

生機系電工學第一次隨堂練習 2011/03/02

學號：_____ 姓名：_____

1-1 What is the diameter in inches of wires having the area of 625 CM ?

$$d_{\text{mils}} = \sqrt{625\text{CM}} = 25\text{mils} = 0.025\text{in}$$

1-2 What is the potential difference between two points in an electric circuit if 200 mJ of energy is required to bring a charge of 40 μC from one point to the other?

$$V = \frac{W}{Q} = \frac{200\text{mJ}}{40\mu\text{C}} = \frac{200 \times 10^{-3}\text{J}}{40 \times 10^{-6}\text{C}} = 5 \times 10^3\text{V} = 5\text{kV}$$

1-3 How long can we use a welding unit for NT\$100.00 (新臺幣) if the unit draws 14 A at 220 V and the cost is 2.1 元/kWh (每度 2.1 元) ?

2.1 元可以用 1 度，即 2.1 元可以用 1kWh。

100 元可用 47.619kWh

$$47.619\text{kWh} = \frac{Pt}{1000} = \frac{VIt}{1000} = \frac{220 \times 14 \times t}{1000}$$

$$t = 15.461\text{ h}$$

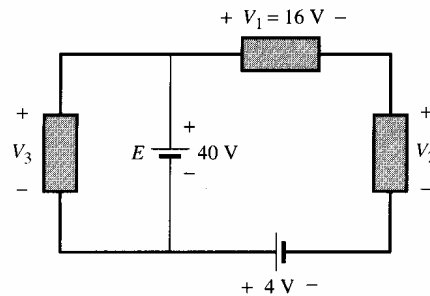
1-4 Determine the unknown voltages for the circuits as shown.

V_3 與 E 並聯， $V_3 = E = 40\text{V}$ 。

利用 KVL：

$$E - V_1 - V_2 + 4\text{V} = 0$$

$$V_2 = 28\text{V}$$



1-5 Determine R_T 、 I 、 I_1 、 V_3 、 P_2 for the circuits as shown.

$$R_T = R_1 // R_2 // R_3 = 1.765\text{k}\Omega$$

由 E 流出來的電流 I

$$I = \frac{E}{R_T} = \frac{60\text{V}}{1.765\text{k}\Omega} = 33.99\text{mA}$$

跨越 R_1 、 R_2 、 R_3 的電壓降都等於 E

因此， $V_3 = E$ 且

$$I_1 = \frac{E}{R_1} = 20\text{mA} \quad \text{且}$$

$$P_2 = \frac{V_{R_2}^2}{R_2} = \frac{(60\text{V})^2}{6\text{k}\Omega} = 0.6\text{W}$$

