Digital Design Principles

Assignment 2

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A. Part A

1. F = xy'z
2. S = (A'B')cd
3. Y = (abc')

   = a' + b' + c (De Morgan's Law)

4. E = a(b+c)' + d'(b+c)'

   = a(b'c') + d'(b'c') (De Morgan's Law)

   = ab'c' + d'b'c' (Distributive Law)

   = b'c'(a + d') (Distributive Law)

5. Q = (a+b)c

B.

1. (a.b)'.(a'+b).(b'+b)

   = (a' + b').(a' + b) (De Morgan's Law)

   (b' + b = 1)

   = a' + a'b +a'b' (Distributive Law)

   = a' (Absorption Law - a' + a'b = a, a' + a'b' = a)

2. a'(a + b) + (b + a)(a + b')

   a'b + ab + a + ab' (a'.a = 0) (Distributive Law)

   a'b + a (absorbation Law – a+ab = a, a + ab' = a)

3. ab + a(b+c) + b(b+c)

   = ab + ab +ac + b (Distributive Law)

   (Absorbation Law (b(b+c) = b))

= ab + ac + b (ab + ab = ab)

= ac + b (absorbation law (b + ab = b))

4. ab’ + a(b+c)’ + b(b+c)’
   ab’ + a(b’c’) + b(b’c’) (De Morgan’s Law)
   ab’ + ab’c’ (b.b’ = 0 ,0.c’ = 0)
   a(b’ + b’c’) (Distributive Law)
   ab’ (Absorption Law - b’ + b’c’ = b’)