OCR
Oxford Cambridge and RSA

A level Physics B

H557/01 Fundamentals of physics

Question Set 25

1

Fig. 1.1 shows a simplified diagram of a d.c. motor with permanent magnets.
Fig. 1.2 shows the graph of current in the coil against frequency of rotation for this motor.

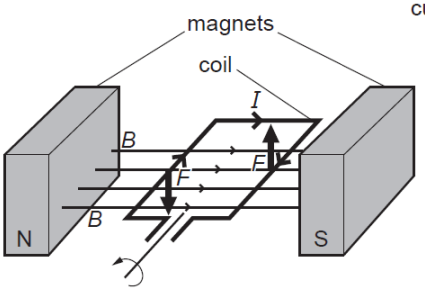

Fig.1.1

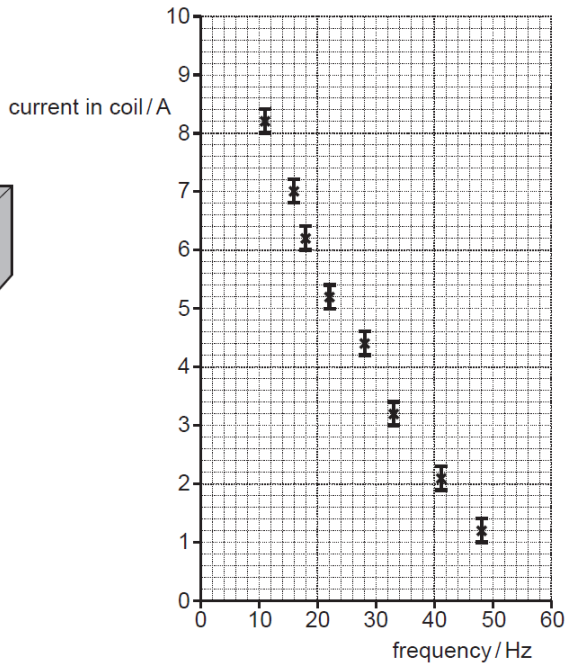

Fig. 1.2

The coil is connected to a 12.0 V supply of negligible internal resistance shown in **Fig. 1.1**. This produces the force to keep the motor turning against a mechanical load.

(a) Draw a **straight line** of best fit on **Fig. 40.2** and use it to predict the current in the coil when the motor is not rotating.

Use your prediction to calculate the resistance of the coil.

resistance =……..……..……Ω

[3]

(b)* This type of d.c. motor is described as a self-regulating device. As more mechanical load is put on the motor it slows down and draws more current from the supply to produce the extra force required.

Use the laws of electromagnetism to explain how this device can act as a self-regulating motor.

[6]

Total Marks for Question Set: 9