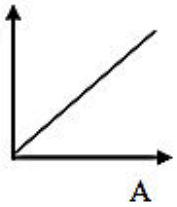
NAME:
YEAR 13:

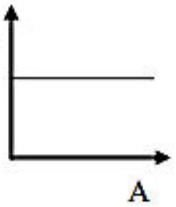
YEAR 13 PHYSICS
WORKSHEET WEEK 7
STRAND: DIRECT CURRENT
SUBSTRAND: Current and charge + Resistance, Resistivity & Ohms Law

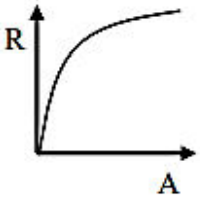
1. A charge of 3.25 C passes through a wire in 0.6 s. The electric current flowing through the wire is

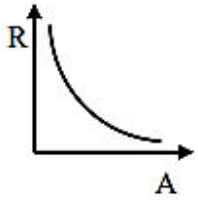
   A. 0.6 A B. 0.18 A C. 1.95 A D. 5.42 A

2. The resistance of a conductor is given by $R = \rho \frac{l}{A}$. Which of the following graph **best** represents the relationship between resistance, R, and the cross sectional area, A, of a conductor?

A.


C.


B.


D.


3. The resistance of a conductor varies inversely to the

   A. area of cross-section B. temperature. C. resistivity. D. length.

4. Copper contains approximately 10^{29} free electrons per m^3 and a typical copper wire has a cross sectional area of 0.001 m^2. Resistivity of copper is 1.62 x 10^{-8} Ωm. If a 3 A current flow through the wire, calculate the

   (i) current density in the conductor.

   (ii) drift velocity of the electrons.

5. A copper wire of cross-sectional area 3×10^{-6} m carries a current of 10 A. The density of free electrons in copper is 8×10^{28} electrons per cubic metre.

   a) Find the current density.

   b) Calculate the drift velocity of the electrons.

6. A potential difference of 12 V is found to produce a current of 0.40 A in a 3.2 m length of wire with a uniform radius of 0.40 cm.
   Calculate the:
   a) resistance of the wire.

   b) resistivity of the wire.

7. Calculate the resistivity of a conductor in which a current density of 2.5 Am^{-2} exists, when an electric field of 15 Vm^{-1} is applied on it.