017**SUBJECT: - PROGRAMMABLE LOGIC AND MICROCONTROLLER**

Time: Three hours

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART II	Marks
	<p><u>Answer any three</u> <i>Two marks reserved for neatness.</i></p>	
1.	Write the mnemonics of various rotate instructions available in context with the programming of 8051. Explain each of them along with appropriate examples.	16
2.	Explain the operation of following instructions: i) JBC 03H, 04H ii) CJNE @R0, 05H, 06H iii) DJNZ 08H, 09H iv) MUL AB	4x4
3.	a) Write a program to generate a square wave of 1kHz frequency at pin P2.3 of 8051 on crystal frequency of 11.0592MHz.	8
	b) Write a program to implement the following function: $y(x) = 3x^2 + 5x, \quad 0 \leq x \leq 5$ Input x is received from port-3 and the output y is delivered to port-1.	8
4.	Write short notes on any two: a) Ports of 8051. b) Modes of Timer in 8051. c) Activation of Interrupts in 8051.	2x8
5.	Write the bit formats of following SFRs and mention in short their functions: a) TCON b) PSW c) IE d) SCON	4x4