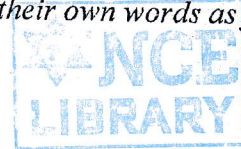


TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2082 Kartik

Exam.	Back (New Course)		
Level	BE	Full Marks	60
Programme	BEL	Pass Marks	24
Year / Part	II / I	Time	3 hrs.

Subject: - Logic Circuit (ENEX 203)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.



1. What is an ASCII code? Design 3-bit binary to Gray code converter with truth table. [1+4]
2. Perform adding $(+18)_{10}$ with $(-27)_{10}$ using an 8-bit signed number with 1's complement method. [2]
3. Perform the following code conversion: [3×1]
 - i) $(51.825)_{10} = (?)_2$
 - ii) $(E3A.9B)_{16} = (?)_8$
 - iii) $(11010)_2 = (?)_{BCD}$
4. Simplify the following Boolean function using K-map and draw the circuit of simplified expression using NAND– NAND logic functions only. [3+2]

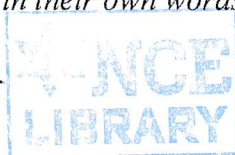
$$Y = \sum_m (0, 1, 4, 6, 7, 8, 12, 15) + d (2, 3, 9, 11)$$
5. Draw the simplest logic circuit for “c” segment of the BCD-to-seven segment display decoder. [3]
6. What is an encoder? Realize a full-subtract or circuit using a single 1:4 demultiplexer and use logic gates if necessary. [1+3]
7. Define sequential logic circuit. Explain the operation of positive edge-triggered JK flip-flop with its excitation table, state diagram and find out its characteristic equation. [1+5]
8. Convert SR flip-flop into D flip-flop with necessary logic expressions and logic circuit diagram. [6]
9. Explain briefly about how 1011 data can be stored and retrieve in 4-bit parallel-in parallel-out (PIPO) shift register with neat diagram and its corresponding data transfer timing diagram. [5]
10. Design the mod-6 synchronous counter using only T flip-flops with state diagram, logic circuit diagram and timing diagram. [6]
11. Design a sequential machine which consists of a single input, X and the single output, Z. The machine is required to give output Z high when it contains serial message 1010. Use JK flip-flops only to realize the desired machine design. [10]
12. What are the key advantages of using multiplexing in a display system? Explain multiplexing display with suitable diagram. [5]

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2081 Chaitra

Exam.	Regular (New Course-2080 Batch)		
Level	BE	Full Marks	60
Programme	BEL	Pass Marks	24
Year / Part	II / I	Time	3 hrs.

Subject: - Logic Circuit (ENEX 203)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.



1. List the advantages of digital system over analog system with necessary diagrams. [3]
2. Perform adding $(+28)_{10}$ with $(-37)_{10}$ using an 8-bit signed number with 2's complement method. [2]
3. Convert the number as indicated [1+1]
 - (a) $(11011.1001)_2$ (into decimal)
 - (b) $(101101)_2$ (into gray code)
4. Simplify the following Boolean function using K-map and draw the circuit of simplified expression using NOR – NOR logic function only. [3+2]

$$Y = \sum_m(0, 1, 4, 6, 7, 8, 12, 14) + d(2, 3, 9, 10)$$
5. Design a logic circuit which can be realized for the both full-adder and full-subtractor. [6]
6. Define demultiplexer. Realize a full-adder circuit using a single 4:1 multiplexer and necessary logic gates. [1+3]
7. Design an octal priority encoder with corresponding truth table, logic expressions and neat circuit diagram. [6]
8. Convert SR flip-flop into JK flip-flop with necessary logic expressions and logic circuit diagram. [6]
9. Explain briefly about how 1101 data can be stored and retrieve in 4-bit parallel-in serial-out (PISO) shift register with neat diagram and its corresponding data transfer timing diagram. [6]
10. Describe the operation of mod-12 asynchronous counter using negative-edge triggered T flip-flops with neat logic circuit diagram and timing diagram. [6]
11. Design a sequential machine which consist of a single input, X and the single output, Z. The machine is required to give output Z high when it contains serial message 010. Use RS flip-flops only to realize in the desired machine design. [10]
12. Explain briefly about how counter can be used in the measurement of frequency with neat diagram. [4]
