Lab Session#10

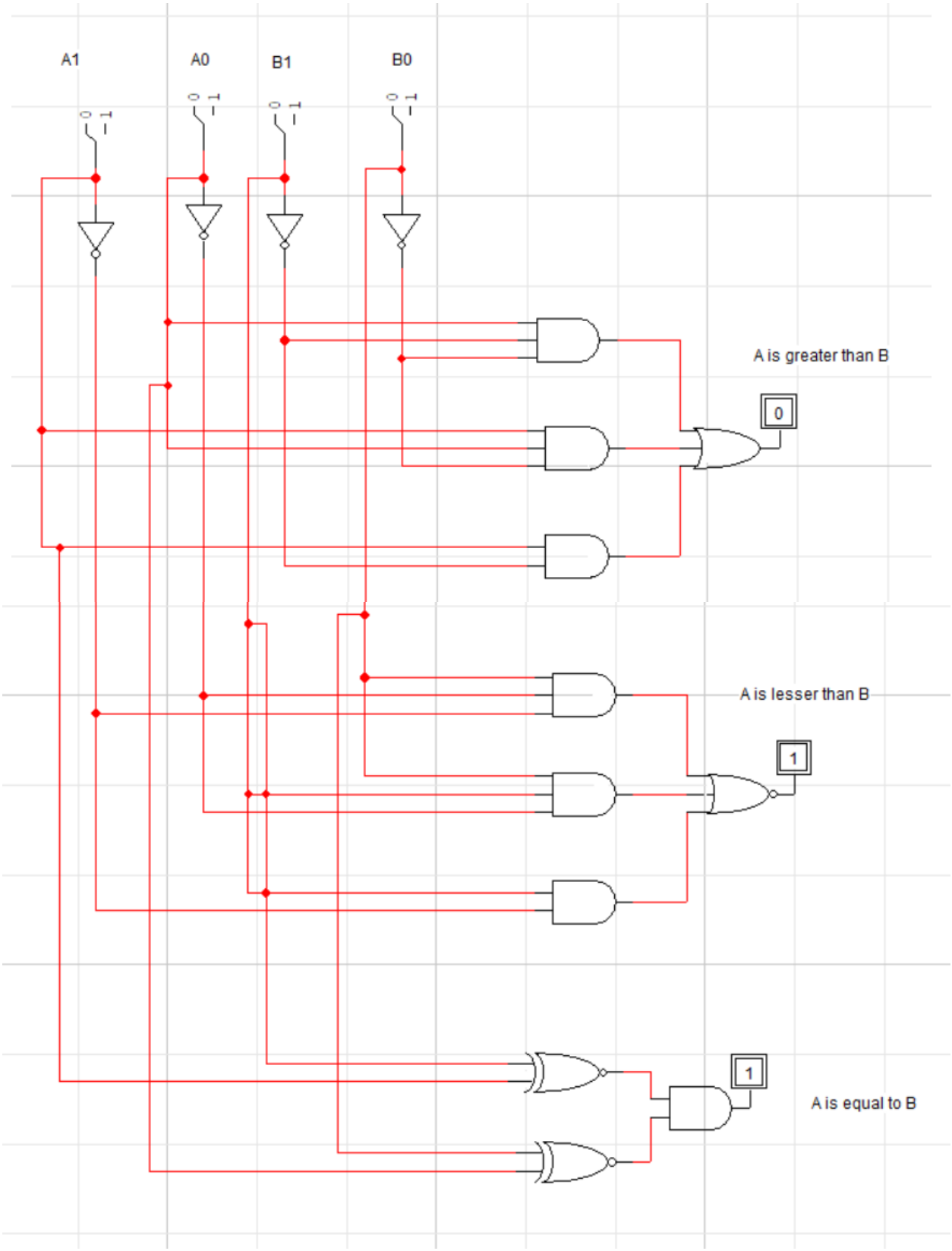
Roll no: 20k-0409 Name: Mukand Krishna

Task#1

Design 2-bit comparator and Truth Table

A1	A0	B1	B0	A>B	A<B	A=B
0	0	0	0	0	0	1
0	0	0	1	0	1	0
0	0	1	0	0	1	0
0	0	1	1	0	1	0
0	1	0	0	1	0	0
0	1	0	1	0	0	1
0	1	1	0	0	1	0
0	1	1	1	0	1	0
1	0	0	0	1	0	0
1	0	0	1	1	0	0
1	0	1	0	0	0	1
1	0	1	1	0	1	0
1	1	0	0	1	0	0
1	1	0	1	1	0	0
1	1	1	0	1	0	0
1	1	1	1	0	0	1

Circuit Diagram



Task#2

Find minimal SOP and POS expressions for the outputs L, E, and G using K-map

K-Map for output L (A<B)

	B1~B0~	B1~B0	B1B0	B1B0~
A1~A0~	0	1	1	1
A1~A0	0	0	1	1
A1A0	0	0	0	0
A1A0~	0	0	1	0

SOP

L: A < B = B1A1~ + B0B1A0~ + A1~A0~B0

POS

L: A < B = **(**B1+ B0) **+** (A1~+A0) + (A0~ + B1) + (A1~ + B1) + (A1~ + B1~ + B0)

K-Map for output G (A > B)

	B1~B0~	B1~B0	B1B0	B1B0~
A1~A0~	0	0	0	0
A1~A0	1	0	0	0
A1A0	1	1	0	1
A1A0~	1	1	0	0

SOP

G: A > B = A1B1~ + A0B1~B0~ + A1A0B0~

POS

G: A > B = (A1+A0) (A1+B0~) (A1+B1~) (B1~+B0~) (A0+B1~)

K-Map for output E (A = B)

	B1~B0~	B1~B0	B1B0	B1B0~
A1~A0~	1	0	0	0
A1~A0	0	1	0	0
A1A0	0	0	1	0
A1A0~	0	0	0	1

SOP

E: A = B **=** A1~A0~B1~B0~ + A1~A0B1~B0~ + A1A0B1B0 + A1A0~B1B0~

A = B: (A0 **Ex-NOR** B0) (A1 **Ex-NOR** B1)

POS

E: A = B = (A1~ + B1) + (A0~ + B1~ + B0) + (A0 + B0~) + (A1+ B1~)

----------END----------