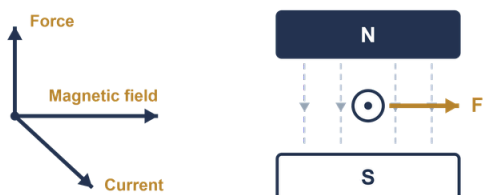


The Motor Effect: Motors and Loudspeakers

1 · Explain why a force acts on the wire

the motor effect



(a) State the direction of the force on the wire. [1]

(b) Explain why a force acts on the wire. [3]

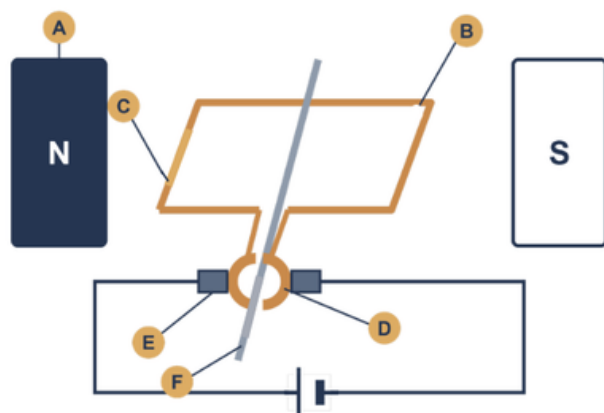
MOTOR EFFECT

- ☐ The **current** in the wire creates a **magnetic field** around it
- ☐ This field **interacts** with the field of the **permanent magnet**
- ☐ So a **force** acts on the wire
- ☐ This is called the **motor effect**

Explain, don't describe. Describe = what happens. Explain = **why** it happens.

2 · The electric motor

we'll do this one together



(a) Label parts A–F of the d.c. motor. [6]

- A
- B
- C
- D
- E
- F

Word bank: axle · brush · coil · current · magnet · split-ring commutator

(b) Explain how the motor works. [6]

MOTOR EFFECT

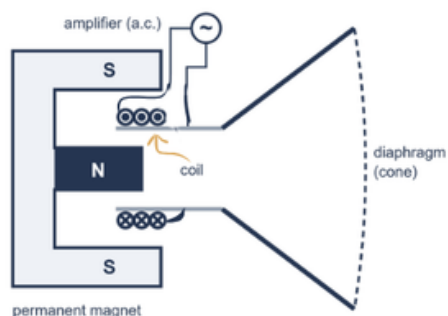
- ☐ The **current** in the wire creates a **magnetic field** around it
- ☐ This field **interacts** with the field of the **permanent magnet**
- ☐ So a **force** acts on the wire — **up** on one side of the coil, **down** on the other

THE MOTOR

- ☐ **TRIPLE ONLY** The forces create a **moment** about the **axle**, so the coil turns
- ☐ The **split-ring commutator** reverses the current in the coil every **half turn**
- ☐ So the **force** on each side of the coil changes direction every half turn
- ☐ So the coil keeps **rotating** the same way around the **axle**

3 · Now you try: the loudspeaker

same three motor-effect steps



Explain how a loudspeaker produces a sound. [5]

MOTOR EFFECT

- ☐ The **current** in the coil creates a **magnetic field**
- ☐ It **interacts** with the field of the **permanent magnet**
- ☐ A **force** acts on the coil, so the coil and **diaphragm** move

THE LOUDSPEAKER

- ☐ The current from the amplifier is **a.c.**, so it keeps **changing direction**
- ☐ So the force changes direction: the diaphragm **vibrates** and makes a **sound wave**