Electricity

Internal Resistance

1) State what is meant by the ***emf*** of an electric cell.

2) A physics student measures the voltage across the terminals of an electric cell.
The voltmeter connected across the terminals reads 1.5 V when no current is taken from the cell.
When an electric current of 0.5 A is taken from the cell the voltmeter reads 1.3 V.

   a) State the emf of the cell. [1.5 V]
   b) State the lost volts of the cell. [0.2 V]
   c) Calculate the internal resistance of the cell. [0.4 Ω]

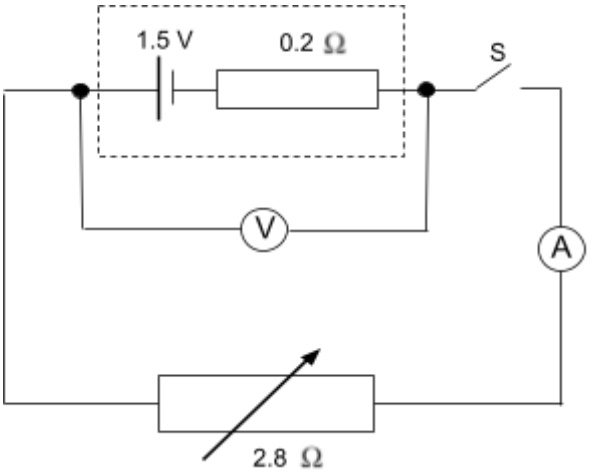
3) The circuit shown is built to investigate the internal resistance of an electric cell.

   a) State the reading on the voltmeter when
   The switch is open. [1.5 V]

   b) Determine the electric current reading on the ammeter when the switch is closed. [0.5 A]

   c) Find the value of the lost volts. [0.1 V]

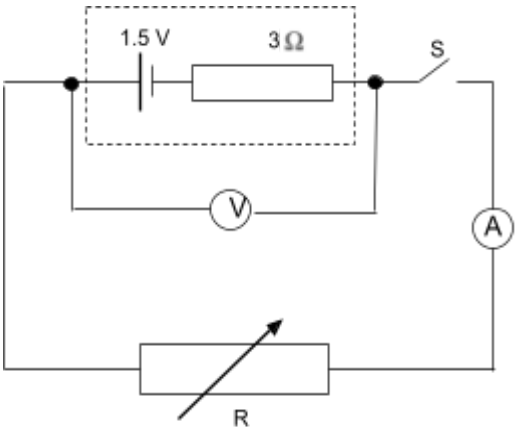
   d) Find the terminal potential difference of the cell when the switch is closed. [1.4 V]



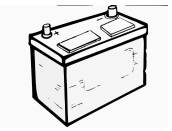
4) A physics student set up the following circuit to investigate an electric cell.

Switch S is closed and the variable resistor is changed to a resistance of 2Ω.

   a) Calculate the reading on the ammeter. [0.3A]
   b) Find the lost volts. [0.9V]
   c) Find the tpd of the cell. [0.6V]
   d) The current is reduced in the circuit. What happens to the reading on the voltmeter? [increases]

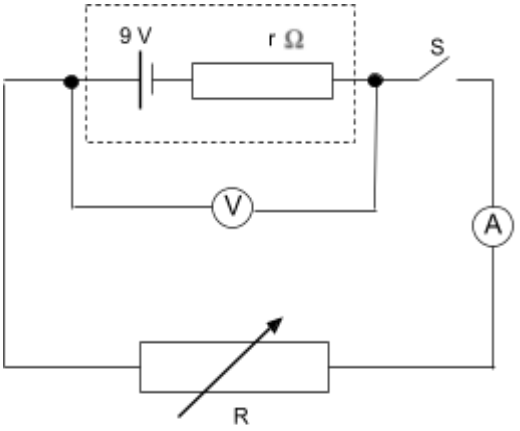


5) The tpd of a car battery when a voltmeter is connected across the terminals is 12.2 V When the car battery is connected to a lamp the tpd decreases to 11.6 V and the current taken from it is 0.2 A.



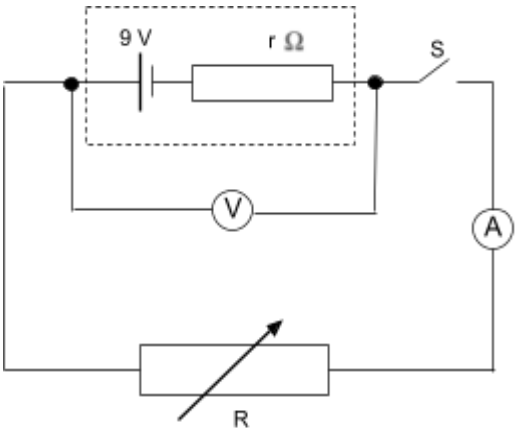
a) State the emf of the cell [12.2 V]
b) State the lost volts [0.6 V]
c) Calculate the internal resistance of the car battery. [3 Ω]

6) When switch S is open the voltmeter across the terminals of the cell reads 9 V.
When the switch is closed the voltmeter reads 6 V and the ammeter reads 0.6 A.



a) Calculate the value of the internal resistance of the cell. [5 Ω]
b) Find the value of the variable resistor. [10 Ω]
c) Explain what would happen to the value of the voltmeter if the resistance of the variable resistor was increased.

7) In the circuit shown the variable resistor is set to a value of 15 Ω. When switch S is closed, the ammeter reads 0.50 A.



a) Find the tpd. [7.5 V]
b) Determine the lost volts. [1.5 V]
c) Calculate the internal resistance of the cell. [3 Ω]