PSCELET02 - Paper-II : Digital Design & Applications

P. Pages : 2

Time : Three Hours

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GUG/S/23/11155

Max. Marks : 80

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Notes : 1. All questions are compulsory and carry equal marks.
2. Draw well labeled diagrams wherever necessary.

Either:

1. a) What is the K - map method to simplify any Boolean function? What are the advantages and disadvantages of using the Karnaugh map? **8**

b) What is two - level NAND gate? Simplify the following functions and Implement them with two - level NAND gate? **8**

OR

c) What is a multiplexer? What are the advantages of using multiplexer? Explain the procedure of combinational logic design using multiplexers. **8**

d) What is a decoder? Explain BCD - to - Decimal decoder using gates. **8**

Either:

2. a) Define a flip - flop. Explain the wording of RS flip - flop using NAND or NOR gates. Write truth table. **8**

b) Explain the working of J - K flip - flop. Draw logic diagram of J - K master slave flip - flop and explain its truth table? **8**

OR

c) With the help of a block (logic) diagram, explain the working of a ripple Counter. Write its truth table. Differentiate between synchronous and Asynchronous counters. **8**

d) Write a note on up - down counters. Explain the working of ring counter using D flip - flops. Draw the waveforms? **8**

Either:

3. a) Explain Half adder and full adder with logic diagram, equations, truth table and using gates. Write equations for carry and sum. **8**

b) Write a note on 4 - bit binary adder and binary adder - subtractor. **8**

OR

c) What is a demultiplexer (DEMUX)? State the uses of demultiplexers. Draw logic diagram of 1:4 demultiplexer and explain its working. **8**

	d)	What is an ALU? How does an arithmetic - logic unit work? What type of functions do ALUs support?	**8**

Either:

4.	a)	What is VHDL Architecture? Define with example, the following terms related to VHDL.	**8**

      i)   Entity   ii)   Architecture
      iii) Configuration   iv) Package

	b)	What do you mean by ROM? How to write simple ROM in VHDL?	**8**

<div align="center">OR</div>

	c)	What do you mean by PLA draw its block diagram and explain its working?	**8**
	d)	What is a CPLD? Explain architecture of complex programmable logic device with applications?	**8**

5.		Attempt the following.	

	a)	Implement the following multi - output combinational logic circuit using a 4 - to - 16 - line decoder.	**4**

$$Fl = \sum m(2,3,6,9,12,15)$$

$$F2 = \sum m(2,4,6,8,10,12,14)$$

$$F3 = \sum m(4,8,12)$$

$$F4 = \sum m(5,10,15)$$

	b)	Explain Mealy and Moore Models with examples?	**4**
	c)	What is shift register explain in details?	**4**
	d)	Explain different types of operators in VHDL?	**4**

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