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M – 5665

Reg. No.

Name :

Third Semester B.Tech. Degree Examination, October 2021

13.306 : DIGITAL ELECTRONICS (T)

(2013 Scheme)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer all questions :

1. Determine 2's complement of the following numbers
(a) 01011100
(b) 001001110
2. Draw logic diagram of half adder with truth table.
3. How a j-k flip-flop can be changed to T flip-flop?
4. Modulo-9 ripple counter is designed using J-K flip-flops, each having propagation delay of 50 ns. Calculate the maximum clock frequency that can be used.
5. Compare Moore machine and Mealy machine.
6. Differentiate synchronous and asynchronous sequential circuits.
7. What is PLD? Which are types of PLD?
8. Draw a CMOS inverter and give input and output conditions.
9. Find the grey code of binary number $(1001011)_2$.

P.T.O.



10. Describe the terms

- (a) Fan-out
- (b) Propagation delay.

(10 × 2 = 20 Marks)

PART – B

Answer **any one** full questions from each Module :

Module – 1

- 11. (a) Draw and explain BCD adder circuit. 10
- (b) Sketch a NAND only logic circuit for the expression $Y = AB' + AC + BD$. 10
- 12. (a) Implement the function using 8:1. MUX
 $F(A, B, C, D) = \sum(0, 1, 3, 4, 8, 9, 15)$ 8
- (b) Explain operation of 4-bit magnitude comparator circuit. 12

Module – 2

- 13. (a) Design a decade counter to count in Excess -3 sequence. 12
- (b) Compare combinational and sequential circuits. 8
- 14. (a) Draw astable, multivibrator using 555 IC and explain the working. 10
- (b) Design a divide-by-96 counter using IC 7490. 10



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Module – 3

15. (a) Design a sequential circuit with two D flip-flops and one input x. When x = 0, the state of circuit remains same. When x = 1, state passes through state transition from 00 to 01 to 11 to 10 and back to 00 and repeats. 15
- (b) What is a state diagram and what are the informations obtained from state diagram? 5
16. (a) Design a 3 bit synchronous counter using J-K flip-flops. 10
- (b) Draw an asynchronous decade counter and explain its operation and draw the waveforms. 10

Module – 4

17. (a) Write descriptions of :
- (i) RAM and types of RAM 4
- (ii) ROM and types of ROM 6
- (b) Which are the different modelling techniques used in HDL? Explain Behavioral modelling. 10
18. (a) Draw CMOS-NAND circuit and explain the operation with truth table. 10
- (b) Draw a D flip-flop and write the VHDL Code for D flip-flop with clock. 10

(4 × 20 = 80 Marks)

