

Solution and marking scheme for quiz-1

Question 1:

1. Truth table

Marks: 3

INPUT			OUTPUT
TOP_SENSOR (T)	BOTTOM_SENSOR (B)	VALVE_CONTROL (V)	VALVE_CONTROL (V)
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	x
1	0	1	x
1	1	0	0
1	1	1	0

2. Karnaugh map and equation

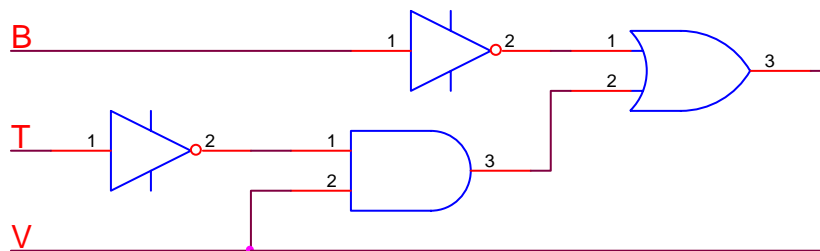
Marks: 1

	/B /V	/B V	B V	B /V
/T	1	1	1	0
T	X	X	0	0

$$V = /B + /T V$$

3. Circuit diagram (There can be other solutions also; no marks for minimization).

Marks: 1



NOTE: Marks to consecutive steps will only be given if all the previous steps are correct.

Question 2:

CLOCK	0	1	0	1	0	1
INPUT	0	0	1	1	0	0
OUTPUT	0	0	0	1	1	1

- There is one mark for each of the colored box filled correctly.
- Marks to a box will only be given if all the previous boxes are filled correctly.

The table given below is not required it is for understanding purpose.

Clock	0	1	0	1	0	1
Input	0	0	1	1	0	0
Output	0	0	0	1	1	1
$J_A = \text{Input}$	0	0	1	1	0	0
$K_A = /Q_B$	1	1	1	0	0	0
Q_A	1	0	0	1	1	1
$/Q_A$	0	1	1	0	0	0
$J_B = K_B = /Q_A$	0	1	1	0	0	0
$Q_B = \text{Output}$	0	0	0	1	1	1
$/Q_B$	1	1	1	0	0	0

Question 3:

1. Truth table

Marks: 2

A	B	C	D	OP
0	0	0	0	1
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	0

2. The circuit is logically correct

Marks: 2

3. If less than 5 IC packages are used in the circuit.

Marks:1

4. If less than 4 IC packages are used in the circuit.

Marks:1

5. If less than 3 IC packages are used in the circuit.

Marks:4

