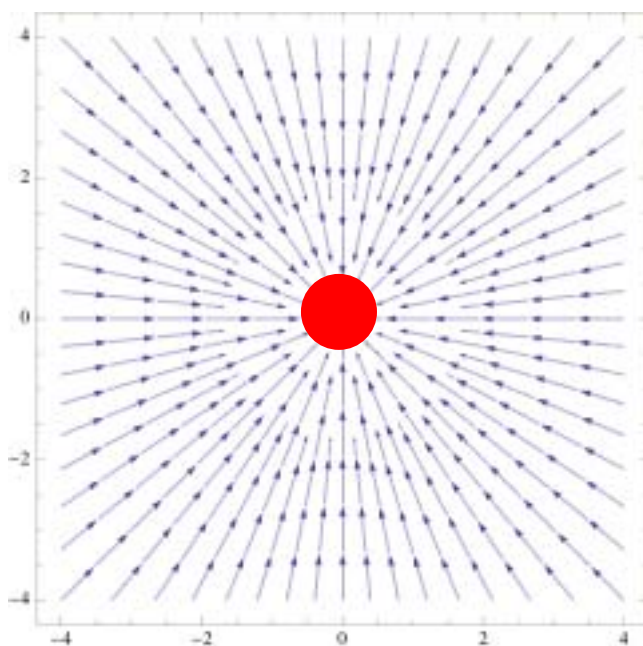
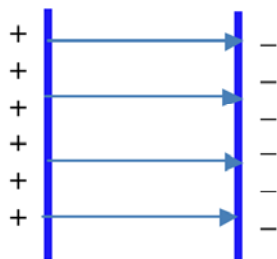


## Mark scheme for Support Worksheet – Topic 5, Worksheet 5

- 1 There must be a force towards the centre of the circle and so **D**. [1]
- 2 Use the right hand grip rule to find the magnetic field of each wire separately. Then adding the vectors gives **D**. [1]
- 3 Parallel currents attract so Z is attracted to X and to Y. the resultant force is then upwards, i.e. **A**. [1]
- 4 See diagram below.

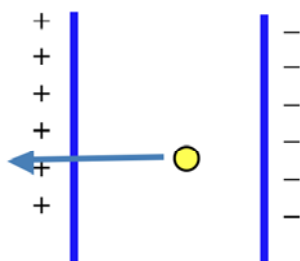


- 5 If the electric field inside a conductor in electrostatics were not zero then a force would be exerted on the free electrons; and so a current would be established contrary to the assumption that we have an electrostatic situation, i.e. zero current. [2]
- 6 The kinetic energy in both cases is equal to  $qV$ ; so the ratio of kinetic energies is 1. [2]
- 7 **a** See diagram below.



[3]

**b** See diagram below.



[2]

**c**  $E = \frac{V}{d} = \frac{120}{6.2 \times 10^{-2}} = 1.9 \times 10^3 \text{ NC}^{-1}$ ; so force is

$$F = eE = 1.6 \times 10^{-19} \times 1.9 \times 10^3 = 3.0 \times 10^{-16} \text{ N}$$

[2]