

CAMBRIDGE LOWER SECONDARY CHECKPOINT
PRACTICE QUESTIONS AND MARK SCHEMES

Subject: Physics

TOPIC: Electric Circuits

Set-1

1

- (a) Fig. 8.1 shows a circuit containing a 6V lamp, two switches and a 6V motorcycle battery. The lamp has a resistance of 10Ω when it is glowing normally.

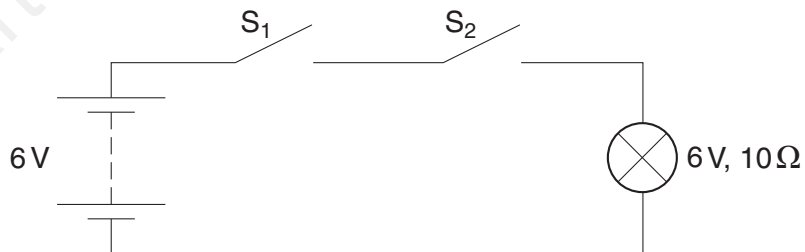


Fig. 8.1

How can the lamp be made to light up at normal brightness? Tick the box alongside any action which will do this.

close S_1 only

☐

close S_2 only

☐

close both S_1 and S_2

☐

[1]

- (b) Fig. 8.2 shows a similar circuit, but the switches are arranged in parallel.

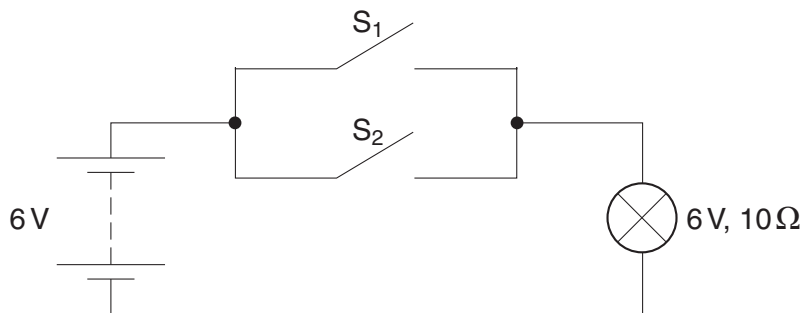


Fig. 8.2

How can the lamp be made to light up at normal brightness? Tick the box alongside any action which will do this.

close S_1 only

☐

close S_2 only

☐

close both S_1 and S_2

☐

[2]

(c) The lamp is now connected to a 12V car battery, as shown in Fig. 8.3.

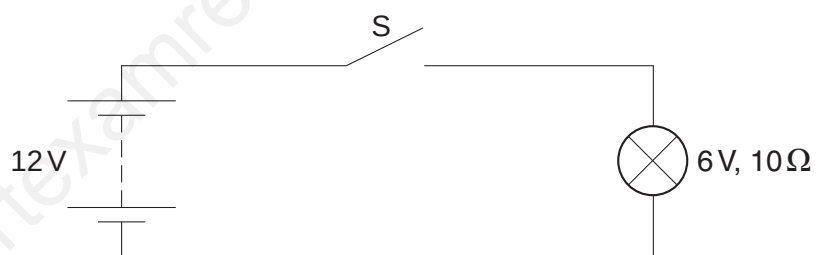


Fig. 8.3

State why it would not be wise to close switch S.

.....

..... [1]

MARK SCHEME:

- (a) close both S1 and S2 ticked B1**
- (b) any 1 ticked C1**
all 3 ticked A1
- (c) lamp would blow OR too much voltage/current B1**

- 2** A student has devised the circuit in Fig. 7.1 to control the lighting of three lamps, A, B and C.

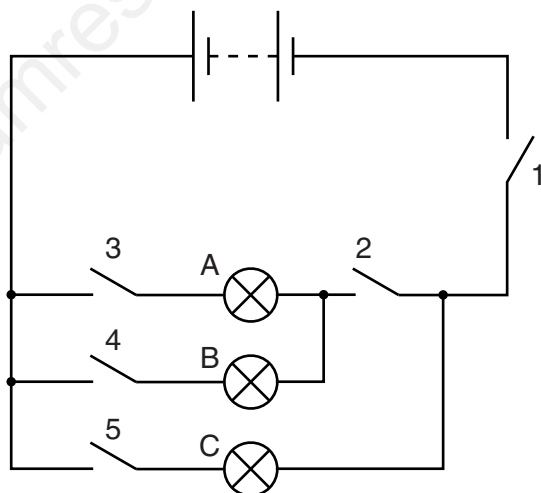


Fig. 7.1

More than one switch must be closed in order to light any lamp.

- (a) In the table below, put ticks to indicate which switches **must** be closed in order to light the lamps. The first row has been completed for you.

lamp that is lit	switches closed				
	1	2	3	4	5
lamp A only	✓	✓	✓		
lamp B only					
lamp C only					

[3]

- (b) **All** the switches are now closed.

Which of the lamps light up? [1]

- (c) Which one switch **must** be open to ensure that none of the lamps light up? [1]

[Total: 5]

MARK SCHEME:

(a)

lamp that is lit	switches closed				
	1	2	3	4	5
lamp A only	✓	✓	✓		
lamp B only	✓	✓		✓	
lamp C only	✓				✓

B1

B2

ignore any additions for lamp A
for C allow B1 only for ✓

✓

✓

(b) all of them OR A, B and C

B1

(c) (switch) 1

B1

3

A student connects the circuit shown in

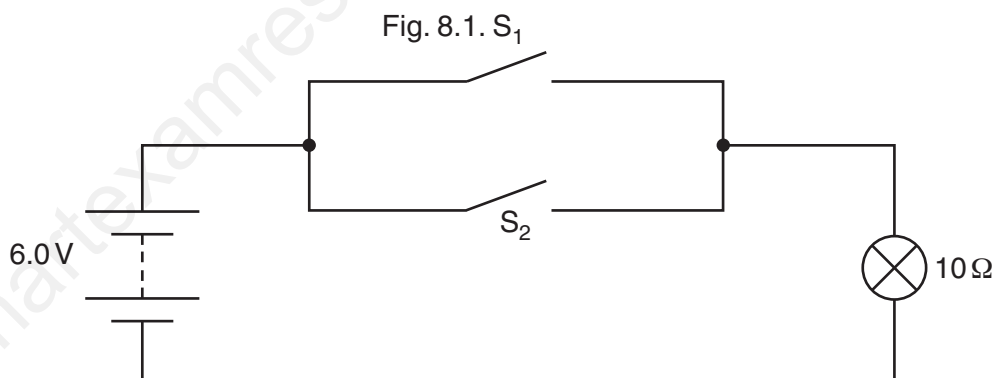


Fig. 8.1

When operating normally, the lamp has a resistance of 10Ω .

- (a) (i) State the current in the lamp when both S_1 and S_2 are open.

.....[1]

- (ii) The student closes switch S_1 .

Calculate the current in the lamp, stating the unit of your answer.

current = [4]

- (iii) The student now closes S_2 as well as S_1 .

State the current in the lamp with both switches closed.

.....[1]

- (b) The student decides that she would like to be able to vary the brightness of the lamp.

- (i) Name an electrical component that she could add to the circuit to do this.

.....[1]

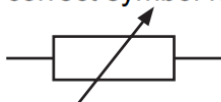
- (ii) In the space below, redraw the circuit of Fig. 8.1, including the component for varying the lamp brightness.

[2]

[Total: 9]

MARK SCHEME:

- (a) (i) nothing / zero / 0 B1
- (ii) $V = IR$ or V/R in words, symbols or numbers C1
- 6/10 C1
- 0.6 A1
- A **OR** amp(s) **OR** ampere(s) B1
- (iii) candidate's (a)(ii) B1
- (b) (i) variable resistor **OR** rheostat
- OR** potential divider B1
- (ii) neat, correct circuit with one added component in series with lamp B1
- correct symbol for variable resistor B1



[Total: 9]

- 4** The electric circuit in Fig. 8.1 contains a cell, two resistors and another component.

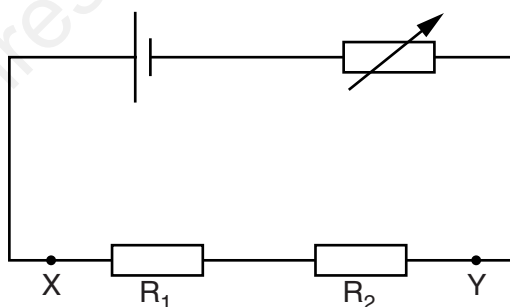
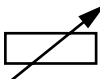


Fig. 8.1

- (a) (i) Name the component that is shown in Fig. 8.1 by the symbol  .

.....

- (ii) What is the function of this component in the circuit?

.....

.....

.....

[2]

- (b) (i) What flows in the circuit in order to create the current in the circuit? Tick one box.

charge

☐

potential difference

☐

power

☐

resistance

☐

- (ii) In which unit do we measure current?

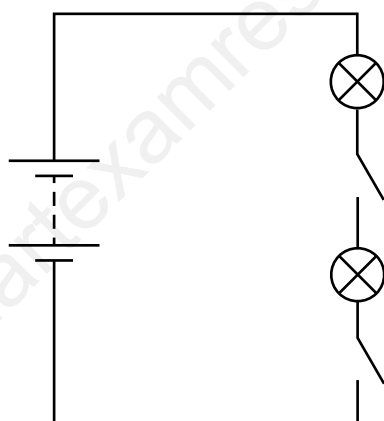
[2]

MARK SCHEME:

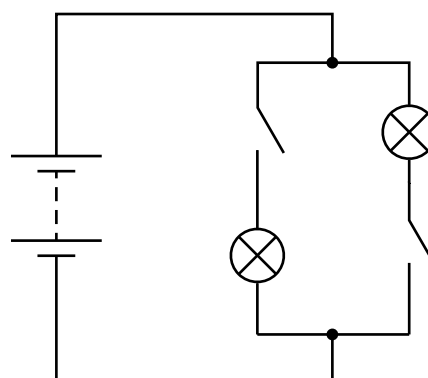
- (a) (i) variable resistor B1
- (ii) adjust/change/vary/control the current/voltage, ignore vary resistance B1
- (b) (i) top box ticked: charge B1
- (ii) A or amp(s) or ampere(s), condone a, ignore I, NOT ammeter B1

5

Fig. 5.1 shows two circuits, A and B.



circuit A



circuit B

Fig. 5.1

Both circuits contain a 6V power supply and two 6V lamps.

(a) State **two** advantages of circuit B compared to circuit A.

.....

.....

.....

..... [2]

MARK SCHEME:

any two from:

lamps all have 6V or full voltage (across them) OR lamps are brighter

if one (lamp) breaks, little/ no effect on other

lamps can be switched on and off independently

B2