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Question Paper Code	11660
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B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

Fourth Semester

Electronics and Instrumentation Engineering

(Common to Instrumentation and Control Engineering)

20EIPW401 - DIGITAL ELECTRONICS WITH LABORATORY

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|--|-------------------------------|
| 1. Convert $(115)_{10}$ to hexadecimal number. | 2,K2,CO1 |
| 2. State De-Morgan's law. | 2,K1,CO1 |
| 3. Define Noise margin and propagation delay. | 2,K1,CO2 |
| 4. Compare totem pole output with open collector output. | 2,K1,CO2 |
| 5. Draw a half subtractor using logic gates. | 2,K2,CO3 |
| 6. What is meant by combinational logic circuits? | 2,K1,CO3 |
| 7. Compare synchronous and Asynchronous circuits. | 2,K2,CO4 |
| 8. Reproduce D flipflop using T flipflop. | 2,K1,CO4 |
| 9. List out the operators present in VHDL. | 2,K1,CO6 |
| 10. Write an entity declaration for 1x8 De-Mux. | 2,K1,CO6 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) (i) Convert the following Number system 10,K2,CO1
- $(10111.1011)_2 = ()_{10}$
 $(BABA)_{16} = ()_8$
 $(36.4)_8 = ()_{10}$
 $(72.45)_{10} = ()_2$
 $(673)_8 = ()_{16}$
- (ii) Prove that $ABC+ABC'+AB'C+A'BC=AB+AC+BC$. 3,K2,CO1
- OR**
- b) Construct a Karnaugh Map for the following function $F(A,B,C,D,E) = \sum (0,5,6,8,9,10,11,16,20,24,25,26,27,29,31)$ and draw the logic diagram. 13,K2,CO1
12. a) Write about the following. 7,K2,CO2
- (i) Emitter coupled Logic(ECL), 6,K2,CO2
- (ii) CMOS Logic.

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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OR

- b) Design a TTL logic circuit for three input NAND gate. 13,K2,CO2

13. a) (i) Discuss the design procedure for combinational circuit. 5,K2,CO3
(ii) Design and implement the full adder circuit. 8,K2,CO3

OR

- b) Design a BCD to Excess 3 code converter and implement the same using logic gates. 13,K2,CO3

14. a) Explain the circuit of a SR flipflop and explain its operation. Give the truth table, characteristic table and excitation table. 13,K2,CO4

OR

- b) A sequential circuit with 2 D FFs A and B and two inputs X and Y, one output Z is specified by the following next state and output equations. 13,K3,CO4

$$A(t+1) = x'y + xA,$$
$$B(t+1) = x'B + xA ; \quad Z = B$$

- (i) Draw the logic diagram of the circuit,
(ii) Derive the state tables,
(iii) Draw the state diagram.

15. a) Write the behavioral and structural model of a Full Adder. 13,K3,CO6

OR

- b) Discuss in detail different modeling styles of VHDL with suitable example. 13,K3,CO6

PART - C (1 × 15 = 15 Marks)

16. a) Design the following using PLA and PROM. 15,K3,CO5
 $W(A,B,C,D) = \sum m(2,12,13)$
 $X(A,B,C,D) = \sum m(7,8,9,10,11,12,13,14,15)$
 $Y(A,B,C,D) = \sum m(0,2,3,4,5,6,7,8,10,11,15)$
 $Z(A,B,C,D) = \sum m(1,2,8,12,13)$

OR

- b) (i) Derive the PLA programming table for the combinational circuit that squares a 3 bit number. 10,K2,CO5
(ii) Compare three combinational circuits PLA,PAL and ROM. 5,K2,CO5