Electronics – 2022 November IGCSE 0625
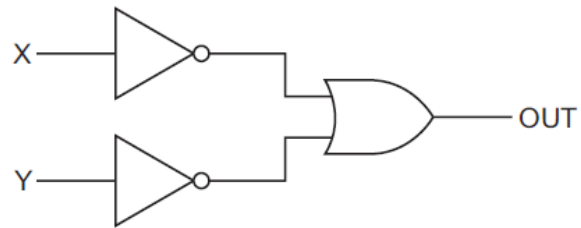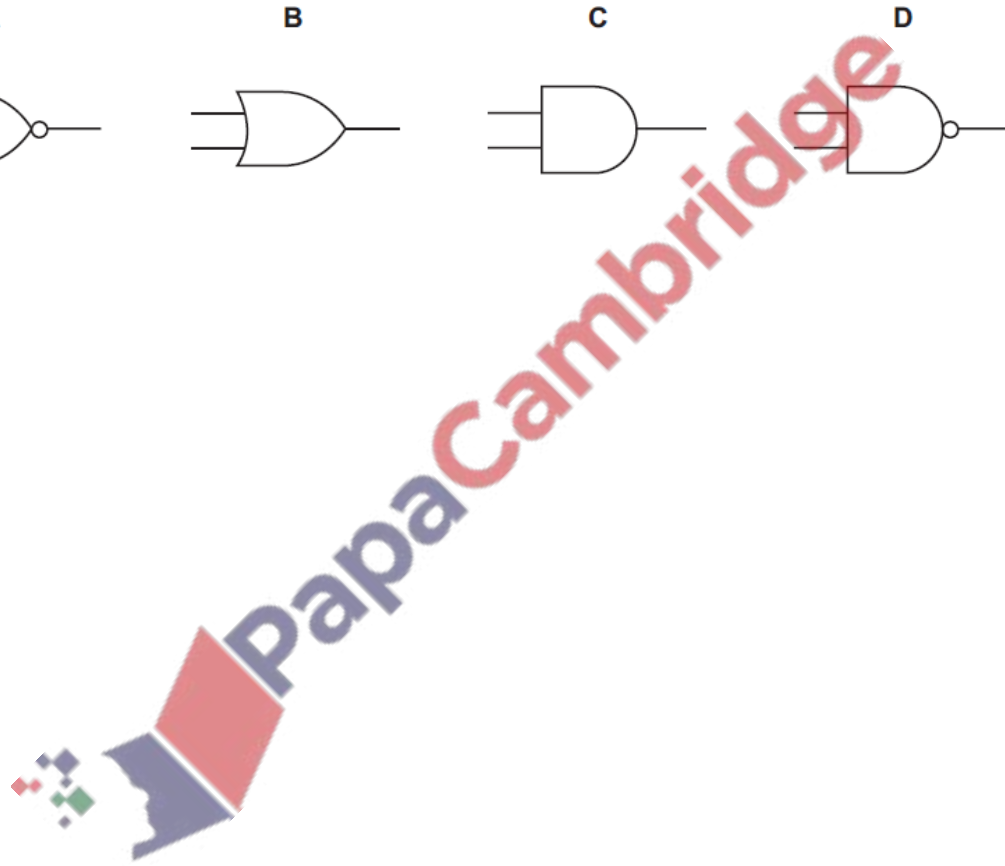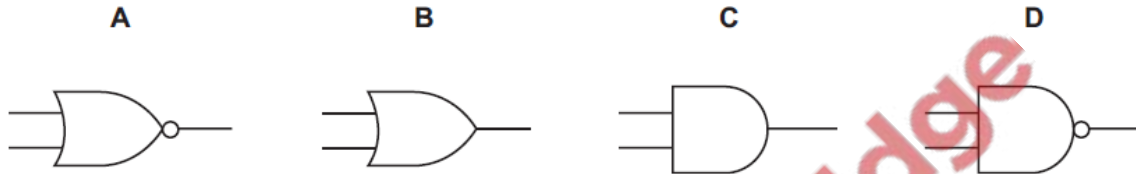
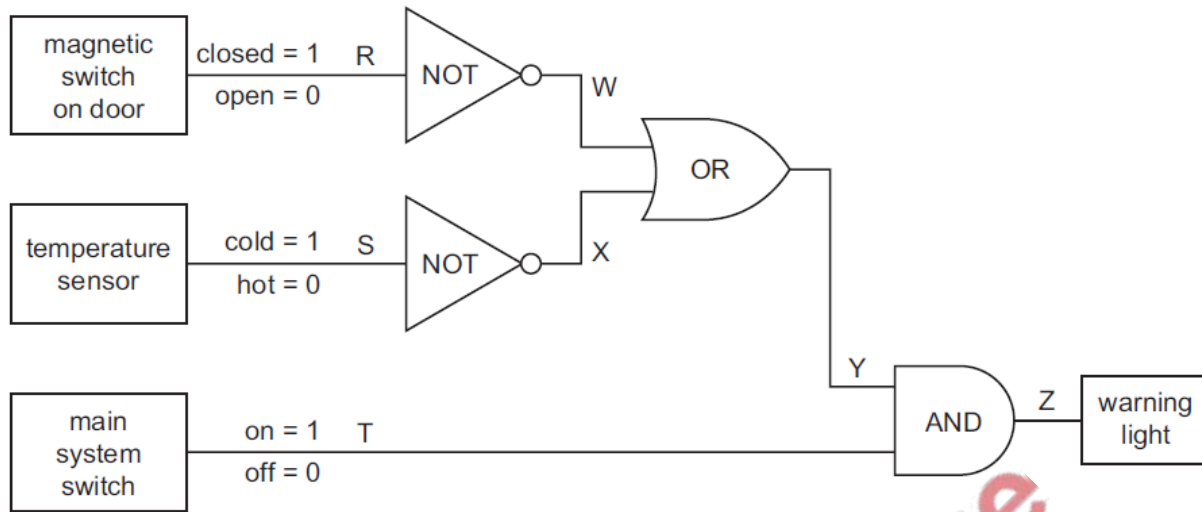**1.** Nov/2022/Paper_21/No.33
The diagram shows a network of logic gates.

Which single logic gate, placed between X, Y and OUT, would have the same effect as the network?

A	B	C	D

The diagram shows how logic gates can be used to monitor the temperature in a refrigerator.
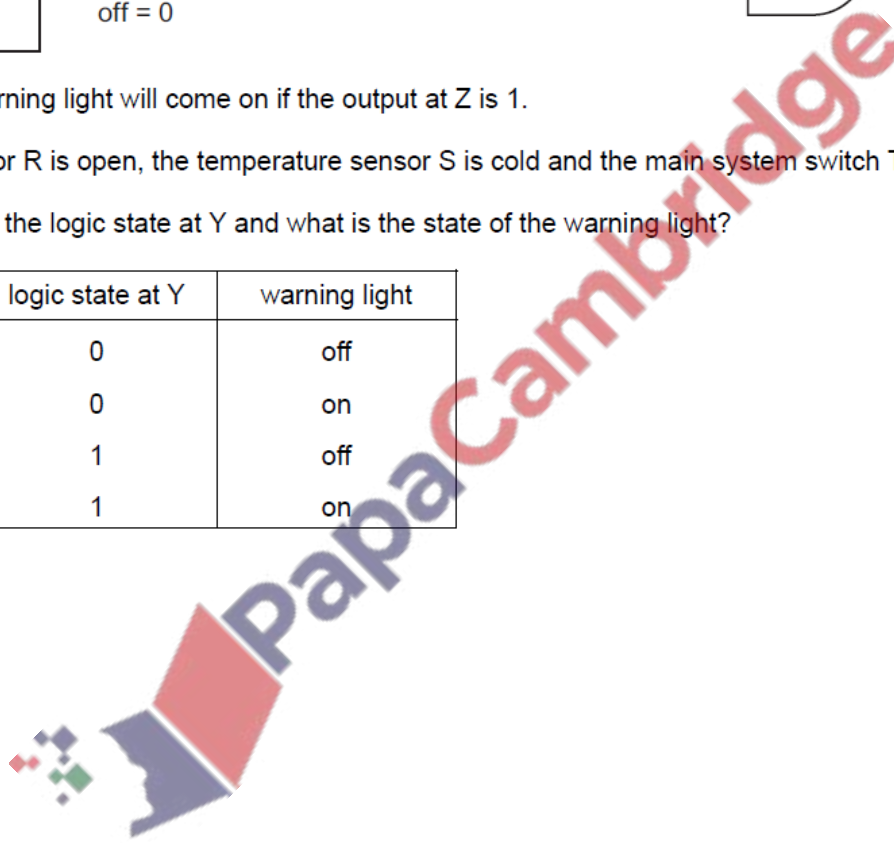

The warning light will come on if the output at Z is 1.

The door R is open, the temperature sensor S is cold and the main system switch T is on.
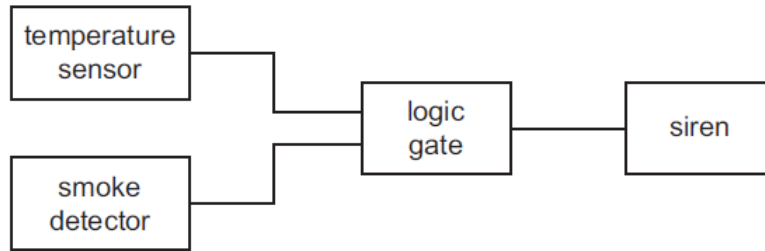
What is the logic state at Y and what is the state of the warning light?

	logic state at Y	warning light
A	0	off
B	0	on
C	1	off
D	1	on

3.

The diagram represents an alarm system using a logic gate.

```
┌──────────────┐
│ temperature  │────────┐
│   sensor     │        │     ┌──────────┐
└──────────────┘        ├─────│  logic   │─────┌────────┐
                        │     │  gate    │     │ siren  │
┌──────────────┐        │     └──────────┘     └────────┘
│    smoke     │────────┘
│  detector    │
└──────────────┘
```

The data for the system is shown.

state	0	1
temperature sensor	cold	hot
smoke detector	no smoke	smoke
siren	no sound	sound

The siren sounds when there is any indication of a fire.

Which logic gate is used?

A   B   C   D

4.
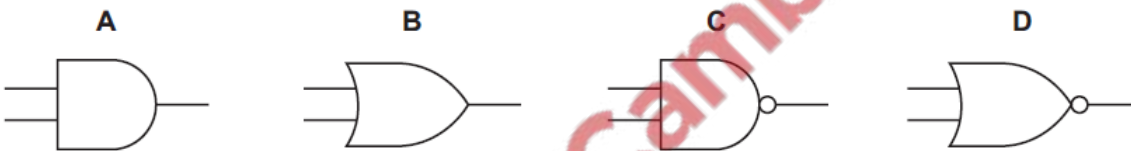
   (a) Draw the symbol for:

     (i) a diode

[1]

     (ii) a NOT gate.

[1]

   (b) (i) Fig. 9.1 shows a digital circuit.
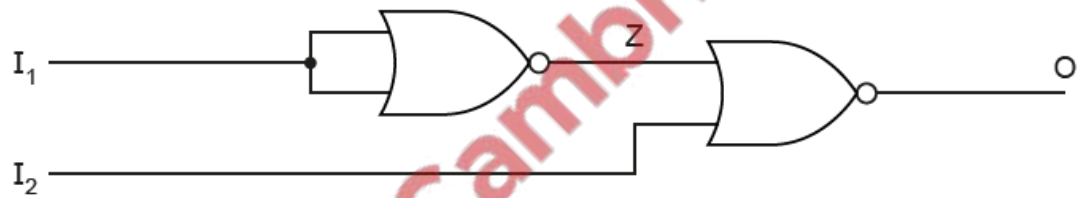
Fig. 9.1

Complete the truth table shown in Table 9.1.

Table 9.1

I_1	I_2	Z	O
0	0		
0	1		
1	0		
1	1		

[2]

     (ii) State another single gate which is equivalent to the part of the circuit between I_1 and Z.

.... [1]
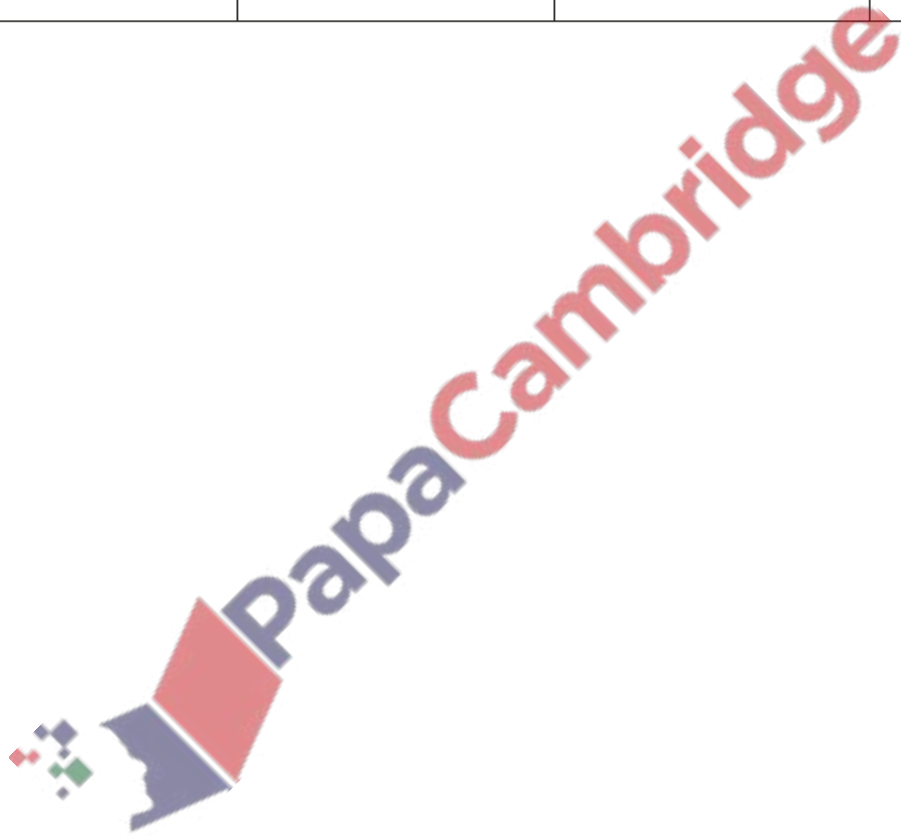
4

(c) Using **two** logic gates, design and draw a digital circuit with two inputs and two outputs which has the truth table shown in Table 9.2.

Use either the usual logic gate symbols or correctly labelled square boxes in your diagram.

Table 9.2

input 1	input 2	output 1	output 2
0	0	0	1
0	1	1	1
1	0	1	1
1	1	1	0

[4]

[Total: 9]