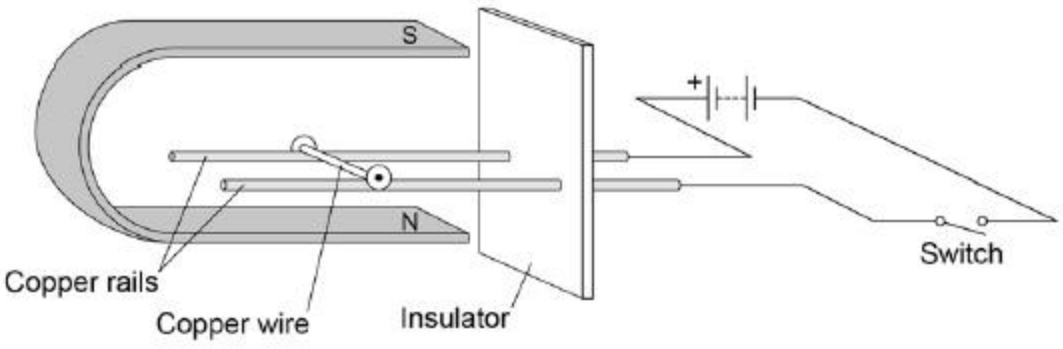
Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Q1.

(a) **Figure 1** shows one way that the motor effect can be demonstrated.

Figure 1



When the switch is closed the copper wire moves.

Describe how the direction that the copper wire will move can be predicted using Fleming's Left Hand rule.

_____

_____

_____

_____

_____

_____

_____

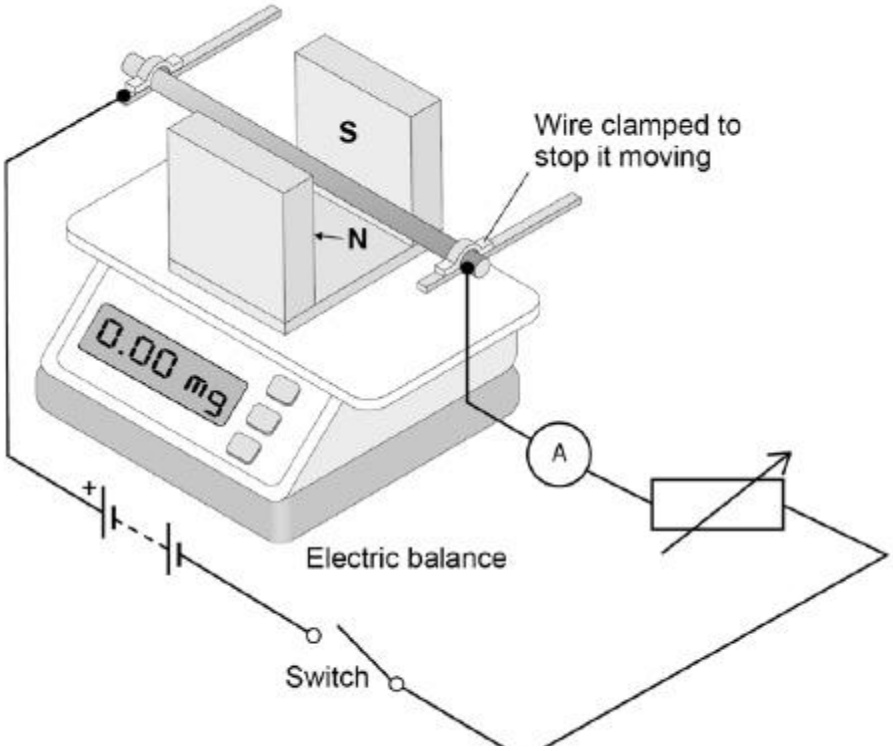
_____

(4)

Figure 2 shows the apparatus a student used to measure the force acting on a conducting wire in a magnetic field.

The wire is clamped to stop it moving.

Figure 2



This is the method used.

1. The student set the reading on the balance to zero.

2. The student closed the switch and recorded the new balance reading.

3. The student then repeated the procedure three more times. Each time the current was kept the same.

(b) The four balance readings taken by the student are given in the box.

0.21	0.23	0.25	0.23

Estimate the uncertainty in the balance readings taken by the student.

Show how you estimate the uncertainty.

_____

_____

_____

Uncertainty = ± _____ mg

(2)

(c) The student changed the current in the wire and recorded the new balance reading.

The table shows all of the data recorded by the student.

Current in the wire	2.2 A
Balance reading	0.40 g

Magnetic flux density	0.030 T
Gravitational field strength	9.8 N/kg

Calculate the length of the wire in the magnetic field.

Length of wire = _____ m

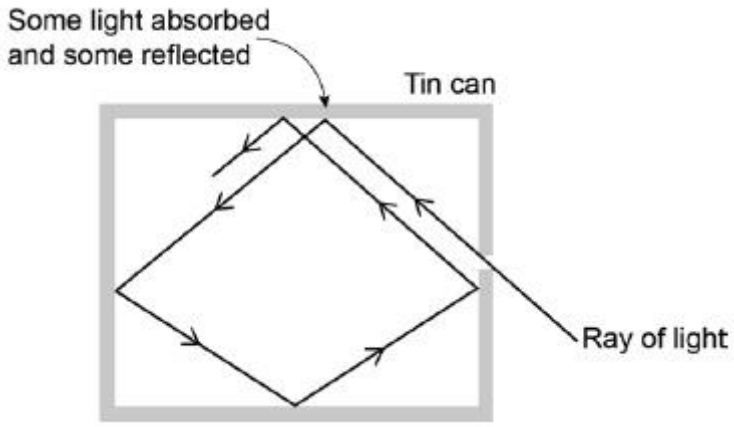
(5)

(Total 11 marks)

Q2.

Figure 1 shows what happens when a ray of light enters a tin can through a small hole.

Figure 1



(a) Explain why the small hole looks black.

(2)

(b) All objects absorb and emit radiation.

What is meant when an object is described as a perfect black body?

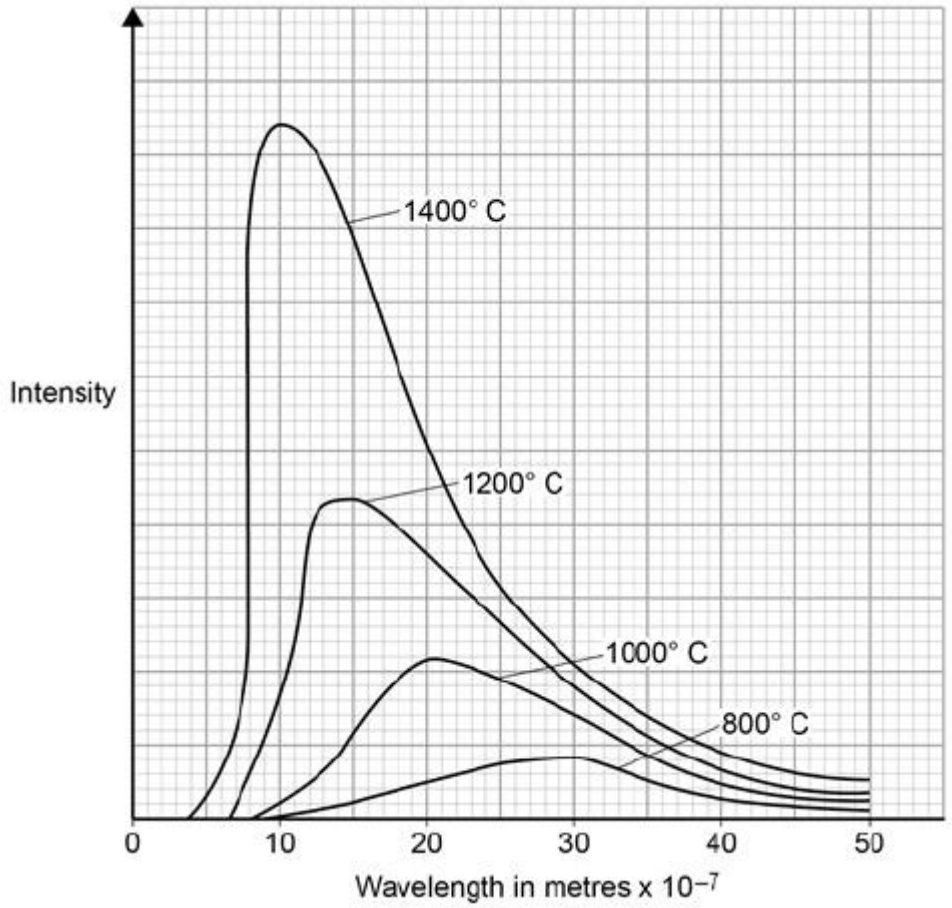
_____

_____

(1)

Figure 2 shows how the intensity of different wavelengths of radiation from a hot object varies with temperature.

Figure 2



(c) What can be concluded from **Figure 2** about how the distribution of the intensity of radiation from an object changes as the temperature of the object increases?

_____

_____

_____

_____

_____

_____

_____

_____

(3)

(d) The wavelength at which the Sun emits the maximum intensity of radiation is approximately 5 × 10–7 m

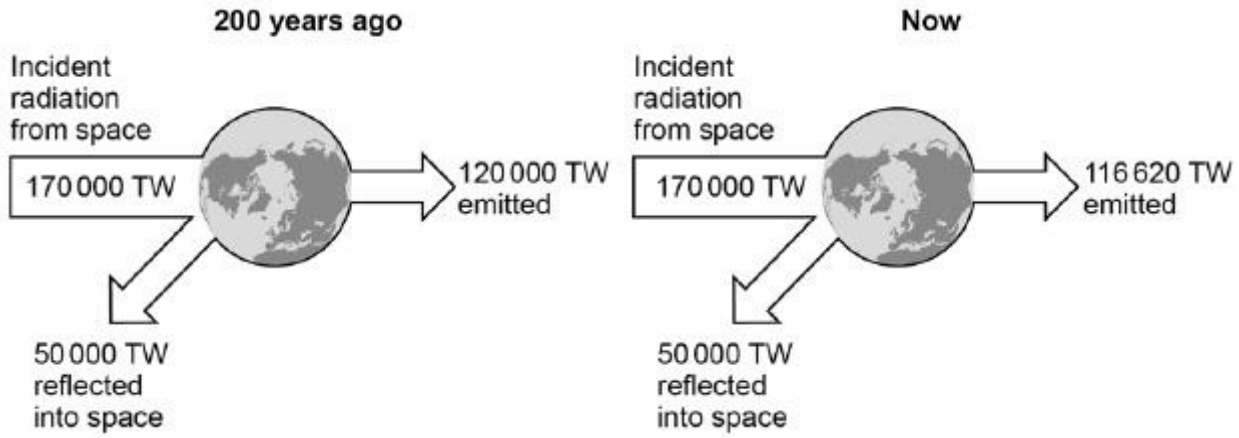
Estimate the surface temperature of the Sun.

Use **Figure 2**.

(1)

(e) **Figure 3** shows how the balance between the incident radiation from space and the radiation emitted by the Earth into space has changed over the last 200 years.

Figure 3



Explain how the temperature of the Earth and its atmosphere has changed over the last 200 years.

Use the information in **Figure 3**.

(3)

(Total 10 marks)