National University

of Computer and Emerging Sciences Chiniot-Faisalabad Campus

EE1005 – Digital Logic Design
CP#3
Fall 2024

Instructor: Muhammad Adeel Tahir
Sections: BSCS 3N
Total Marks: 50 **Deadline:** Friday, 20 September 2024

Question 1: Draw the circuit diagram of each expression and then after simplification using Boolean laws, construct the simplified circuits as well.

1. AC'D' + A'C + ABC + AB'C + A'C'D'
2. (A' + B)'(A' + C')'(AB'C)'
3. A'B'D+A'C'D+BD = D(A'B'+B) + A'C'D
4. x'y'z + x'yz + xy'z' + xy'z + xyz' + xyz
5. w'x'yz + w'xyz + wx'yz + wxy'z' + wxy'z + wxyz' + wxyz
6. w'x'yz' + w'x'yz + wxy'z' + wxy'z + wxyz' + wxyz

Question 2: Apply demorgan's law to the following expressions

i) (XYZ)'
ii) (X + Y + Z)'
iii) (WXYZ)'
iv) (W + X + Y + Z)'
v) $\overline{\overline{(A + B\bar{C} + D(\overline{E + \bar{F}})}}$

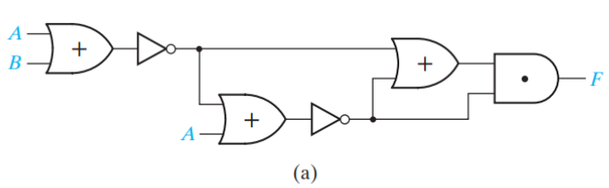
Question 3: Construct a gate circuit using AND, OR, and NOT gates that corresponds one to one with the following switching algebra expression. Assume that inputs are available only in uncomplemented form. (Do not change the expression.)

$$(WX' + Y)[(W + Z)' + (XYZ')]$$

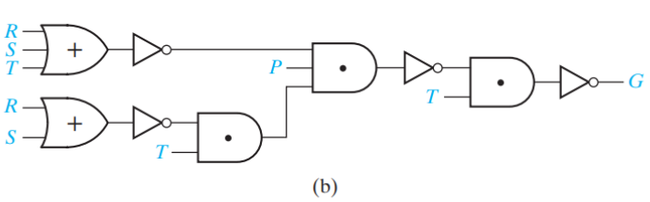
Question 4: Draw a circuit that uses only one AND gate and one OR gate to realize each of the following functions (only most efficient approach will be marked as correct):

$(a)\ ABCF + ACEF + ACDF$
$(b)\ (V + W + Y + Z)(U + W + Y + Z)(W + X + Y + Z)$

Question 5: Find F and G and simplify using Boolean laws.



(a)



(b)