

3E1653

Roll No. _____

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B. Tech. III Semester (Main) Examination-2014
Electronic Instrumentation & Control
3EI3 Digital Electronics
(Common for EC & EIC, EC, CS, IT)

Time : 3 Hours**Maximum Marks : 80****Min. Passing Marks : 24****Instructions to Candidates:**

Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Unit - I

1. a) Subtract the following using 9's complement method.

i) $649 - 387$

ii) $891 - 786$

b) Minimize the following Boolean expression using basic laws of Boolean algebra:

i) $Y = AB + \overline{AC} + \overline{ABC}(AB + C)$

ii) $Y = \overline{(AB + \overline{C}) + (A + B + C)}$

OR

1. a) What is the importance of Gray code in engineering? Find equivalent binary Gray code of $(478)_{10}$

b) Convert the following

i) $(AB6)_{16}$ to decimal.

ii) $(543.26)_{10}$ into Octal.

iii) $(247.36)_8$ into Hexa decimal.

iv) $(AF9.BOD)_{16}$ into binary.

Unit - II

2. a) Explain the operation of tri-state TTL NAND gate with the help of a neat diagram.
- b) What are major advantages of totem - pole output arrangement?

OR

2. a) Define the following characteristics of digital ICs.
- Fan in
 - Power dissipation.
 - Noise margin
 - Propagation delay.
- b) compare the characteristics of TTL, ECL, RTL and CMOS.

Unit - III

3. a) Minimize the 4 - variable Boolean function using K-map :-
- $$f(ABCD) = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$$
- b) Find minimal SOP form for the function
- $$f = \sum (1, 2, 3, 7, 8, 9, 10, 11, 14, 15)$$
- using the Quine Mckluskey method.

OR

3. a) Simplify the following as much as possible.
- $A + \overline{A}B + \overline{A}\overline{B}C + \overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}\overline{C}\overline{D}E$
 - $A(B + C(\overline{AB + AC}))$
- b) Obtain the simplified expression in SOP for the following Boolean expression
- $$f(ABCD) = \sum m(0, 2, 3, 5, 7, 8, 9, 10, 11) + d(4, 15)$$

Unit - IV

4. a) Design a full adder using 4×1 multiplexer.
- b) Design a excess - 3 to BCD code convertor using 4 bit adder.

OR

4. a) Write short note on Diode switching matrix.
b) Design and explain the working of BCD to 7-segment decoder

Unit - V

5. a) What is difference between flip-flop and latch? Explain different types of flip-flops.
b) Explain the construction and working of Master-slave JK flip-flop.

OR

5. a) Design a Mod 8 counter using T-flip flop.
b) Explain the different types of Registers used in sequential circuits.