

1 Fig. 8.1 is a schematic diagram of an electronic circuit controlling a lamp.

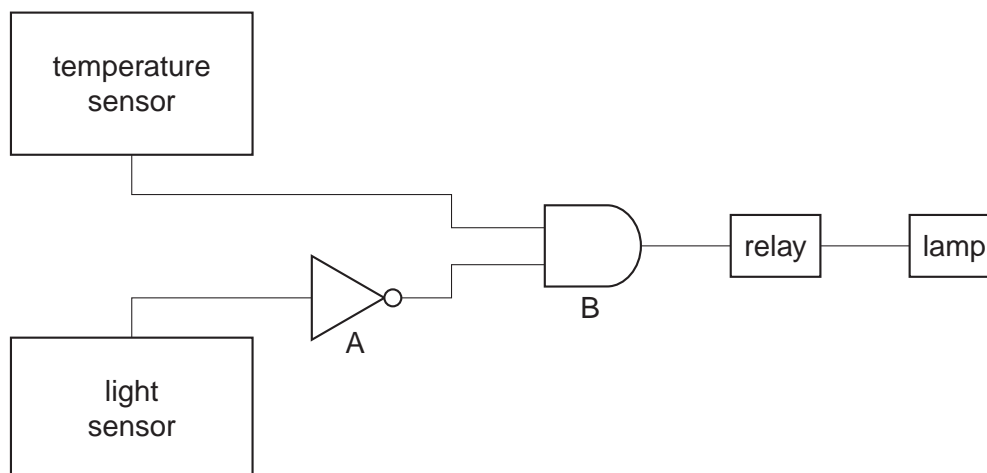


Fig. 8.1

The output of the temperature sensor is high (logic 1) when it detects raised temperatures. The output of the light sensor is high (logic 1) when it detects raised light levels.

The lamp is lit when the input to the relay is high (logic 1).

(a) Complete the truth table by giving the outputs of A and B.

output of light sensor	output of temperature sensor	output of A	output of B
0			
0			
1			
1			

[2]

(b) State the conditions under which the lamp is lit.

..... [1]

(c) Suggest why B is connected to a relay, rather than directly to the lamp.

.....
 [2]

[Total: 5]

- 2 (a) An electrical safety expert is inspecting a laundry. The main workroom has a very hot and damp atmosphere.

The safety expert recommends that normal domestic light switches, as shown in Fig. 9.1, are replaced.

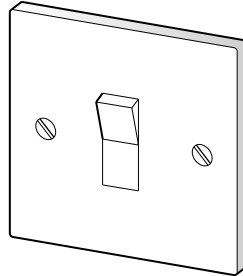


Fig. 9.1

- (i) Explain why this recommendation is made.

.....
.....
.....
..... [2]

- (ii) Suggest how the lights should be switched on and off.

.....
.....
.....
..... [1]

(b) Fig. 9.2 shows an aircraft being refuelled through a rubber hose.

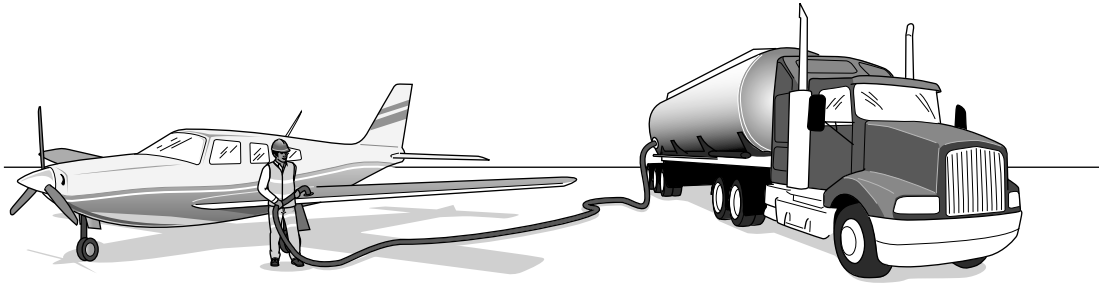


Fig. 9.2

(i) Suggest how fuel flowing through the hose can cause a large build-up of electric charge on the aircraft.

.....
.....
.....
..... [2]

(ii) The aircraft is refuelled on a particular day when the tyres and wheels are wet.
Explain why there will be no large build-up of charge in this case.

.....
.....
.....
..... [1]

[Total: 6]

3 The manufacturer's label on an electric heater is as shown in Fig. 5.1.

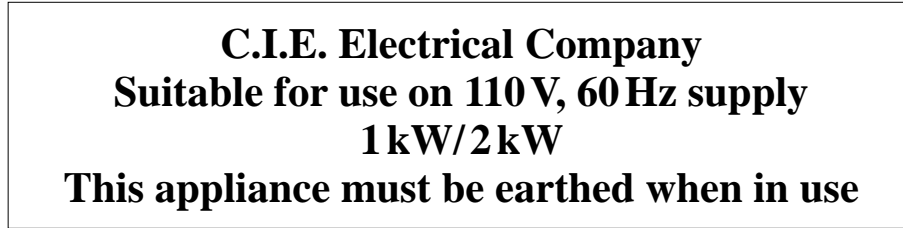


Fig. 5.1

(a) State what electrical quantity is represented by

(i) 110V,

(ii) 60Hz,

(iii) 1 kW. [1]

(b) (i) Which part of the electric heater must be earthed?

..... [1]

(ii) Explain what the hazard might be if the heater is not earthed.

.....
.....
..... [2]

(c) The heater has two 110V heating elements, with two switches, so that either one or both elements may be switched on.

In the space below, draw a circuit diagram showing how the heating elements and switches are connected to the mains supply.

Use the symbol $\square\square\square$ for each heating element.

[2]

[Total: 6]