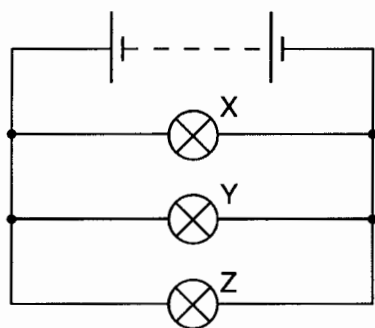


Revision
Questions

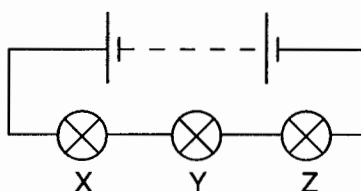
Electrical
Circuits

REVISION QUESTIONS

33 The diagrams show two ways in which three lamps may be connected.



circuit 1



circuit 2

Which statement is correct?

- A If lamp Y breaks in circuit 1, both the other lamps will go out.
- B If lamp Y breaks in circuit 2, both the other lamps will go out.
- C If lamp Y breaks in circuit 1, lamp Z will go out, but lamp X will remain on.
- D If lamp Y breaks in circuit 2, lamp Z will go out, but lamp X will remain on.

34 How is electricity transmitted over large distances and why is it transmitted in this way?

	how	why
A	at high voltage	for safety
B	at high voltage	to reduce energy loss
C	at low voltage	for safety
D	at low voltage	to reduce energy loss

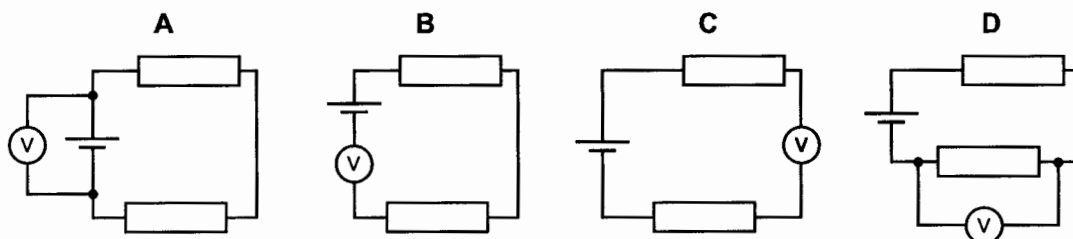
35 In a cathode-ray tube, particles are given off from a hot cathode by thermionic emission.

Which particles are given off?

- A atoms
- B electrons
- C ions
- D protons

ELECTRICAL CIRCUITS

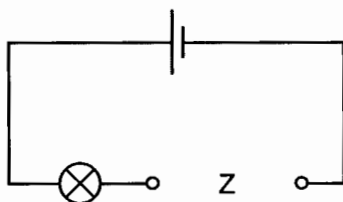
- 29 Which circuit shows how a voltmeter is connected to measure the potential difference across the cell?



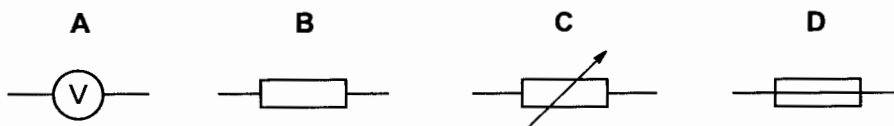
- 30 A polythene rod repels an inflated balloon hanging from a nylon thread.

What charges must the rod and the balloon carry?

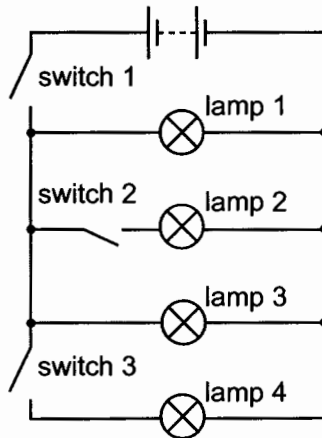
- A The rod and the balloon carry opposite charges.
 B The rod and the balloon carry like charges.
 C The rod is charged but the balloon is not.
 D The balloon is charged but the rod is not.
- 31 An electrical component is to be placed in the circuit at Z, to allow the brightness of the lamp to be varied from bright to dim.



What should be connected at Z?



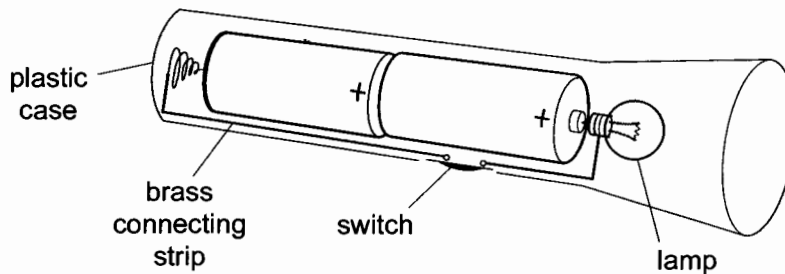
32 The circuit shown contains four lamps and three switches.



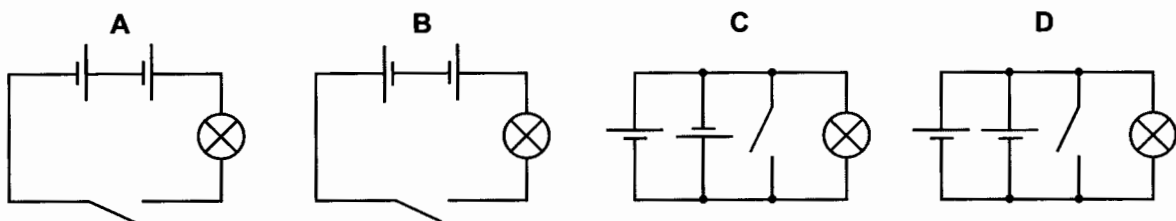
Which switches must be closed to light only lamps 1 and 3?

- A switch 1 only
- B switch 1 and switch 2 only
- C switch 1 and switch 3 only
- D switch 2 and switch 3 only

33 The diagram shows a torch containing two 2 V cells, a switch and a lamp.

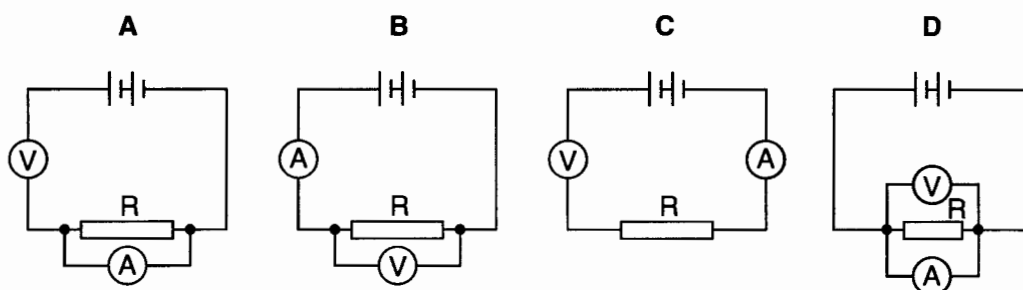


What is the circuit diagram for the torch?

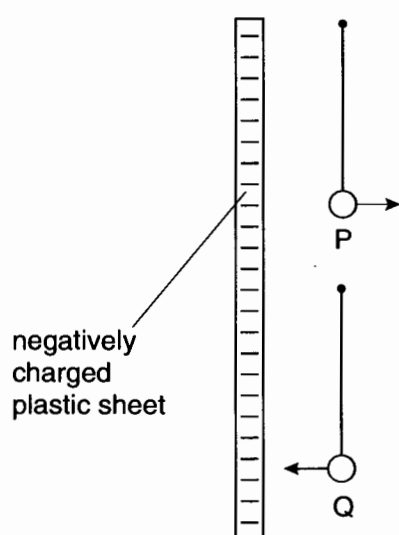


28 A student wants to find the resistance of resistor R using a voltmeter and an ammeter.

Which circuit should the student use?



29 Two very light, charged balls P and Q are hung, one above the other, from nylon threads. When a negatively charged plastic sheet is placed alongside them, P is repelled and Q is attracted.



What are the original charges on P and on Q?

	charge on P	charge on Q
A	negative	negative
B	negative	positive
C	positive	negative
D	positive	positive

- 8 Fig. 8.1 shows a 240 V a.c. mains circuit to which a number of appliances are connected and switched on.

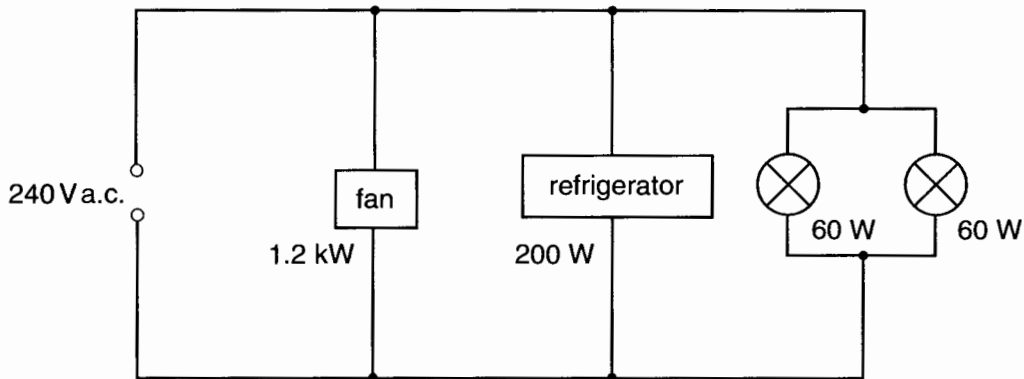


Fig. 8.1

- (a) Calculate the power supplied to the circuit.

power =[1]

- (b) The appliances are connected in parallel.

- (i) Explain what connected *in parallel* means.

.....

- (ii) State two advantages of connecting the appliances in parallel rather than in series.

advantage 1

advantage 2

[3]

- (c) Calculate

- (i) the current in the refrigerator,

current =

- (ii) the energy used by the fan in 3 hours,

energy =

- (iii) the resistance of the filament of one lamp.

resistance =

[7]

- 4 (a) In an experiment to find the specific latent heat of water, the following readings were taken.

m_1 mass of water at 100 °C, before boiling starts	120 g
m_2 mass of water at 100 °C, after boiling finishes	80 g
V voltage across the heater	12 V
I current through the heater	2.0 A
t time that the heater was supplying energy	3750 s

- (i) Using the symbols above, write down the equation that must be used to find the value of the specific latent heat L of water.

- (ii) Use the equation to calculate the specific latent heat of water from the readings above.

specific latent heat = [4]

- (b) Explain, in terms of the energy of molecules, why the specific latent heat of water has a high value.

.....

 [2]

8 A student has a power supply, a resistor, a voltmeter, an ammeter and a variable resistor.

For
Examiner's
Use

- (a) The student obtains five sets of readings from which he determines an average value for the resistance of the resistor.

In the space below, draw a labelled diagram of a circuit that he could use.

[3]

- (b) Describe how the circuit should be used to obtain the five sets of readings.

.....

[2]

- (c) Fig. 8.1 shows another circuit.

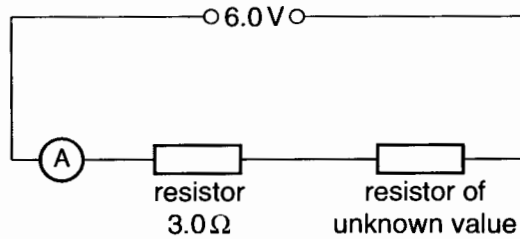


Fig. 8.1

When the circuit is switched on, the ammeter reads 0.50 A.

- (i) Calculate the value of the unknown resistor.

resistance = [2]

- (ii) Calculate the charge passing through the 3.0Ω resistor in 120 s.

charge = [1]

- (iii) Calculate the power dissipated in the 3.0Ω resistor.

power = [2]

- 10 Fig. 10.1 shows a battery with an e.m.f of 12 V supplying power to two lamps.
The total power supplied is 150 W when both lamps are on.

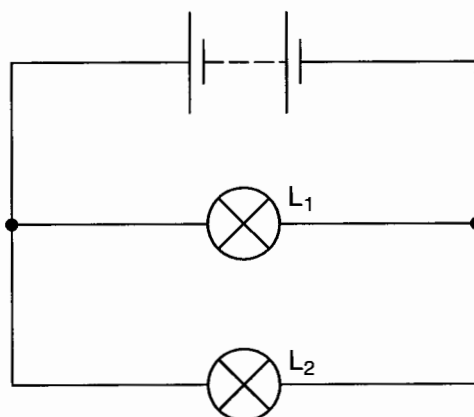


Fig. 10.1

- (a) Calculate the current supplied by the battery when both lamps are on.

current = [2]

- (b) The current in lamp L₂ is 5.0 A.

Calculate

- (i) the current in lamp L₁,

current =

- (ii) the power of lamp L₁,

power =

- (iii) the resistance of lamp L₁.

resistance =

[6]

8 Fig. 8.1 shows a high-voltage supply connected across two metal plates.

For
Examiner's
Use

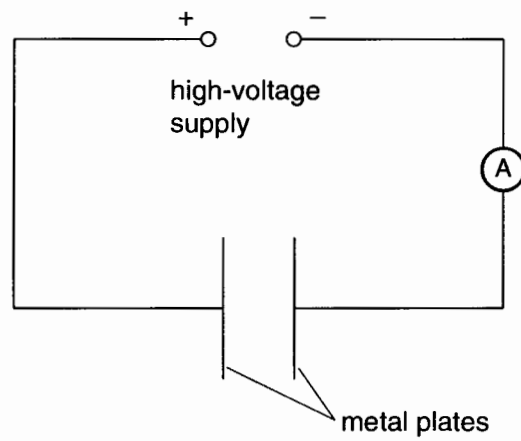


Fig. 8.1

When the supply is switched on, an electric field is present between the plates.

(a) Explain what is meant by an *electric field*.

..... [2]

(b) On Fig. 8.1, draw the electric field lines between the plates and indicate their direction by arrows. [2]

(c) The metal plates are now joined by a high-resistance wire. A charge of 0.060 C passes along the wire in 30 s. Calculate the reading on the ammeter.

ammeter reading = [2]

(d) The potential difference of the supply is re-set to 1500 V and the ammeter reading changes to 0.0080 A. Calculate the energy supplied in 10 s. Show your working.

energy = [3]

9 (a) In the space provided, draw the symbol for a NOR gate. Label the inputs and the output.

For
Examiner's
Use

[2]

(b) State whether the output of a NOR gate will be high (ON) or low (OFF) when

(i) one input is high and one input is low,

.....

(ii) both inputs are high.

.....

[1]

(c) Fig. 9.1 shows a digital circuit made from three NOT gates and one NAND gate.

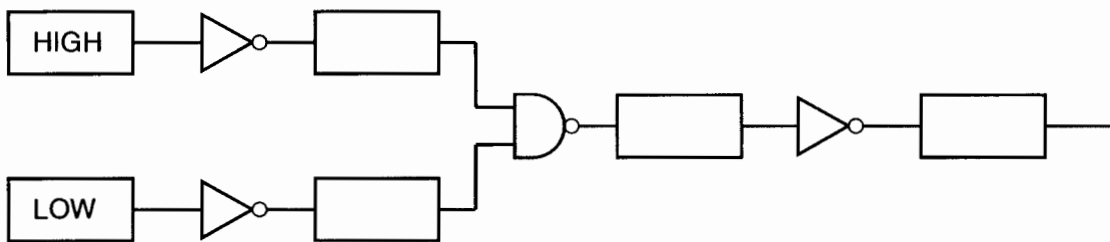


Fig. 9.1

(i) Write HIGH or LOW in each of the boxes on Fig. 9.1.

[2]

(ii) State the effect on the output of changing both of the inputs.

.....

..... [1]

- 3 In an electrical experiment, a student set up a circuit to measure current and potential difference. Part of the circuit is shown in Fig. 3.1.

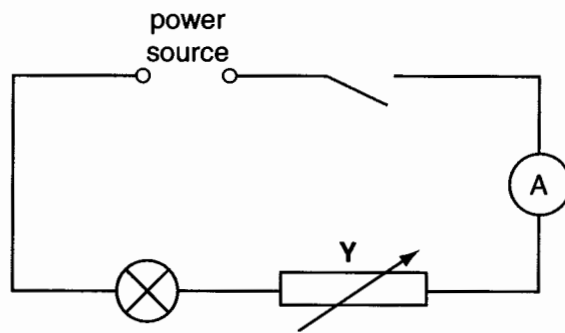


Fig. 3.1

- (a) (i) Complete the circuit diagram by drawing in a voltmeter connected across the lamp.
 (ii) Name the component labelled Y. [2]
- (b) The first reading on the voltmeter was 2.2 V. On the voltmeter face shown in Fig. 3.2, show the position of the pointer giving the reading 2.2 V.

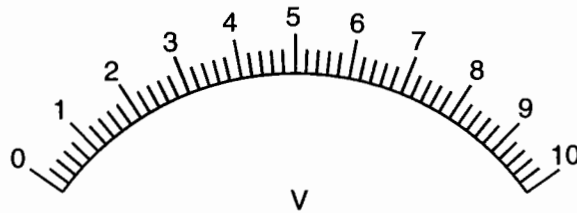


Fig. 3.2

[1]

- (c) The readings of V and I obtained by the student are given in the table below.

$V/$	$I/$	$R/$
2.2	0.36	
4.1	0.62	
6.0	0.86	
7.9	0.98	
9.8	1.20	

- (i) Calculate the resistance R of the lamp filament for each set of V and I readings and write the values in the table. Use the equation

$$R = \frac{V}{I}$$

- (ii) Complete the column headings in the table.

[6]

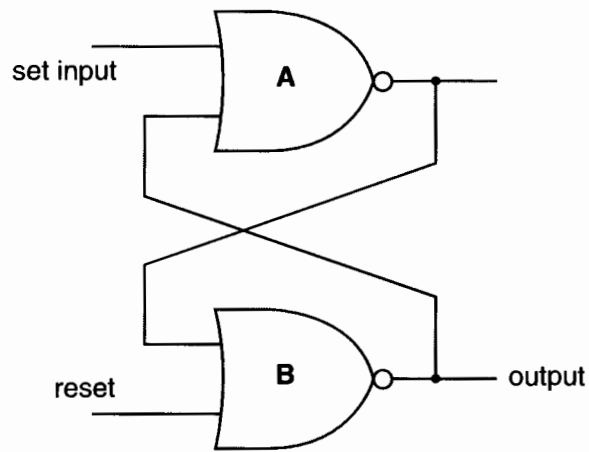
(b) A latch can be made from two NOR gates, **A** and **B**.

When a latch **input** becomes high

- the output becomes high
- the output stays high even when the input is disconnected.

The diagram shows a latch.

Explain how a latch works.



.....

.....

.....

.....

.....

.....

..... [3]

[Total: 5]