

Registration No :

--	--	--	--	--	--	--	--	--	--

Total Number of Pages : 02

B.Tech  
PEI4I103

4<sup>th</sup> Semester Regular / Back Examination 2018-19

DIGITAL ELECTRONICS

BRANCH : AEIE, EIE, IEE

Max Marks : 100

Time : 3 Hours

Q.CODE : F680

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- Draw the basic configuration of three PLDs.
- What do you understand by "cell adjacency"?
- Why the term 'Line' is associated with encoders and decoders?
- How shift registers are different from general registers?
- As NAND and NOR gates are universal logic gates, which is a universal combinational logic?
- Draw the block diagram of a memory unit.
- Write the significance of excitation table in flip-flops.
- How A/D conversion takes place?
- Suggest a code converter used to convert  $(10110111)_2$  to  $(11101100)_2$ .
- Prove the identity,  $1+X+Y+\dots = 1$ .

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Using CMOS logic, implement the function  $F(A, B, C) = AB + BC + AC$ .
- Design a 16:1 MUX using 2:1 MUX(s) only. Mention the LSB and MSB in the diagram.
- What are types of Floating-point representation of numbers? Explain them.
- Differentiate between Programmable Logic Array and Programmable Array Logic.
- Design a 4-bit magnitude comparator. Draw the necessary circuit.
- Express the complement of the following function in sum-of-products form.  
 $F(A, B, C, D) = \sum(3,5,9,11,15)$
- Explain the properties of I<sup>2</sup>L logic family in details.
- How will you convert a D flip-flop to SR flip-flop? Show the necessary tables and draw the diagrams.
- Given two numbers,  $X = 1010100$  and  $Y = 1000011$ , perform the subtraction  $X - Y$  and  $Y - X$  using 2's complement method.
- Show that the dual of exclusive-OR is equal to its complement.
- Explain the Master-Slave operation using JK flip-flop. Draw the necessary circuit diagrams.
- Differentiate between Mealy and Moore state machines. Give examples.

**Part-III**

210 210 **Only Long Answer Type Questions (Answer Any Two out of Four)** 210 210

- Q3 a)** Draw a NAND logic diagram that implements the complement of the following function: **(8)**  
 $F(A, B, C, D) = \sum(0, 1, 2, 3, 4, 8, 9, 10, 11, 12)$ . Mention all the desired minimizations.
- b)** Design a binary multiplier for the multiplication of 4-bit x 3-bit numbers. Draw the final circuit. **(8)**
  
- Q4** Design a Modulo-11 up-down counter using a negative edge-triggered JK flip-flop. **(16)**  
Consider the two asynchronous inputs and a synchronous clock. Draw the state diagram, necessary tables and final circuit diagram. 210
  
- Q5** Design a 4-bit SIPO and PIPO shift register and show its operation using the timing diagram. **(16)**
  
- Q6 a)** Discuss the process of error detection and correction using Hamming Code. **(10)**  
**b)** What are the different types of ROMs used in storing? Explain in details. **(6)**