

Guru Nanak Dev Engineering College, Ludhiana

Department of Information Technology

Digital Circuits and Logic Design

Assignment – 1

Submission Date: 29 September 2025

Q1. What are 1's complement, 2's complement, and r's complement? Why are they used in digital systems?

Q2. Explain signed binary numbers. How are they different from unsigned binary numbers?

Q3. Convert the following numbers as directed:

a) $(135)_{10} \rightarrow$ Binary, Octal, Hexadecimal

b) $(1101011)_2 \rightarrow$ Decimal, Octal, Hexadecimal

c) $(7B)_{16} \rightarrow$ Binary, Decimal, Octal

Q4. Perform the following binary subtractions using the 2's complement method:

a) $(10110)_2 - (1101)_2$

b) $(11101)_2 - (10101)_2$

Q5. Convert the following numbers to Gray Code and Excess-3 Code:

a) $(1011)_2$

b) $(57)_{10}$

Q6. Suppose you are designing a system for data transmission. Which system and error detection technique would you use? Justify your answer with proper reasoning.