Subject code: ES302EC Semester: 2nd

Subject name: Digital Electronics ACY: 2022-23

Assignment Questions

1. What is the design process in digital hardware, and how does it incorporate synthesis using logic gates? Provide a concise example to illustrate the design approach. [CO1]

2. Explain the role of Boolean algebra in digital hardware design. Briefly discuss the optimized implementation of logic functions using K-Map. [CO1]

3. Define logic circuits and their components. Provide a short example showcasing the application of logic circuits in real-world scenarios. [CO1]

4. How are signed and unsigned numbers added and subtracted in digital systems? Highlight the significance of accurate number representation. [CO2]

5. Briefly discuss the design and applications of combinational circuit building blocks such as multiplexers and decoders. Provide a succinct overview of their functionality. [CO2]

6. Explain the purpose and applications of code converters, focusing on BCD to 7-segment converters and arithmetic comparator circuits. [CO2]

7. What is the general structure of Programmable Array Logic (PAL)? Explain how it contributes to the design of combinational circuits. [CO3]

8. Introduce Verilog HDL and its role in digital design. Provide a short Verilog code snippet for a basic logic gate. [CO3]

9. Discuss the design of combinational circuits using Complex Programmable Logic Devices (CPLDs) and Field-Programmable Gate Arrays (FPGAs). [CO3]

10. Define basic latches and gated latches, including the Gated SR Latch and Gated D Latch. Briefly discuss their characteristics and applications. [CO4]

11. Explain the role of flip-flops in digital systems. Provide a concise overview of registers and counters, including their applications. [CO4]

12. Discuss the characteristics and applications of T flip-flop and JK flip-flop. Provide a brief excitation table for flip-flops. [CO4]

13. What are the basic design steps for synchronous sequential circuits? Discuss the representation of Finite State Machines (FSM) using Moore and Mealy state models. [CO5]

14. Explore the design of FSM for sequence generation and detection. Provide a brief explanation of Algorithmic State Machine (ASM) charts. [CO5]

15. Discuss state minimization techniques in the context of synchronous sequential circuits. [CO5]