

Paper Id:

130305

Roll No:

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B.TECH
(SEM-III) THEORY EXAMINATION 2019-20
DIGITAL DESIGN

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A**

- 1. Attempt all questions in brief. 2 x 10 = 20**
- a. What is the best Example of Digital system?
 - b. Define Pair, Quad, and Octet?
 - c. What are the basic Logic gates?
 - d. Define Fan-in and Fan-out?
 - e. What are the fundamental properties of Boolean algebra?
 - f. Define Setup time?
 - g. What is meant by K-Map or Karnaugh Map?
 - h. What is a Multiplexer?
 - i. Convert the Binary Code 111001 into octal and hexadecimal code.
 - j. Perform the BCD addition of 126 and 105.

SECTION B

- 2. Attempt any three of the following: 10x3=30**
- a. Explain the full adder circuit using logic diagram and Truth Table.
 - b. Explain different logic gates families in digital circuits. Write a short note on Universal Gate.
 - c. Solve the following Boolean functions by using K-Map : F
 $(w,x,y,z) = \Sigma(0,1,4,5,6,8,9,10,12,13,14)$
 - d. What is asynchronous counter? How would you design asynchronous counter?
 - e. What are sequential logic circuits? Draw the logic diagram of JK Flip Flop.

SECTION C

- 3. Attempt any one part of the following: 10x1=10**
- a. With the help of logic diagram, explain the 4 bit universal shift register using D flip-flops and 4:1 MUX.
 - b. Write the truth table of the SR, JK, D & T flip-flops.
- 4. Attempt any one part of the following: 10x1=10**
- a. Design a Mod 6 synchronous counter using D flip-flop and T flip-flop.
 - b. Explain Mealy and Moore model of a clocked synchronous sequential network.
- 5. Attempt any one part of the following: 10x1=10**
- a. Construct a state diagram for synchronous decade UP/DOWN counter. The mode control; 'M' decides the pattern of counting operation. When M=0 Counter counts UP and when M=1, counter counts DOWN. When counter reaches terminal count Y=1 (for UP count) and Z=1 (for DOWN count). Label the state diagram in M/YZ mode.
 - b. Define state, present state, state diagram and state table.
- 6. Attempt any one part of the following: 10x1=10**
- a. Implement 4 bit magnitude comparator.
 - b. Simplify following logic function and realize using NOR gates.
 $f(w,x,y,z) = \pi M(1,2,3,7,10,11) + d(0,15)$
 $f(w,x,y,z) = \pi M(3,4,5,6,7,10,11,15)$
- 7. Attempt any one part of the following: 10x1=10**
- a. Design a carry look ahead 4-bit parallel adder. Show that the time for addition is independent of the length of operands.
 - b. Construct 16:1 MUX using 4:1 and 2:1 multiplexers and hence analyze using truth table.