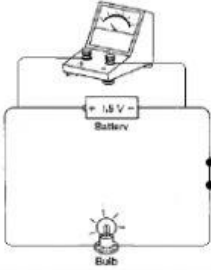
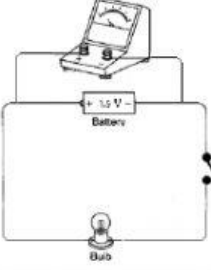
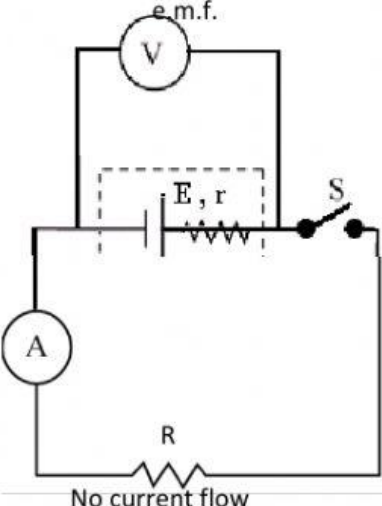
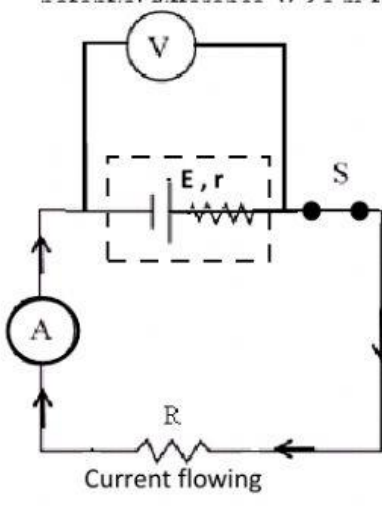


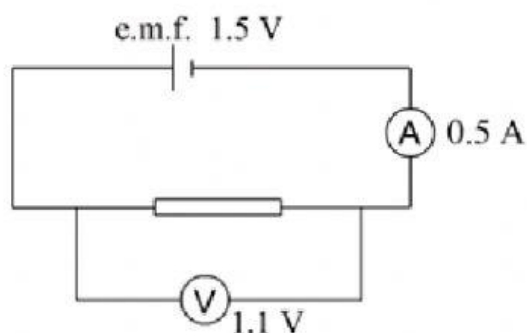
Lembaran kerja 3.3 Electromotive force and internal resistance

Figure (a)	Figure (b)
	
<p>Voltmeter reading,</p>  <p>No current flow</p>	<p>Voltmeter reading,</p>  <p>Current flowing</p>

1. An electrical circuit is set up as shown in figure (a). A high resistance voltmeter is connected across a dry cell which labeled 1.5 V.
 - a) Figure (a) is (an open circuit / a closed circuit)
 - b) There is (current flowing / no current flowing) in the circuit. The bulb (does not light up / lights up)
 - c) The voltmeter reading shows the (amount of current flow across the dry cell / potential difference across the dry cell)
 - d) The voltmeter reading is (0 V / 1.5 V / Less than 1.5 V)
 - e) The potential difference across the cell in **open circuit** is (0 V / 1.5 V / Less than 1.5 V). Hence, the electromotive force, e.m.f., E is (0 V / 1.5 V / Less than 1.5 V)
 - f) It means, (0 J / less than 1.5 J / 1.5 J / 3.0 J) of electrical energy is required to move **1 C** charge across the cell or around a **complete** circuit.

2. The switch is then closed as shown in figure (b).

- Figure (b) is (an open circuit / a closed circuit)
 - There is (current flowing / no current flowing) in the circuit. The bulb (does not light up / lights up)
 - The voltmeter reading is the (potential difference across the dry cell / potential difference across the bulb / electromotive force).
 - The reading of the voltmeter when the switch is closed is (lower than/ the same as / higher than) when the switch is open.
 - If the voltmeter reading in figure (b) is 1.3 V, it means, the electrical energy dissipated by 1C of charge after passing through the bulb is (0.2 J / 1.3 J / 1.5 J)
 - The potential difference drops by (0.2 V/ 1.3 V / 1.5 V). It means, the potential difference lost across the internal resistance, r of the dry cell is (0.2 V/ 1.3 V / 1.5 V).
- 3.



- Why is the potential difference across the resistor not the same as the e.m.f. of the battery?

The potential drops as much as V across the internal resistance

- Determine the value of the internal resistance.

Since $E = V + Ir$

$$\text{.} = \text{.} + \text{.} r$$

$$r = \text{.} \Omega$$

Therefore, the value of the internal resistance is Ω

c) Determine the value of the external resistor.

Since $V = IR$

$$\boxed{.} = \boxed{.} R$$
$$R = \boxed{.} \Omega$$

Therefore, the value of the external resistance is $\boxed{.} \Omega$