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COMPUTER SCIENCE AND ENGINEERING

Digital Electronics

ES-207-A

[Time: Three Hours] [Maximum Marks : 75]

Note : Attempt Five questions in all, selecting at least one question from each Unit. All questions carry equal marks.

UNIT–I

1. a) Convert the following decimal numbers in binary: **2**

   i) 28.6

   ii) 31.567

   b) Perform the following operations using 2's complement: **5**

   i) 48 -23

   ii) 23 – (-67)

   c) Explain the conversion of AND operation into OR operation with the help of De-Morgan Theorem. **5**

   d) Simplify (A+B)(A′+C) to minimum number of literals. **3**

2. a) Explain the different properties of logic families. Explain the working of TTL NAND gate. **7**

   b) Minimize the expression using K-Map:

   $F=\prod M(1, 2, 5, 6, 8, 9, 10) .d(3, 7, 15)$.

   Also realize the obtained expression using AOI logic. **8**

UNIT–II

3. a) State and explain the working of BCD adder with its logic diagram. **10**

   b) Design 3-to-8 decoder. **5**

4. a) Design 3 bit odd parity generator. **5**

   b) What do you mean by multiplexer? Explain the working of n:1 mux. Design a multiplexer tree for 32:1 mux using 8:1 and 2:1 mux. **10**

UNIT- III

5. a) Explain the working of J-K flip-flop. What is race around condition in J-K flip-flop? How can it be solved by master slave flip-flop? **8**

   b) Convert S-R flip-flop in D flip-flop. **7**

6. a) Design synchronous mod-6 counter. Use J-K flip-flop for designing the counter. **8**

   b) What do you mean by register? Draw and explain the logic diagram of serial in serial out shift right register. **7**

UNIT-IV

7. a) Explain the working of R-2R ladder. Digital to Analog Converter. **8**

   b) Describe the working of successive approximation type ADC. **7**

8. a) Draw the diagram of basic RAM cell. Explain SRAM and DRAM memories. Also describe, how read and write operations occur in

RAM. **8**

b) Draw the block diagram of memory device. Mention the working of Rom. Also draw diagram showing ROM array. **7**
