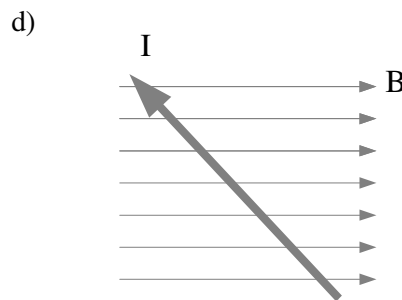
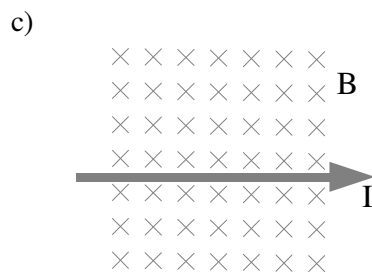
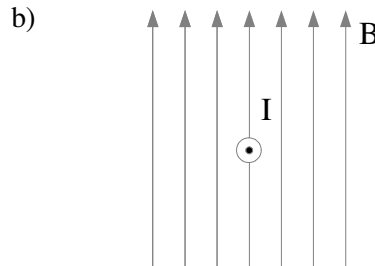
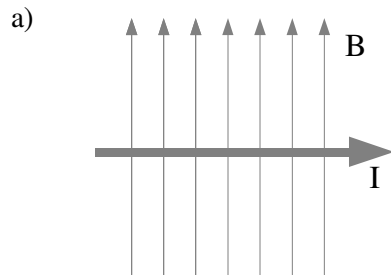


Magnetic Fields Assignment

1. Sketch the magnetic field lines produced by an electric current flowing in:

- a) a straight conductor /2
- b) a loop /2
- c) a solenoid /2

2. State the direction of the force on the following current-carrying conductors in uniform magnetic fields:



/4

3.

Hadrian Glabmoor works in the Bleebox Wire Pushing Factory, where (obviously) he spends the day doing nothing else but pushing wires. He's heard a rumour that he could save himself the effort simply by running his wires through a magnetic field and passing a current through the wire.

a) If Hadrian tested this rumour by running a current-carrying wire through a magnetic field with the wire and field direction parallel or antiparallel, he might well conclude that the rumour was false. Explain why the wire would not be pushed if the magnetic field is parallel or antiparallel to the wire. /2

b) Luckily he decides to test it out with the wire at right angles to the field. He runs 20.1cm of wire carrying 951 mA through a field of 4.99T.

Calculate the magnitude of force the wire experiences. /2

c) Calculate what the magnetic field strength required to have the same force but with the wire at an angle of 25.0° to the field. /2

d) Calculate the angle at which the force will be double that experienced at 25.0°. /2

4.

a) Draw a diagram of a moving-coil loudspeaker, with these components labelled: cone, magnet structure, voice coil, supporting frame. /4

b) Explain how a moving-coil loudspeaker produces sound from an electrical signal. /4

TOTAL /26