



كلية تكنولوجيا الصناعة والطاقة

Information Technology Department
2nd Year



جامعة برج العرب التكنولوجية
BORG AL ARAB TECHNOLOGICAL UNIVERSITY

جامعة برج العرب التكنولوجية

Course: Digital Engineering Semester: 1 st term 2025/2026.	Lecturers: Dr. Osama Elnahas, Dr. Dina Abdelhafiz, Dr. Bassant Tolba, Dr. Radwa Rady Assistant:
Tutorial 1: Digital Engineering	

Answer the following questions:

Q1. Draw the Logic Circuit diagram for the following Boolean expression

a) $F = \overline{AB} + \overline{C}(E + \overline{D})$

b) $F = [A + \overline{BCD}] [\overline{AD} + B(\overline{C} + A)]$

c) $F = \overline{A + B} + \overline{A}.(C + \overline{B})$

Q2. Find the Boolean expression output and the complement for the following circuits.

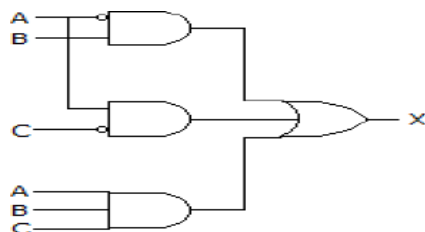


Fig. 1

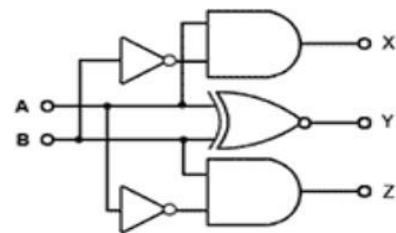


Fig. 2

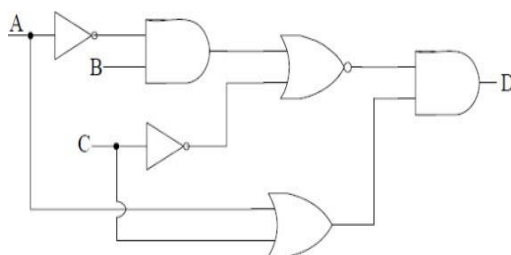


Fig. 3

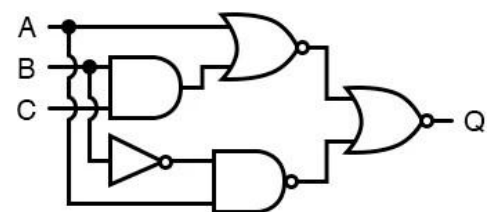


Fig. 4



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Q3. Apply DeMorgan's Law to the following expressions:

- a) $F = \overline{AB + C(E + D)}$
- b) $F = \overline{(A + B)(A + \overline{AB})}$
- c) $F = \overline{A(B + C) + \overline{CED}}$
- d) $F = \overline{(ABCE)\overline{C(E + D)}}$

Q4. Find the duals of the logic expressions in Q3.

Q5. Write down the truth table for a logic expression in Q1 (c) and Q3 (b).

Q6. Apply Graphical DeMorgan's Theorem to the following logic circuits:

