Name:

Date:

P7 - Test 6

MAGNETISM AND ELECTROMAGNETISM

Advanced

GCSE

PHYSICS

AQA - Combined Science

Mark

Grade

Materials

For this paper you must have:

- Ruler
- Pencil and Rubber
- Scientific calculator, which you are expected to use when appropriate

Instructions

- Answer all questions
- Answer questions in the space provided
- All working must be shown

Information

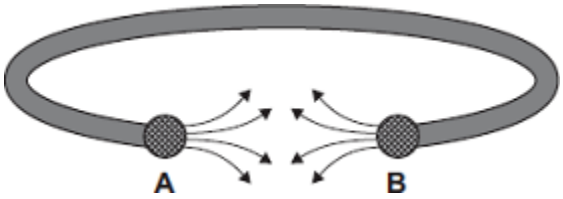
- The marks for the questions are shown in brackets

1. (a) Some people wear magnetic bracelets to relieve pain.

Figure 1 shows a magnetic bracelet.

There are magnetic poles at both **A** and **B**.
Part of the magnetic field pattern between **A** and **B** is shown.

Figure 1



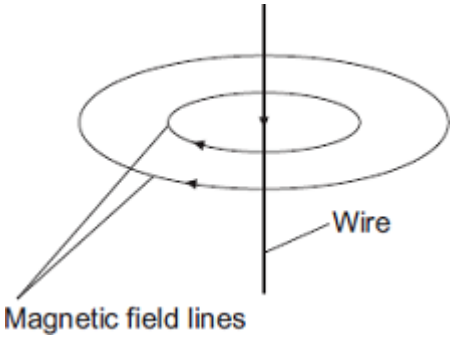
What is the pole at **A**? _____

What is the pole at **B**? _____

(1)

(b) **Figure 2** shows two of the lines of the magnetic field pattern of a current-carrying wire.

Figure 2



The direction of the current is reversed.

What happens to the direction of the lines in the magnetic field pattern?

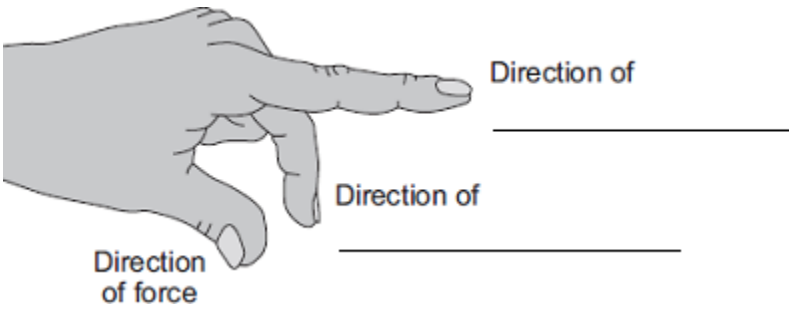
_____

(1)

(c) Fleming's left-hand rule can be used to identify the direction of a force acting on a current-carrying wire in a magnetic field.

(i) Complete the labels in **Figure 3**.

Figure 3

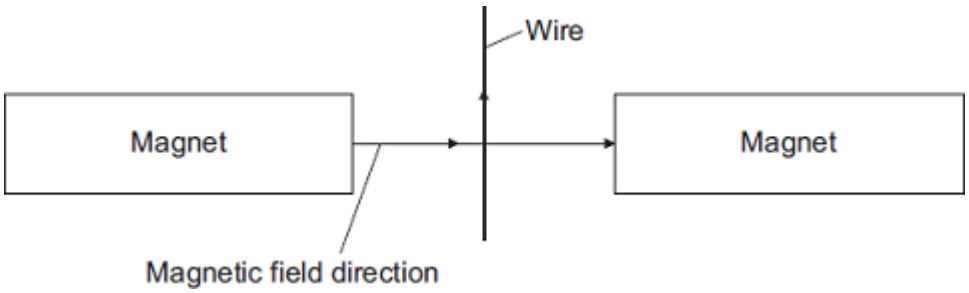


(2)

(ii) **Figure 4** shows:

- the direction of the magnetic field between a pair of magnets
- the direction of the current in a wire in the magnetic field.

Figure 4



In which direction does the force on the wire act?

_____

(1)

(iii) Suggest **three** changes that would **decrease** the force acting on the wire.

1. _____

2. _____

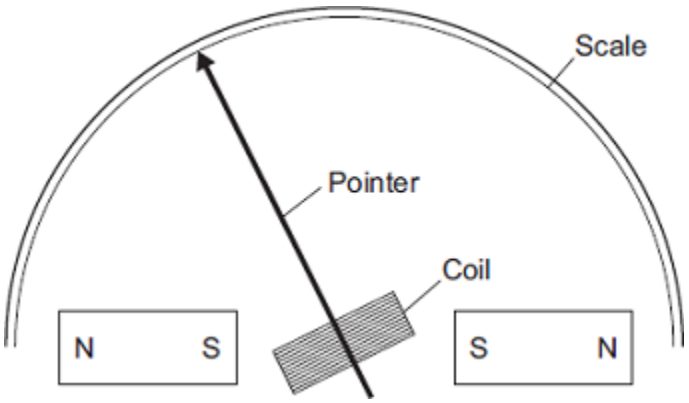
3. _____

(3)

(d) **Figure 5** shows part of a moving-coil ammeter as drawn by a student.

The ammeter consists of a coil placed in a uniform magnetic field.
When there is a current in the coil, the force acting on the coil causes the coil to rotate and the pointer moves across the scale.

Figure 5



(i) The equipment has **not** been set up correctly.

What change would make it work?

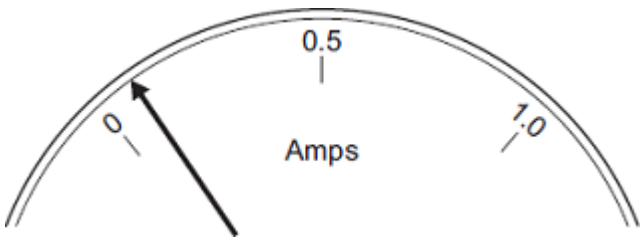
_____

_____

(1)

(ii) **Figure 6** shows the pointer in an ammeter when there is no current.

Figure 6



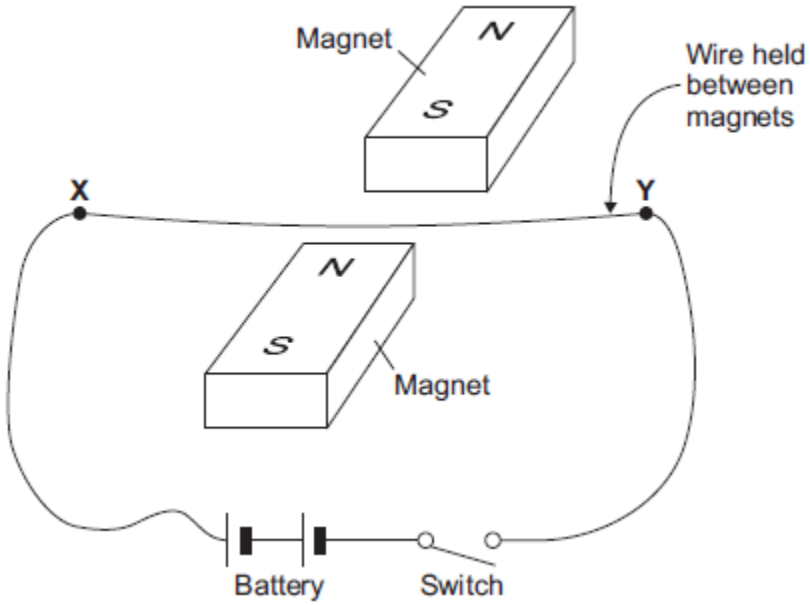
What type of error does the ammeter have?

_____

(1)

(Total 10 marks)

2. The diagram shows apparatus set up by a student.



Closing the switch creates a force that acts on the wire **XY**.

(a) (i) Explain why a force acts on the wire **XY** when the switch is closed.

_____

_____

_____

_____

_____

_____

(3)

(ii) The force causes the wire **XY** to move.
Draw an arrow on the diagram above to show the direction in which the wire **XY** will move.

(1)

(iii) State the effect that this experiment demonstrates.

_____

(1)

(b) The student replaced the battery with a low frequency alternating current (a.c.) power supply.

The student closed the switch.

(i) Describe the movement of the wire.

_____

(1)

(ii) Give a reason for your answer to part (i).

_____

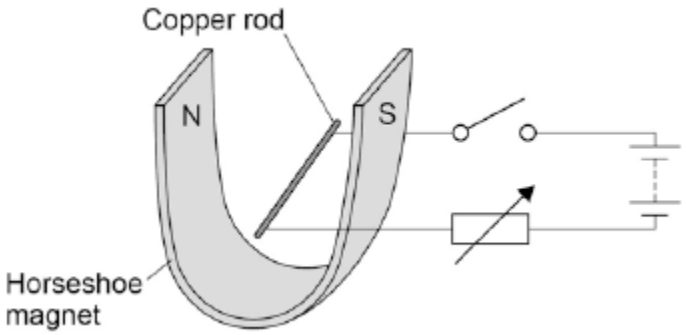
_____

_____

(1)

(Total 7 marks)

3. A teacher used the equipment shown in the figure below to demonstrate the motor effect.



(a) Describe how Fleming's left-hand rule can be used to determine the direction in which the rod will move when the switch is closed, and state the direction.

_____

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(b) Increasing the current can increase the force acting on the copper rod.

Give **one** other way in which the size of the force acting on the copper rod could be increased.

_____

_____

(1)

(c) The copper rod in the figure above has a length of 7 cm and a mass of 4×10^{-4} kg.

When there is a current of 1.12 A the resultant force on the copper rod is 0 N.

Calculate the magnetic flux density.

Gravitational field strength = 9.8 N / kg

_____

_____

_____

_____

_____

_____

Magnetic flux density = _____ T

(5)

(Total 10 marks)