KFUPM - ELECTRICAL ENGINEERING DEPARTMENT
EE-200 – Digital Logic Circuit Design (section 05)

Student Name:

Student Number:

You MUST SHOW your work – correct results without showing leading work do not count!

Problem 1 (20 points): Perform the following operations

    a. (+19) + (-12) – using 2's complement and appropriate number of digits

    b. (-19) + (+12) - using 2's complement and appropriate number of digits

    c. (+19) + (-12) – using 9's complement and appropriate number of digits – i.e. numbers are in signed-magnitude decimal representation

    d. (-19) + (+12) - using 10's complement and appropriate number of digits – i.e. numbers are in signed-magnitude decimal representation

Problem 2 (10 points): Simplify the following expressions to a minimum number of "*literals*" using Boolean algebraic manipulation

       a) ABC + A′B + ABC′

       b) (BC′ + A′D)(AB′ + CD′)

Problem 3 (10 points): Prove the following Identities using Boolean algebraic manipulation:

       a) x′y + xy′ + xy + x′y′ = 1

       b) xy′ + y′z′ + x′z′ = xy′ + x′z′