**Digital Systems Preliminary Examination for Fall 2018**

1. Given the following function, f = ABC’D + ABC + A’CD, simplify using a K-map.
2. Design a counter using D or T flip that goes through the sequence: 0, 2,4,6,7,0. Illustrate the state table, state diagram, and sequential circuit.
3. Implement the following functions using: (a) Programmable Logic Array (PLA) and (b) Programmable Array Logic (PAL). Illustrate the Programming Tables.

F1 = ABCD + A’B’CD + BC’D’

F2 = AD + A’BC

1. Design a decoder with 3 inputs and 8 outputs at the gate level.
2. Design a 4 to 1 multiplexer to implement the function. Implement on the block level.

f (x, y, z) = (0,2,5,6,7) = x’y’z’ + x’yz’+xy’z+xyz’ + xyz

1. Convert the following decimal number to its binary and hexadecimal equivalents: Show all work.

123

1. Binary
2. Hexadecimal
3. Define the following:
4. RAM
5. ROM
6. Dynamic RAM
7. EEPROM