

# Logic Circuits

Tutorial:2

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1. 'Excess-3 code is also known as self-complementing code'. Explain.
2. Perform the following subtraction of following decimal numbers in BCD using 10's complement:
  - i) 9-5                      iv) 203-817
  - ii) 54-22                  v) 8301-2321
  - iii) 817-213              vi) 2321-8301
3. Write (-53) in: i) Signed magnitude representation, ii) 1's complement representation and iii) 2's complement representation.
4. Find the value of negative number 1101011 if it is in signed magnitude, 1's complement and 2's complement forms.
5. Perform the following:
  - i)  $(84.9)_{10} = (\text{----})_{\text{BCD}}, (\text{----})_{\text{excess-3}}$
  - ii)  $(1101)_{\text{Gray}} = (\text{----})_2$
  - iii)  $(110101)_{\text{Gray}} = (\text{----})_2$
  - iv)  $(101111)_2 = (\text{----})_{\text{Gray}}$
6. Realize all the basic gates using NAND and NOR gate.
7. State and verify De Morgan's Theorem for three variables.
8. If  $F = x^l + yz^l$ , find  $F^l$ . Also prove that  $F.F^l = 0$  and  $F + F^l = 1$ .