7 Two long straight parallel copper wires A and B are clamped vertically. The wires pass through holes in a horizontal sheet of card PQRS, as shown in Fig. 7.1.

For Examiner's Use

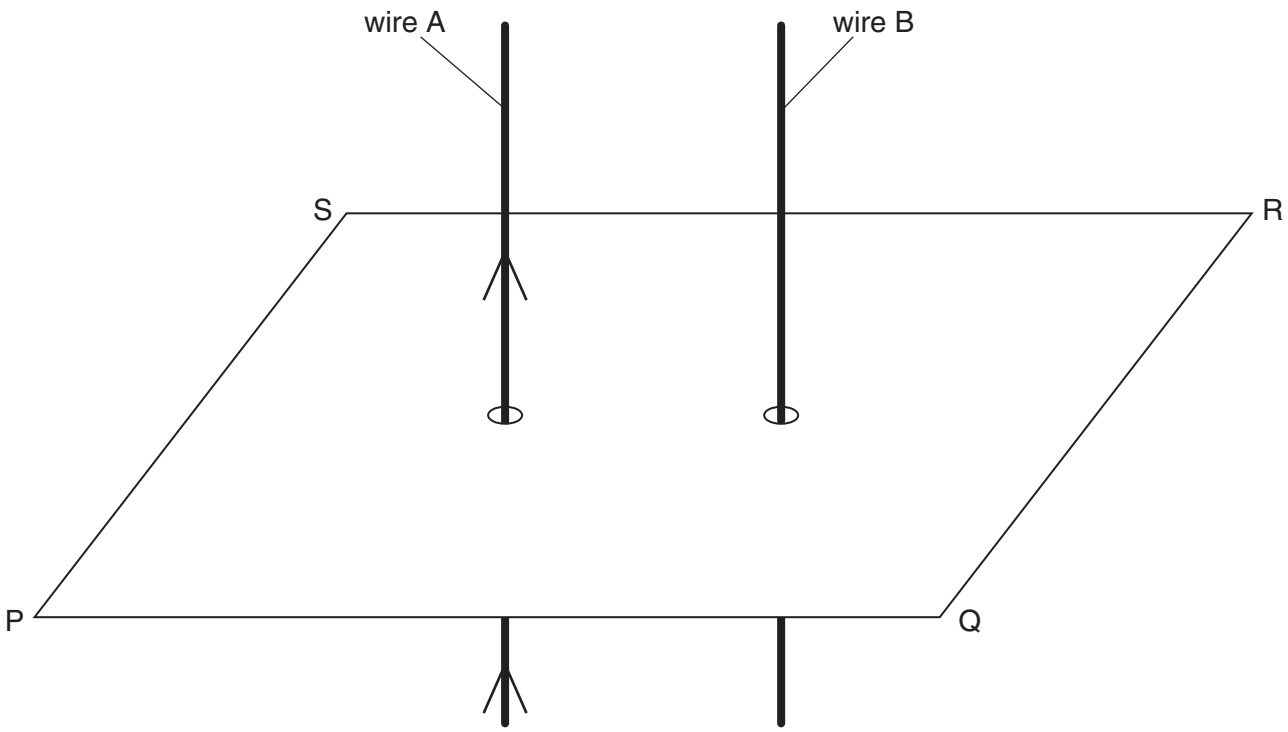

Fig. 7.1

(a) There is a current in wire A in the direction shown on Fig. 7.1.
On Fig. 7.1, draw four field lines in the plane PQRS to represent the magnetic field due to the current in wire A. [3]

(b) A direct current is now passed through wire B in the same direction as that in wire A. The current in wire B is larger than the current in wire A.

(i) On Fig. 7.1, draw an arrow in the plane PQRS to show the direction of the force on wire B due to the magnetic field produced by the current in wire A. [1]

(ii) Wire A also experiences a force. State and explain which wire, if any, will experience the larger force.

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..... [2]

(c) The direct currents in wires A and B are now replaced by sinusoidal alternating currents of equal peak values. The currents are in phase.
Describe the variation, if any, of the force experienced by wire B.

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..... [3]