AOC I - Davi Ventura Cardoso Perdigão
Ex. de lógica digital - Circuitos Combinacionais

1) a) $F = \overline{\overline{\overline{A}\,\overline{B} + C + \overline{A}}}$

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

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

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

$\overline{\overline{A}\,\overline{B} + C} = (\overline{\overline{A}}\cdot\overline{\overline{B}})\cdot\overline{C}$

$= A \cdot \overline{B} \cdot \overline{C}$

$\overline{(A\overline{B}) \cdot (\overline{C}+\overline{A})} = (\overline{A}\overline{B}) + (\overline{\overline{C}} + \overline{\overline{A}})$

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

b) $F = ABC + A\overline{C} + A\overline{B}$

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

$F = ABC + A(\overline{C} \cdot \overline{B})$

$F = A(BC + \overline{C}\,\overline{B})$

$F = A$

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

$F = A\overline{A} + AB + AC + B\overline{A} + B\overline{B} + BC + C\overline{A} + C\overline{B} + CC$

$F = (AB + AC) + B\overline{A} + (BC + C\overline{A} + C\overline{B})$

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

$F = B + AC + C\overline{A}$

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

$F = B + C$

d) $F = \overline{A}B\overline{C}\,\overline{D} + \overline{A}B\overline{C}D + \overline{A}\,\overline{B}\,\overline{C}D + \overline{A}\,\overline{B}CD$

$F = \overline{A}(B\overline{C}\,\overline{D} + B\overline{C}D + \overline{B}\,\overline{C}D + \overline{B}CD)$

$F = \overline{A}(B\overline{C} + D - B\overline{C}D + \overline{B+C} \cdot D + BCD)$
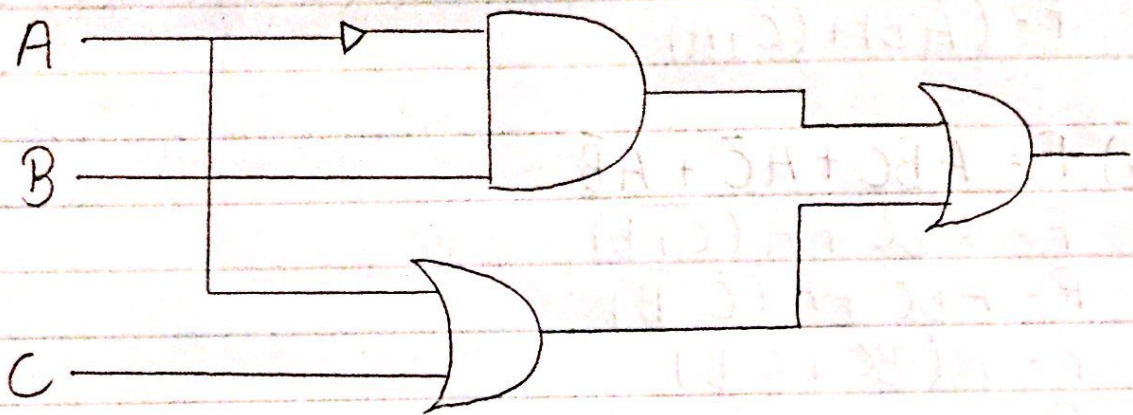
$F = BD + (B + 1 + \overline{B}D)\overline{A}\overline{C}$

$F = BD + (D + 1) + \overline{A}\overline{C}$

$F = BD + \overline{A}\overline{C}$

e) $F = ABC(\bar{D}+D) + ACD(B+A+C) + AC(B+D)$

$F = ABC + ABCD + A \cdot ACD + ACCD + ABC + ACD$

$F = ABC + ABCD + ACD + CAD + ABC + ACD$
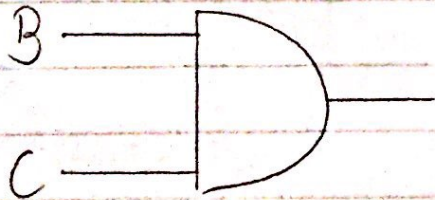
$F = ABCD + ACD$

$F = ACD(B+1)$

② a) $(\bar{A}B) + (C+A)$
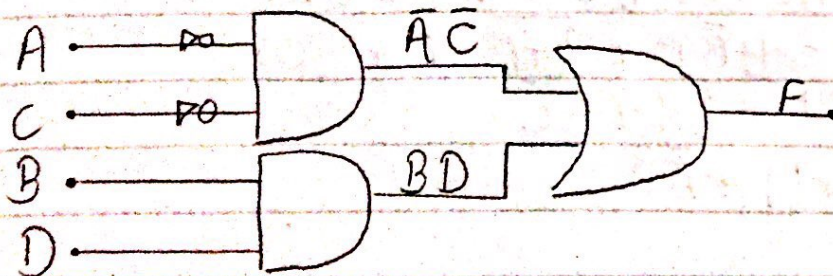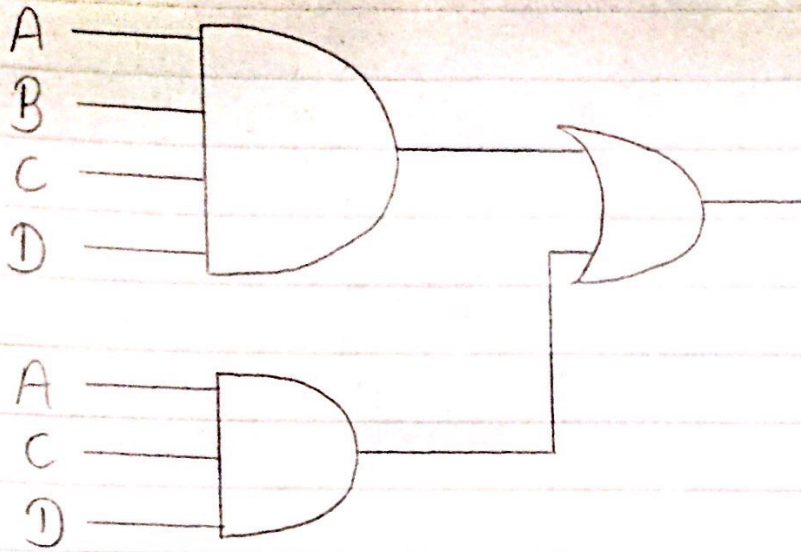

b)

A

c) $B+C$

d) $BD + \bar{A}\bar{C}$

e) $ABCD + ACD$

③ a) $S = (\bar{A}\bar{B}) + (A\bar{B}) + (A\bar{B})$

$S = A + \bar{B}$

b) $S = (\bar{A}B\bar{C}) + (\bar{A}BC) + (A\bar{B}\bar{C}) + (AB\bar{C}) + (ABC)$

$S = (A+B+C)(A+B+\bar{C})(\bar{A}+B+\bar{C})$

c) $S = (\bar{A}B\bar{C}\bar{D}) + (A\bar{B}\bar{C}\bar{D}) + (A\bar{B}\bar{C}D) + (A\bar{B}C\bar{D}) + (A\bar{B}CD) +$
$(AB\bar{C}\bar{D}) + (ABC\bar{D}) + (ABCD)$

$S = (A+B+C+D)\cdot(A+B+C+\bar{D})\cdot(A+B+\bar{C}+D)\cdot$
$(A+B+\bar{C}+\bar{D})\cdot(A+\bar{B}+C+\bar{D})\cdot(A+\bar{B}+\bar{C}+D)\cdot(A+\bar{B}+\bar{C}+\bar{D})\cdot$
$(A+B+\bar{C}+D)$

④ a) $AB + \bar{C} + \overline{CD}$

b) $\left(\overline{\overline{AB} + \overline{A\bar{B}} + \bar{C}}\right)\cdot(C+D)$