Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2079, Phagun/Chaitra

Program: Diploma in IT Engineering | **Full Marks:** 80

Year/Part: I/II (2016) | **Pass Marks:** 32

Subject: Digital Logic | **Time:** 3 hrs.

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt any FIVE questions.

1. a) Define signal. Differentiate between analog and digital signal with suitable example. [1+3]

   b) Convert the following number system: [4×2]

   i. $(2567.350)_{10} = (?)_2$

   ii. $(BCDE.4A)_{16} = (?)_8$

   iii. $(1100110011)_2 = (?)_{16}$

   iv. $(376.351)_8 = (?)_{10}$

   c) Perform the following operation: [2×2]

   i. Divide: $(1100110011)_2 / (1011)_2$

   ii. Multiply: $(1011001101)_2 \times (101101)_2$

2. a) State and prove De-Morgan's Theorem with necessary diagram and truth table. [8]

   b) Simplify the following expression using Boolean Algebra. [2×4]

   i. $Z(Y + Z)(X + Y + Z) = Z$

   ii. $A'BC + AB'C + ABC + BC'$

3. a) Simplify the following expression using k-map. [2×4]

   i $\sum F(A, B, C, D) = \pi m(2,3,4,5,7,10,11,14) + \sum d(0,1,6,15)$

   ii. $\sum F(A, B, C, D) = \sum M(0,1,4,8,11,12,15) + \sum d(2,3,5,7)$

   b) Realize basic gate using universal NAND gate only with truth table and logic circuit. [8]

4. a) Define multiplexer. Explain the operation of full subtractor with clear logic diagram, truth table and expression. [2+6]

Cont……

b) Define encoder. Design and explain seven segment Display decoder with necessary diagram and truth table. [2+6]

5. a) Define counter. Explain the operation of 'T' flip flop with necessary diagram and truth table. [2+6]

b) Define adder. Explain about ripple counter with necessary diagram. [2+6]

6. Write short notes on: **(Any Four)** [4×4]

a) ASCII Code

b) DTL Logic Family

c) AND & OR Gates

d) 1:4 De-multiplexer

e) SISO Shift Register

Good Luck!