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Logic design (2016 spring)

Quiz # 3

Name:_____ID:_____

1. (50%) Eliminate the exclusive OR, and then factor to obtain a minimum product of sums

$$M'(K \oplus N') + MN + K'N$$

$M'(K \oplus N') + MN + K'N$

=M'(K'N'+KN)+MN+K'N

=K'M'N'+KM'N+MN+K'N

=K'M'N'+N(M+KM'+K')

=K'M'N'+N(M+K'+M')

=K'M'N'+N

=N+K'M'

=(K'+N)(M'+N)

2. (50%) Determine the following equation is always valid or not with algebraic proof

$$a'b + b'c + c'a = ab' + bc' + ca'$$

a'b+b'c+c'a

=a'b(c+c')+(a+a')b'c+(b+b')ac'

=a'bc+a'bc'+ab'c+a'b'c+abc'+ab'c'

=(a'bc+a'b'c)+(a'bc'+abc')+(ab'c+ab'c')

=a'c+bc'+ab'