9. Write a short summary of the contributions of De Morgan.

→ Augutus De Morgan was born in June 27, 1806 in Nadure India and he died on March 18, 1871 in London, England. He was an English Mathematician and logician whose major contribution to the study of logic including the formation of De-Morgan's law and the theory of relation of the rise of modern symbolic or mathematical logic.

10. The NAND gate is the same as the Bubbled or gate (ie. gate with complemented inputs). ⓐ Explain with the De Morgan's Draw diagram.

→ De Morgan's law second theorem states, "The NAND gate is equivalent to a bubbled OR gate." The Boolean expression for the NAND-gate is given by the equation chown below:

$$Z = A \cdot B \Rightarrow Z = (A \cdot B)'$$

for OR gate, $Z = \overline{A} \perp \overline{B} = (A' \perp B')$

Since NAND and bubbled OR gates are interchangeable ie. both gates have identical outputs for the same set of inputs. Therefore, the equations become as given below

$$\overline{AB} = \overline{A} + \overline{B}$$. This equation is known as De-Morgan's second theorem.