Oxford Cambridge and RSA

GCSE Physics B (Twenty First Century Science)

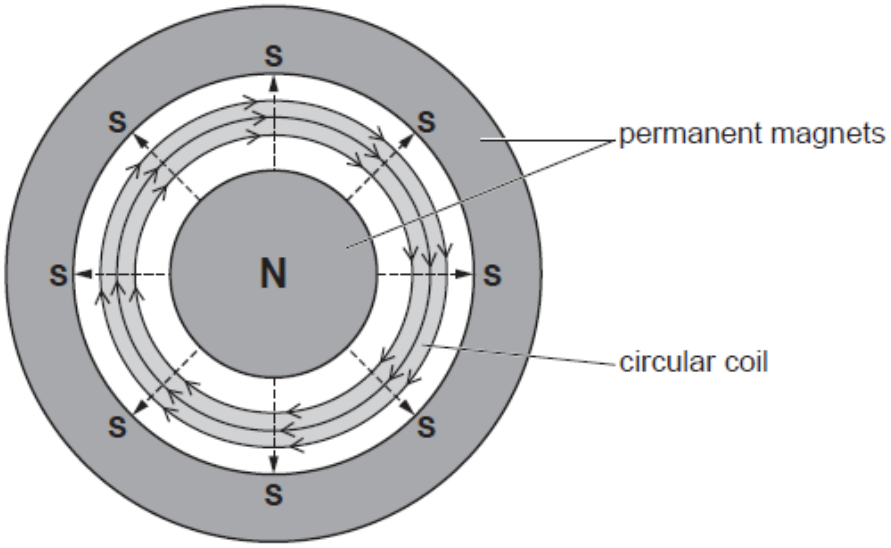
J259/03 Depth in physics (Higher Tier)

Question Set 13

Multiple Choice Questions

1 The diagram shows part of a loudspeaker. It contains specially-shaped permanent magnets with south poles, **S**, in a ring around the outside and a circular north pole, **N**, in the centre.

In the gap between the shaped magnets there is a circular coil carrying electrical current.



The direction of the magnetic field between the poles is shown as ----------►

The magnetic field through the coil has strength 0.40 T.

The coil has circumference 25 mm and has 200 turns. The diagram shows only 3 turns of this coil. A clockwise current of 0.60 A in the coil produces a force on the coil.

(a) What is the direction of the force on the coil?

Tick (✓) **one** box.

Anti-clockwise ☐

Clockwise ☐

Into the page ☐

Out of the page ☐

[1]

(b) Calculate the magnitude of the force acting on the coil.

Force = ... N **[4]**

Total Marks for Question Set 13: 5

Resource Materials

Equations in Physics

change in internal energy = mass × specific heat capacity × change in temperature

energy to cause a change in state = mass × specific latent heat

for gases: pressure × volume = constant
(for a given mass of gas and at a constant temperature)

$(\text{final speed})^2 - (\text{initial speed})^2 = 2 \times \text{acceleration} \times \text{distance}$

energy stored in a stretched spring = ½ × spring constant × $(\text{extension})^2$

potential difference across primary coil × current in primary coil =
potential difference across secondary coil × current in secondary coil

Higher tier only –

pressure due to a column of liquid = height of column × density of liquid × g

force = magnetic flux density × current × length of conductor

potential difference across primary coil ÷ potential difference across secondary coil = number of turns in primary coil ÷ number of turns in secondary coil

change in momentum = resultant force × time for which it acts