

## Digital Circuits - Tutorial One (Section A)

**Question 1:** Consider the following set  $\{a, b, c, d, e, f, g, h\}$ .

- How many bits are needed to represent the elements of this set using a binary system?

**Question 2:** Consider the following set  $\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$ .

- How many bits are needed to represent the elements of this set using a binary system?

**Question 3:** Consider the following set  $\{0, 1, 2, \dots, 511\}$ .

- How many bits are needed to represent the elements of this set using a binary system?

**Question 4:** Consider the following set  $\{-4, -3, -2, -1, 0, 1, 2, 3, 4\}$ .

- How many digits are needed to represent the elements of this set?

**Question 5:** Consider the following set  $\{0, 1, 2, \dots, 255\}$ .

- Assume that the elements of the set are represented using an 8-bit binary system.
- Determine the binary pattern used to represent the following:
  - 13
  - 17
  - 113

**Question 6:** Consider the following binary patterns: 0011, 1001, 1100, and 1110.

- Determine the decimal numbers represented by these patterns.
- How many digits are needed to represent the elements of this set using a trinary system?