Council for Technical Education and Vocational Training

**Office of the Controller of Examinations**

Sanothimi, Bhaktapur

**Regular/Scholarship Exam-2080 Bhadra**

**Program:** Diploma in Information Technology/ Computer Engineering — **Full Marks: 80**

**Year/Part:** II/I (2022) — **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. $(10111.01)_2=(?)_{10}$ ii. $(3471)_8=(?)_{16}$

   iii. $(BCDE.4A)_{16}=(?)_8$ iv. $(3567.350)_{10}=(?)_2$

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

   i. Multiply: $(11101.11*101)_2$

   ii. Divide: $(110100.110/110)_2$

2. a. Subtract the following $(11001100)_2$ from $(11110000)_2$ using 2's complement. [4]

   b. Realize basic gate using NAND gate only with clear diagram and truth table. Also, state and prove De-Morgan's Theorem in brief. [4+4]

   c. Explain XOR and NOR gate with truth table and symbol. [4]

3. a. Simplify the following expression using Boolean algebra: [4×2]

   i. $A'B'C' + A'BC' + AB'C' + ABC' = C'$

   ii. $A(A' + C)(A'B + C)(A'BC + C') = 0$

   b. Simplify the following expression using k-map. [4×2]

   i. $\sum f(A,B,C,D) = \pi M(2,3,4,5,7,10,11,14) + \sum d(0,1,6,15)$
   Draw logic diagram.

   ii. $\sum f(A,B,C,D) = \sum m(0,1,4,8,11,12,15) + \sum d(2,3,5,6,7)$
   Draw logic diagram.



4. a. Define encoder. Explain the decimal to binary encoder with suitable diagram and truth table. [2+6]

**Cont. ...**

b. Differentiate between combinational and sequential circuit with example. [4]

c. Design 1:4 De-multiplexer with clear circuit diagram and truth table in brief. [4]

5. a. Design RS flip-flop with necessary diagram. Write the advantages of JK flip-flop. [6+2]

b. Define shift register. Explain the operation of ripple counter with clear diagram. [2+6]

6. Write short notes on: (any **FOUR**) [4×4]

a. 7 segments display
b. SIPO shift register
c. D flip-flop
d. Half adder
e. ASCII code
f. BCD code

***Good Luck !***