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.

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

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

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

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

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

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

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

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

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

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

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

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.

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

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