# Revision Questions

# ELECTRICITY + MAGNETISM

For Examiner's Use

9 Electromagnetic induction can be demonstrated using a solenoid, a magnet, a sensitive ammeter and connecting wire.

**(a)** In the space below, draw a labelled diagram of the apparatus set up to demonstrate electromagnetic induction. [2]

**(b)** State one way of using the apparatus to produce an induced current.

.....

.....[1]

**(c)** Explain why your method produces an induced current.

.....

.....

.....[2]

**(d)** Without changing the apparatus, state what must be done to produce

**(i)** an induced current in the opposite direction to the original current,

.....

.....

**(ii)** a larger induced current.

.....

.....

[2]





[Turn over

9 **(a)** An engine on a model railway needs a 6 V a.c. supply. A mains supply of 240 V a.c. is available.

For Examiner's Use

**(i)** In the space below, draw a labelled diagram of a transformer suitable for producing the required supply voltage.

**(ii)** Suggest suitable numbers of turns for the coils.

.....

.....

[4]

**(b)** The power needed for this model engine is 12 W. Calculate the current taken from the mains when just this engine is in use, assuming that the transformer is 100% efficient.

current = .....[2]

**(c)** Explain why transformers will only work when connected to an a.c. supply.

.....

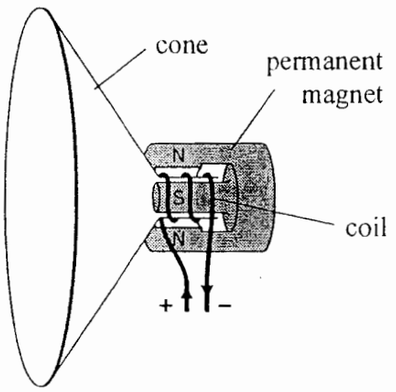
.....

.....[2]

Leave blank

**1.** The diagram shows the inside of a loudspeaker. It contains a cone attached to a coil of insulated wire.

The coil is in the gap between the cylindrical poles of a permanent magnet. When there is a current in the coil, both the coil and the cone are forced to move.




(a) Why is the coil made of insulated wire?

.....

.....

**(1)**

(b) (i) In which direction will the coil move?

.....

**(1)**

(ii) State two changes you could make to increase the force acting on the coil.

1 .....

2 .....

**(2)**

(c) When the current in the coil changes direction the cone vibrates.

(i) When the cone vibrates at a frequency of 3.6 kHz, what is the frequency in kHz of the sound which is produced?

Frequency = ..... kHz

**(1)**

(ii) Name the unit represented by the symbol kHz.

.....

**(1)**

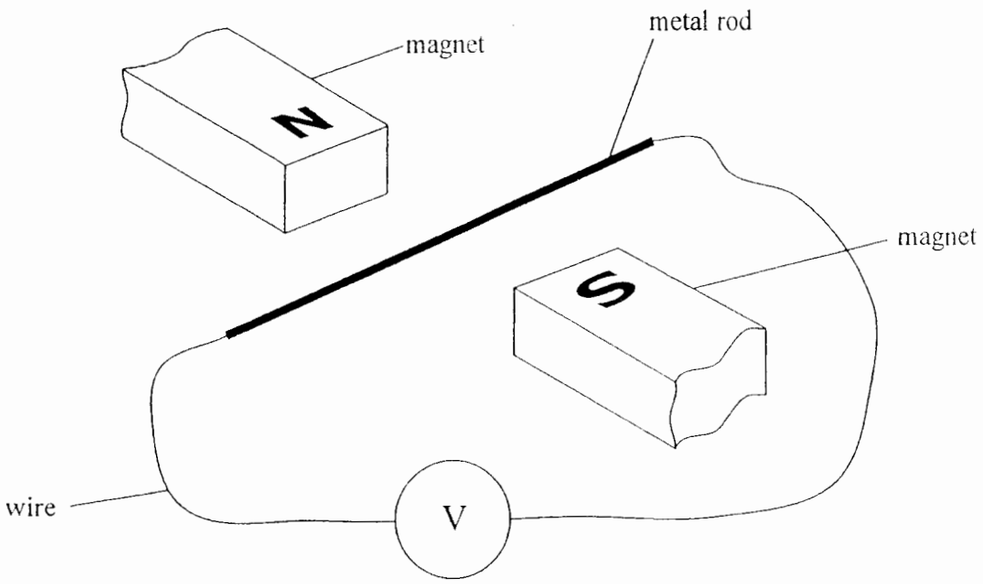
**(Total 6 marks)**



**Turn over**

Leave blank

**2.** A physics teacher uses the apparatus shown in a demonstration to her class.




She moves the metal rod upwards and the voltmeter briefly shows a small reading.

(a) Why does the voltmeter show a reading?

.....

.....

.....

**(3)**

(b) A boy standing at the back of the class complains that he cannot read the voltmeter. Suggest two ways in which the teacher could use the same apparatus to produce a bigger reading on the voltmeter.

1 .....

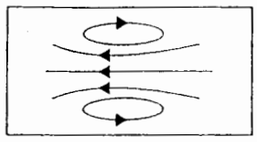
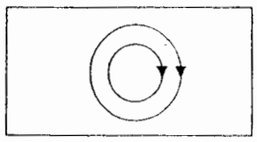
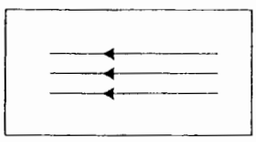
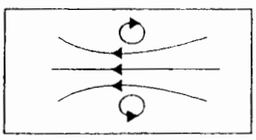
2 .....

**(2)**

**(Total 5 marks)**

Leave blank

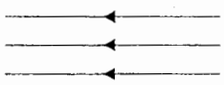
**3.** (a) An electric current produces a magnetic field.
Draw a line from each box to its correct magnetic field pattern.

| | |
|---|---|
| current in a straight wire |  |
| current in a flat circular coil |  |
| current in a solenoid |  |
| |  |

**(3)**

(b) A charged particle travels towards and enters a magnetic field.

charged particle



magnetic field

(i) Describe the magnetic force acting on the charged particle when it is moving in the magnetic field.

.....

**(1)**

(ii) Explain your answer.

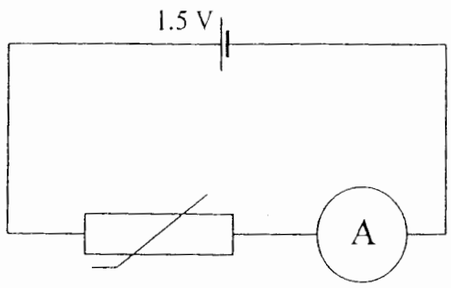
.....

**(1)**

**(Total 5 marks)**

Leave blank

**4.** The circuit below contains a 1.5 V dry cell, an ammeter and a thermistor at room temperature.




(a) At room temperature, the resistance of the thermistor is 1000 Ω.
Calculate the current, in amps.

.....

..... Current = ..... A

**(3)**

(b) What happens to the resistance of the thermistor as its temperature increases?

.....

**(1)**

(c) What happens to the current as the temperature of the thermistor increases?

.....

**(1)**

**(Total 5 marks)**

Leave blank

**5.** (a) A family has a diesel generator. The output from the generator is 120 V a.c. They also have a transformer which will reduce the voltage from the generator to 6 V a.c.

(i) What do the letters a.c. stand for?

.....

**(1)**

(ii) Describe a.c.

.....

.....

**(1)**

(b) (i) Calculate the value of the output current, in amps, when the input current to the transformer is 1.5 A.

.....

.....

..... Current = ..... A

**(2)**

(ii) What assumption have you made?

.....

.....

**(1)**

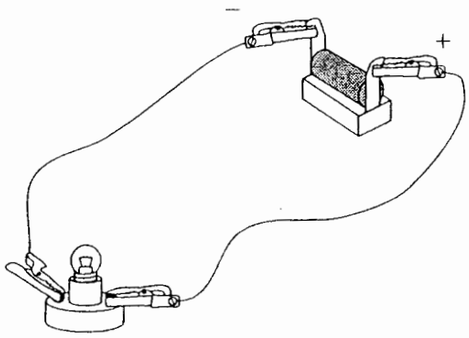
**(Total 5 marks)**



**Turn over**

Leave blank

**6.** (a) The drawing shows an electrical circuit containing a cell, a lamp and some insulated copper wire with clips.




(i) A direct current passes through the circuit.

Name the particles that flow.

.....

Why do the particles flow from the negative terminal to the positive terminal?

.....

.....

**(2)**

(ii) The circuit has a 1.5 V cell.

Complete the sentence by adding the names of the two missing units.

A volt is a ..... per .....

**(1)**

(b) A student has a reading lantern. It contains a 1.5 V rechargeable battery. The lantern uses solar cells to charge its battery during the day. The student switches on the lantern at night to read.

Use the relationship $E = I \times V \times t$ to calculate the average current from the battery when it delivers 216 J in 2.0 hours.
Show how you get your answer and include the unit.

.....

.....

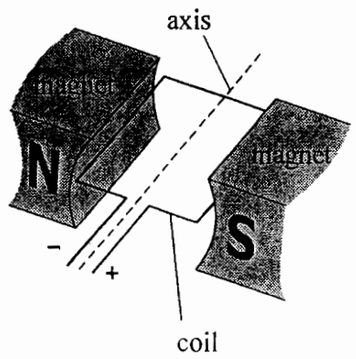
..... Average current = .....

**(3)**

**(Total 6 marks)**

Leave blank

**7.** The diagram shows part of a simple electric motor.




The motor is connected to a d.c. power supply.

(a) A student predicts that, when the motor is switched on, the coil will turn in a clockwise direction.

(i) Name the rule which the student could use to make this prediction.

.....

**(1)**

(ii) Explain how the rule shows that the coil will turn in a clockwise direction.
You may add to the diagram or draw another diagram to help you explain.

.....

.....

.....

**(2)**

(iii) Suggest one change which would make the coil turn faster.

.....

**(1)**

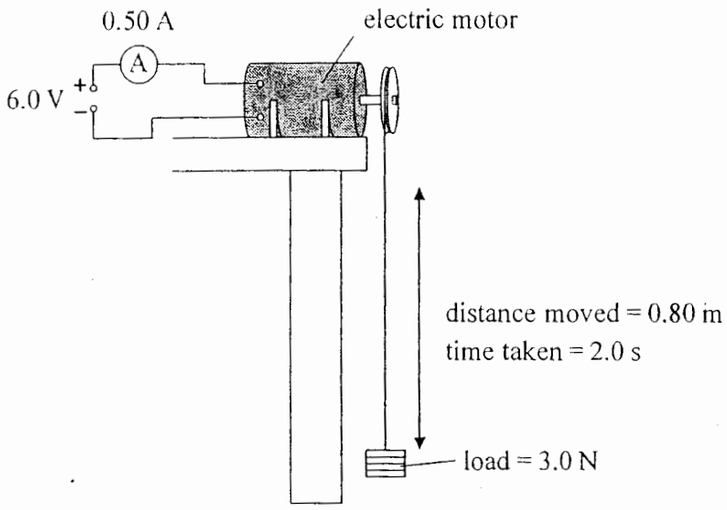
(iv) Suggest one change which would make the coil turn in the opposite direction.

.....

**(1)**

Leave blank

(b) The diagram shows an electric motor lifting a load.




Use information from the diagram to answer the following questions.

(i) Calculate the useful work done in lifting the load 0.80 m, and include the unit.

.....

.....

..... Work done = .....

**(3)**

(ii) How much useful energy was transferred to lift the load?

.....

**(1)**

(iii) The total energy transferred by the electric motor was 6.0 J.
Suggest two reasons for the difference between this value and your answer to (ii).

1 .....

2 .....

**(2)**

**(Total 11 marks)**

**THE END**