

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART-A**(25 Marks)**

- 1.a) Write about the Floating point number representation. [2]
- b) What are the basic theorems in Boolean algebra? [3]
- c) Name different Minimization techniques. [2]
- d) What is race around condition? How is it avoided? [3]
- e) How does a ripple carry-adder function? [2]
- f) Design the 2-bit Binary Adder using logic gates. [3]
- g) Compare latch and flip flop. [2]
- h) What are the various methods used for triggering flip-flops? [3]
- i) Explain the functioning of Random Access memory. [2]
- j) Draw memory hierarchy to improve its capacity. [3]

PART-B**(50 Marks)**

- 2.a) Convert the Decimal Number 35.45 into corresponding Octal Number and Binary Number.
 - b) What is Hamming code? How is the Hamming code word tested and corrected. Explain with an example. [5+5]
- OR**
- 3.a) What are universal gates? Realize AND, OR, NOT, XOR gates using Universal gates.
 - b) Using 2's complement method perform. $(68.32)_{10} - (42.64)_{10}$. [5+5]
- 4.a) Simplify $Y = \sum m(3, 6, 7, 8, 10, 12, 14, 17, 19, 20, 21, 24, 25, 27, 28)$ using K-map method:
 - b) Implement Ex-OR gate using 4×1 MUX. [6+4]
- OR**
5. Convert the following expressions to Sum of Product form
 - a) $(A'+B+C)(A+B'+C')(ABC)$
 - b) $(A+B+C')(A'+B'+C')(A'+BC)$ [5+5]
- 6.a) Explain the working of 4-bit magnitude comparator.
 - b) Draw the logic diagram of 4×1 multiplexer and explain its working. [5+5]
- OR**
- 7.a) Draw the schematic diagram and truth table of full adder. Design the full adder using universal gates. Draw the relevant logic diagrams with necessary expressions.
 - b) Name different code converters and design any one code converter. [5+5]

- 8.a) Explain the basic difference between Combinational and Sequential circuits.
b) Explain working of JK Master Slave flip flop. How are the deficiencies of JK Flip-Flop overcome with Master-Slave configuration? [5+5]

OR

- 9.a) Draw and explain the operation of 4 bit Shift Register with necessary diagrams.
b) Differentiate between Ripple counter and synchronous counter. Draw respective block diagrams for 3 bit counting. [5+5]

- 10.a) Using PLA, implement a BCD to excess-3 code converter. Draw and explain its operation through truth table and logic diagram.
b) Explain in brief, about logic construction of 32×4 ROM. [5+5]

OR

- 11.a) List different types of memory. Explain how combinational functions can be realized using ROM with an example.
b) Write a short note on Memory decoding. [6+4]

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