



**NORTH SOUTH UNIVERSITY**  
**Department of Electrical and Computer**  
**Engineering**

**Digital Logic Design (CSE 231)**

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Section: 06

Group: 04

**Project Part 1**

Combinational circuit only

(Truth table, Equation, K Map-Sop, Pos. Nand, Nor)

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# Truth Table for "CSE-231":

Truth Table:

word	Input			Output						
	A	B	C	a	b	c	d	e	f	g
c	0	0	0	1	0	0	1	1	1	0
d	0	0	1	1	0	1	1	0	1	1
E	0	1	0	1	0	0	1	1	1	1
-	0	1	1	0	0	0	0	0	0	1
2	1	0	0	1	1	0	1	1	0	1
3	1	0	1	1	1	1	1	0	0	1
1	1	1	0	0	1	1	0	0	0	0
	1	1	1	x	x	x	x	x	x	x

Table : Truth table for  
"CSE-231"

## KMap Using SOP:

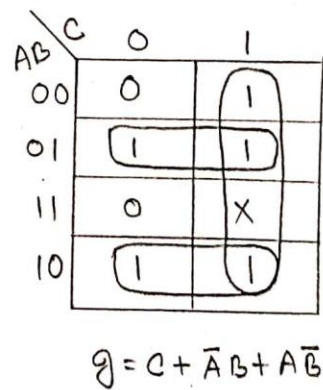
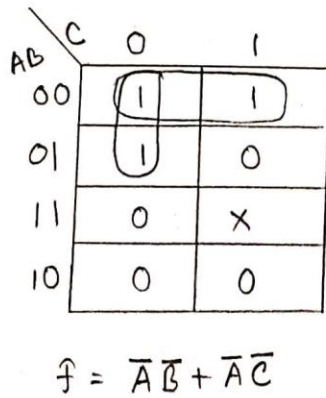
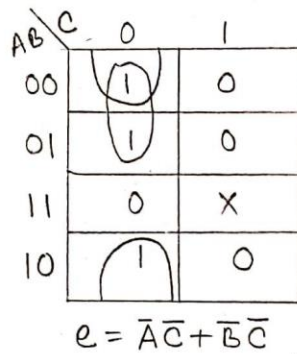
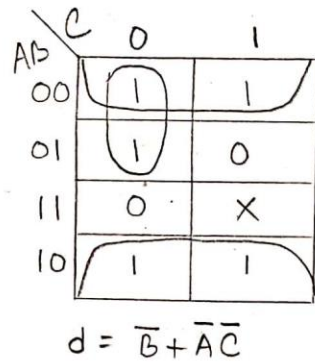
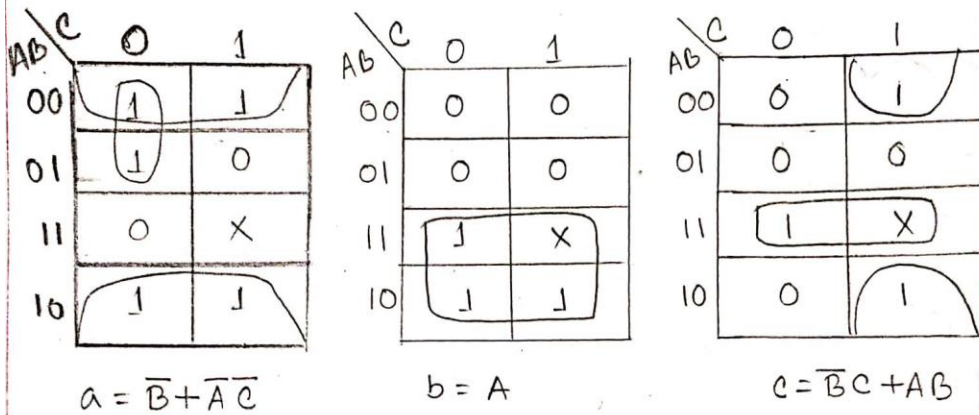


Figure: KMap Using SOP

### Circuit diagram (SOP)

The equations are :  $a = \overline{B} + \overline{A}\overline{C}$ ,  $b = A$ ,  $c = \overline{B}C + AB$ ,  
 $d = \overline{B} + \overline{A}\overline{C}$ ,  $e = \overline{A}\overline{C} + \overline{B}\overline{C}$ ,  $f = \overline{A}\overline{B} + \overline{A}\overline{C}$ ,  $g = C + \overline{A}B + A\overline{B}$

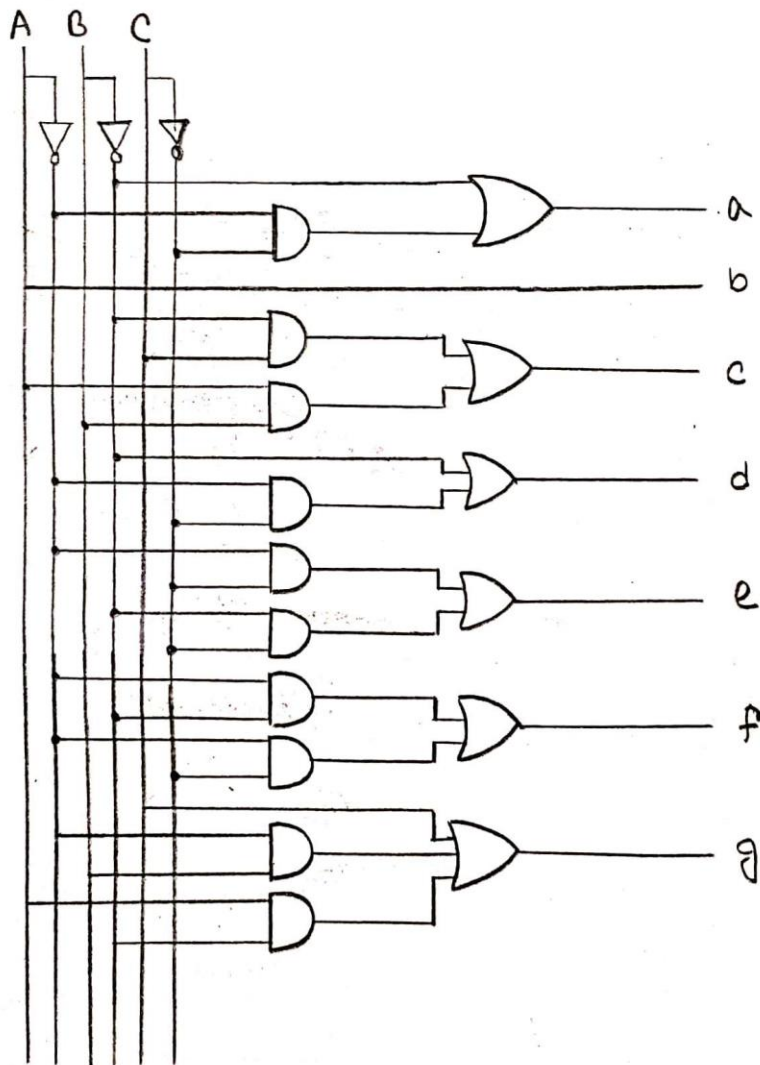


Figure : Circuit Diagram (SOP)

## KMap Using POS:

a			b			c		
AB \ c	0	1	AB \ c	0	1	AB \ c	0	1
00	1	1	00	0	0	00	0	1
01	1	0	01	0	0	01	0	0
11	0	X	11	1	X	11	1	X
10	1	1	10	1	1	10	0	1

d			e			f		
AB \ c	0	1	AB \ c	0	1	AB \ c	0	1
00	1	1	00	1	0	00	1	1
01	1	0	01	1	0	01	1	0
11	0	X	11	0	X	11	0	X
10	1	1	10	1	0	10	0	0

g		
AB \ c	0	1
00	0	1
01	1	1
11	0	X
10	1	1

$$a = (\overline{B} + \overline{c})(\overline{A} + \overline{B})$$

$$b = A$$

$$c = (B + c)(A + \overline{B})$$

$$d = (\overline{A} + \overline{B})(\overline{B} + \overline{c})$$

$$e = (\overline{A} + \overline{B})\overline{c}$$

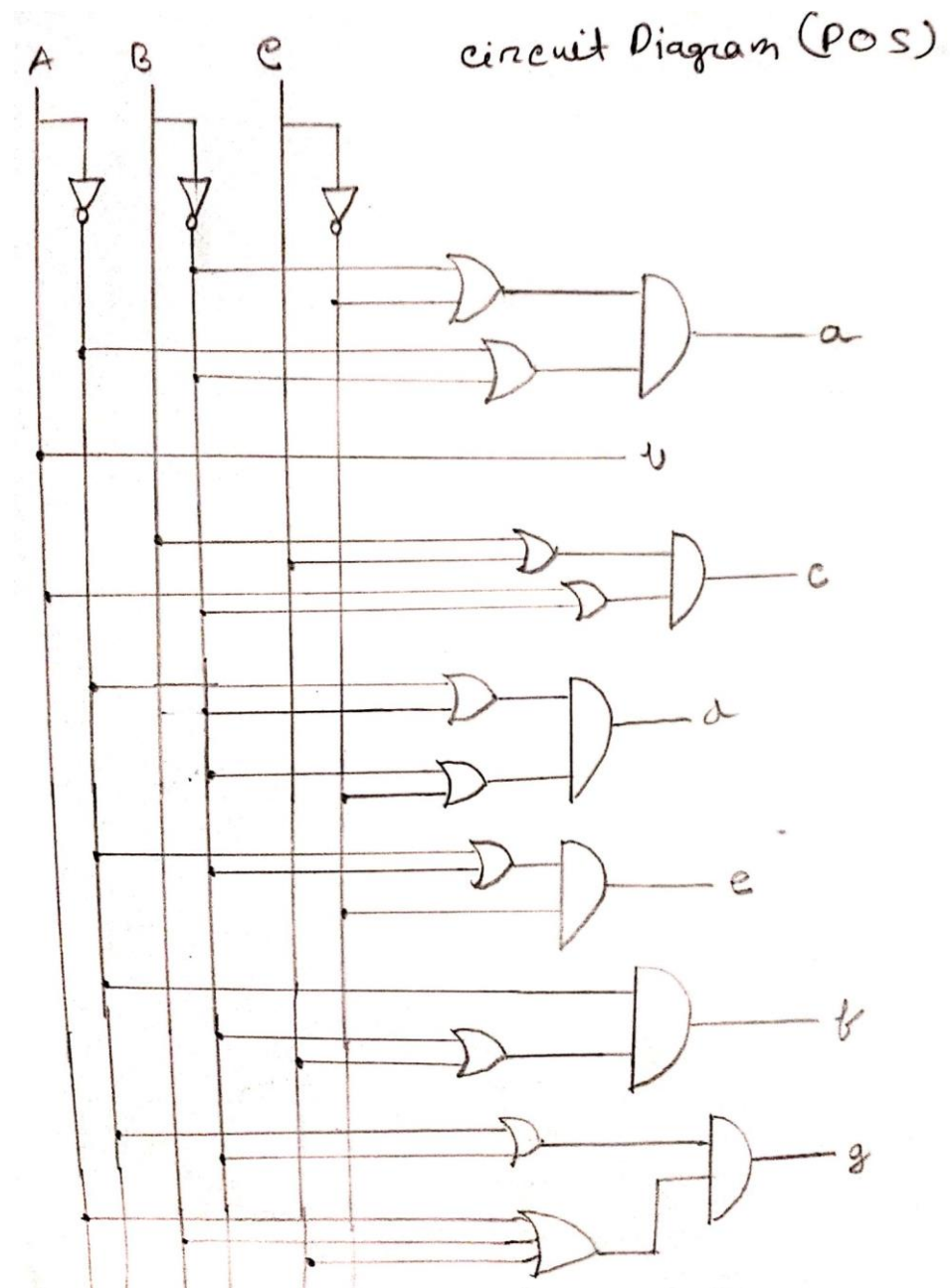
$$f = \overline{A}(\overline{B} + c)$$

$$g = (\overline{A} + \overline{B})(A + B + c)$$

Figure: KMap Using POS

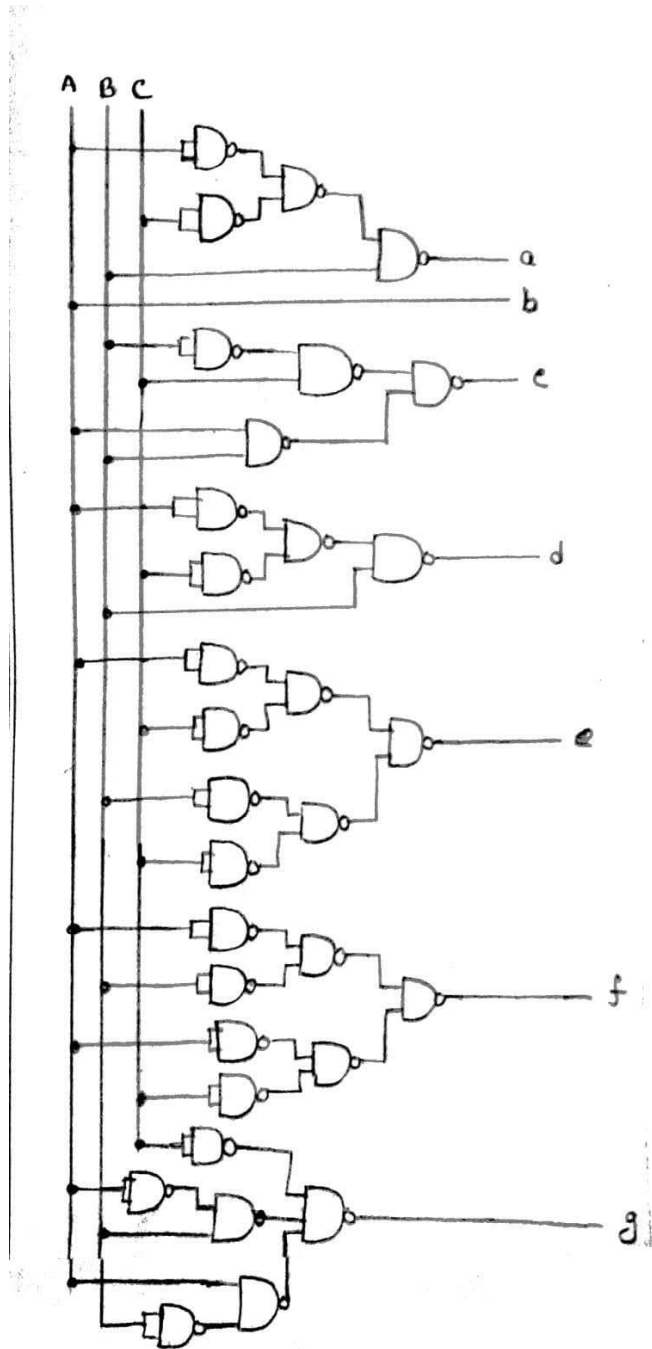


# Circuit diagram (POS)



**Figure:** Circuit diagram (POS)

## Circuit diagram (NAND Gate)



**Figure :** Circuit Diagram (Using Nand Gates)



## Circuit diagram (NOR Gate)

The eqn<sup>n</sup> are:

$$a = \bar{B} + \bar{A}\bar{C}; \quad b = A; \quad c = \bar{B}C + AB; \quad d = \bar{B} + \bar{A}C; \quad e = \bar{A}\bar{C} + \bar{B}\bar{C}$$

$$f = \bar{A}\bar{B} + \bar{A}\bar{C}; \quad g = C + \bar{A}B + A\bar{B}$$

The circuit diagram using NOR gate will be

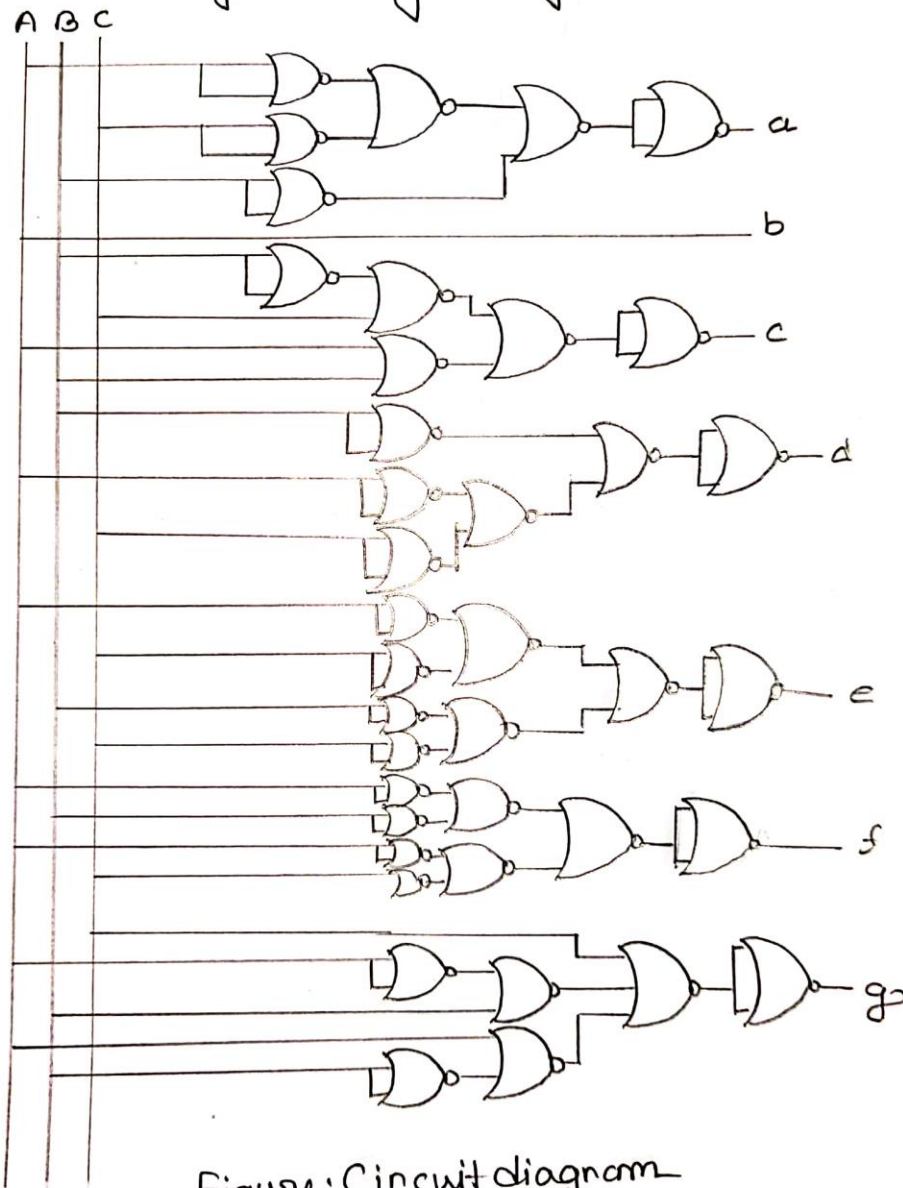


Figure: Circuit diagram  
(using NOR gate)

Figure: Circuit Diagram (Using NOR Gates)