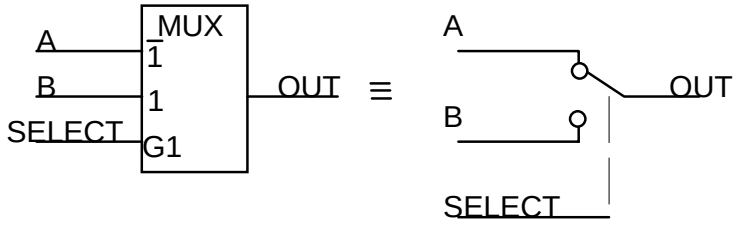
Digital Electronics

Answer Sheet 6

1. $P = \overline{A.B} + \overline{C} = \overline{A.B.C}$ (from De Morgan's Law).

2. Diagonal bar or a bubble.

3.



A	B	Select	OUT
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

AND Gate: set A=0; OUT=B.SELECT
OR Gate: set B=1;OUT=A+SELECT

4. Connect A and B to the control inputs. I0, I1, I2 and I3 will then be the values on the columns - either a constant 0 or 1 or else some function of C.

(i)

C \ AB	00	01	11	10
0	0	0	1	0
1	0	1	1	1

I0=	I1=	I3=	I2=
0	C	1	C

(ii)

C \ AB	00	01	11	10
0	0	1	1	1
1	0	1	0	0

I0=	I1=	I3=	I2=
0	1	$\overline{C}$	$\overline{C}$

5. $p = \overline{C}.\overline{D} + C.\overline{D} + C.D.E = \overline{D} + C.E$
$F = A.\overline{B} + A.B.p = A.\overline{B} + A.B(\overline{D} + C.E)$

6. **Odd Parity generator**: Given that odd parity bit is always the inverse of even parity bit, the solution is simply inverting the output of the generator circuit in the notes.
Odd Parity Checker Circuit: Replace 2-input XOR gates with 2-input XNOR gates.

7. X is HIGH when A≠B, B=C AND C=1. Therefore the only input condition for x=1 is A=0, B=1, C=1.