Unit 1
Digital System & Binary Numbers

2 Marks

1. What is digital system?
2. What is number system?
3. Define the types of number system.
4. How to find 1's complement?
5. How to find 2's complement?
6. Define the signed & unsigned numbers.
7. Define logic gates.
8. How many types of gates are available & what are those?
9. What is binary codes?
10. Mention the types of binary codes.
11. What is gray code?
12. Expand ASCII, EBCDIC, BCD.
13. Draw the pulse operation for AND gate.
14. Write the truth table of OR gate.
15. Draw the graphical symbol of NOT gate.
16. Define gate.
17. Define truth table.

5 Marks

1. Explain the block diagram of a digital computer.
2. Write a short note on number system.
3. Conversion between Decimal number to binary number system
   a) $25_{(10)}=?_{(2)}$ b) $75.125_{(10)}=?_{(2)}$
4. Conversion between Octal number to Decimal number system
   a) $2345_{(8)}=?_{(10)}$ b) $25.376_{(8)}=?_{(10)}$
5. Explain the signed and unsigned numbers with example.
6. Explain the basic gates.
7. Explain the binary codes with example.
8. Explain the Gray code.
9. Explain the excess-3 code.
10. Write the steps of converting from gray code to binary code & binary to gray code.

10 Marks

1. Explain error detecting code & error correction code.
2. Explain the derived gates.
3. Write the algorithm, converting from the decimal number system to any other number system. Explain with example.

Unit 2

Introduction to Boolean algebra

2 Marks

1. What is Boolean algebra?
2. Mention the Boolean laws.
3. What is Boolean function?
4. Define a standard forms.
5. Define SOP.
6. Define POS.
7. Define canonical forms.
8. What is minterm & maxterm?
9. Define gate-level minimization.
10. What is map?
11. What is a K-map?
12. Mention the types of K-map.
13. Define don't-care condition.

5 Marks

1. Prove the distributive law. A)x(y+z)=xy+xz B)(x+yz)=(x+y)(x+z).
2. State the demorgan's law and prove it.
3. Explain the Boolean function with example.
4. Prove that a)x.x=x b)x+xy=x
5. Define a standard form. Explain with example.
6. Write short note on minterm & maxterm.
7. Explain the don't care method with example.
8. Simplify the given equation by using K-map.
   F=a'b'c'd'+ab'c'd+abc'd'+abcd+a'bcd
9. Draw the K-map F(abcd)=∑m(0,2,3,7,11,13,14,15)
10. Explain the Exclusive-OR function.

10 Marks

1. Explain the implementation of NOR gate.
2. Explain the implementation of NAND gate.
3. Explain the 2,3 & 4 variable of K-map in detail.

Unit 3
Combinational Logic

2 marks

1. Define a combinational circuit.
2. Define half adder and full .
3. Define decoder and encoder.
4. Define multiplexers.
5. What is a binary multiplication?
6. What is magnitude comparator?
7. What is BCD adder?
8. With diagram define three-state buffer.
9. Mention the modeling styles.

5 Marks

1. Explain the analysis procedure with logical diagram.
2. What are the steps involved in design procedure.
3. Explain the half adder.
4. Explain 2 to 4 line decoders.
5. Explain the encoders.
6. Explain the multiplexer with diagrammatically.
7. Explain the BCD adder.
8. Implement the following Boolean function with a multiplexer :
   (a) $F(A, B, C, D) = \sum(0, 2, 5, 8, 10, 14)$
   (b) $F(A, B, C, D) = \pi(12, 6, 11)$

10 Marks

1. Explain in detail binary multiplication with example.
2. Explain the full adder and draw the K-map for both sum and carry.
3. Explain the magnitude comparator.
4. Explain the analysis procedure .
5. Explain Four-bit binary adder with truth table and logic diagram.
6. Explain Binary subtractor with truth table and logic diagram.
7. Explain BCD adder with truth table and logic diagram.
8. Explain priority Encoder with truth table.
9. In brief explain gate level modeling.
10. Briefly explain dataflow modeling.
11. Explain behavior modeling.

Unit 4
Synchronous sequential logic

2 Marks

1. Define sequential circuit.
2. Define latches.
3. Define SR latch.
4. Define D latch.
5. Define flip-flops.
6. Mention the types of flip-flops.
7. Write the characteristics table of SR flip-flop.
8. Draw the graphical symbol of JK flip-flop.
9. What is T flip-flop ?
10. Define a register.
11. What is register load ?
12. What is shift register ?
13. Wt is counter?
14. What is ripple counter?
15. What is synchronous counter ?
16. What is storage elements?

5 Marks

1. Write a short on sequential circuit.
2. Explain in detail storage elements(latches).
3. Explain in detail flip flops.
4. Explain register and register load.
5. Explain the 4 bit register with parallel load.
6. Explain the ripple of counters.
7. Explain the 4 bit shift register.
8. Explain binary counters.
9. Explain ring counters.
10. Explain Johnson counters.

10 Marks

1. Explain synchronous counter.
2. Explain D flip flop with circuit diagram and excitation table.
3. Explain JK flip flop with circuit diagram and excitation table.
4. Explain state table with diagram.
5. Explain state diagram.
6. Explain Mealy and Moore models.
7. Explain serial adder.
8. Explain universal shift register.
9. Explain four-bit ripple counter.

Unit 5
Memory and programmable logic

2 Marks

1. What is memory?
2. Mention the types of memory.
3. Expand Ram, ROM, PROM.
4. Define RAM & ROM.
5. Define a memory decoding.
6. What is programmable logic array?
7. What is mask - programmable?
8. What is field programmable logic array?
9. List the major differences between PLA and PAL.
10. Define PLD.
11. Give the classification of PLDs.
12. Define PROM.
13. Define PLA.
14. Define PAL.
15. Why was PAL developed?
16. Why the input variables to a PAL are buffered?
17. What does PAL 10L8 specify?
18. Give the comparison between PROM and PLA.

5 Marks

1. Explain the block diagram of memory unit.
2. Explain the internal construction of memory decoding.
3. Explain the block diagram of ROM.
4. Explain the sequential programmable devices.

10 Marks

1. Explain error detection and error correction.
2. Explain the types of ROM.
3. Explain the Programmable logic array.
4. Explain PLA with three inputs.
5. Implement the following two Boolean functions with a PLA: $F(A, B, C) = \sum(0, 1, 2, 4)$ $F(A, B, C) = \pi(0, 5, 6, 7)$
6. Explain PAL.