Ref No: EE/T/316/2018

B. E. ELECTRICAL ENGINEERING 3RD YR 1ST SEMESTER EXAMINATION, 2018

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 question no. 1 and any ***two*** from the rest of the questions.
Two marks are for neatness and well organized answers.

1. *Answer any SIX.* 6x3
   i. Why buffers are used at the input side of PLA?
   ii. Name different switching techniques employed in configurable hardware.
   iii. What are the programming techniques available for CPLDs? Discuss briefly.
   iv. What is a JTAG cable? What is its role in context with device programming?
   v. How can ROM be used as PLD?
   vi. Distinguish between SPLDs and CPLDs.
   vii. What is an ASIC?
   viii. What are the different logic states available in VHDL as per IEEE standard?

2. a) Explain with proper circuit diagram, how a single macrocell can be used to implement various outputs. 7
   b) Discuss the different steps involved in simulation and synthesis in a typical CAD system. 8

3. a) Illustrate with relevant circuits the operation of a PAL device. 10
   b) Draw neatly an OR matrix and show how different minterms can be ORed. 5

4. a) Discuss the antifuse switching technology employed in FPGA with proper example. Discuss the applications of FPGA. 7
   b) Draw and explain a circuit diagram to implement the logic function $f = ab + \bar{c}$ using transistor pair logic in FPGA. 8

5. a) Write a VHDL program to develop XOR gate using OR gate, AND gate and NOT gate with proper circuit diagram. Also write a proper test bench program to generate input signals and draw the waveform of input and output signal. 10
   b) Develop a Tri-stated gate with proper test bench program in VHDL. 5

[Turn over

B. E. ELECTRICAL ENGINEERING 3RD YEAR 1ST SEMESTER EXAMINATION, 2018

SUBJECT: - MICROPROCESSOR AND MICROCONTROLLER

Full Marks 100

Time: **Three hours** (50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART II	Marks
	Answer question no. 1 and any two from rest:	
1.	Answer *any **Three*** of the following questions on 8051 platform: a) Write bit-format of the register SCON along with the functions of each of its bits. Hence, write a program segment to configure serial port for continuous transmission of data at a Baud rate of 19200. Comments are not necessary against the segment of program. b) Write the names of SFRs that are used partially or fully for configuring interrupts and running interrupt related routines. State the bit-format of any one of such SFRs and explain the functions of all the bits of the SFR. c) Mention the names of three pins that are used to interface external code memories. Draw neatly an appropriate schematic diagram showing such interface. d) Write a complete mnemonic to perform each of the following tasks (i) store the content of accumulator into an external data memory (ii) store the content of R0 of bank-1 into a location of stack memory (iii) configure port-1 as input port (iv) decrement R2 until it is zero (v) jump relative by 34H if the addressable bit 06H is '1' (vi) detect "divide by zero error" e) Describe the on-chip memory map of the microcontroller.	3x6 = 18
2.	a) Write a program to blink LED at a frequency of 400Hz using timer-0. The following conditions are to be considered. (i) The on-time of the LED should be 80% of its off-time. (ii) The light will continue to blink as long as INT0 pin is high. (iii) The LED is connected to P3.5 of the microcontroller 8051. (iv) The microcontroller runs on 10MHZ clock. Explain your solution.	10

	b) Write the names of alternate functions of port-3.	6
3.	Write short notes on any ***two***:	2x8
	i) Priorities of interrupt and their alterations ii) Addressing modes of 8051 (iii) Assembler directives	
4.	a) The START and STOP switches of a motor are connected to pins P1.0 and P1.1 of an 8051 microcontroller. A seven segment display is connected to the pins of P3 of the microcontroller. Write a program to ensure the following operations: (i) After the START switch is pressed, '1' is displayed for 1 second. (ii) Then, 'c' is displayed as long as motor continues to run. (iii) After the STOP switch is pressed, '0' is displayed until the motor is started again. Explain your solution.	10
	b) Write the name(s) of the flag(s) and the way they are affected by the following instructions; (i) DIV AB (ii) SUBB (iii) CJNE	6