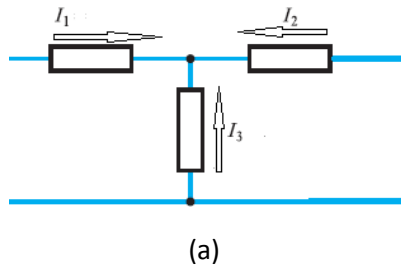
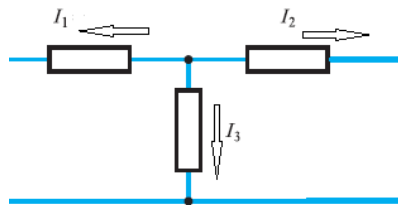


TUTORIAL 1 BASIC ELECTRICAL CIRCUITS AND COMPONENTS

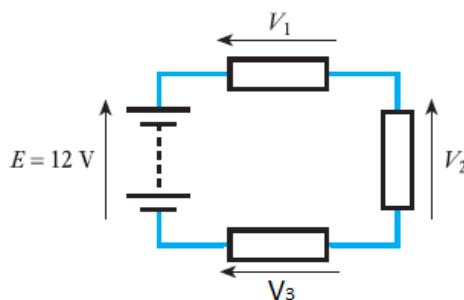
- 1.1** Give the prefixes used to denote the following powers: 10^{-12} ; 10^{-9} ; 10^{-6} ; 10^{-3} ; 10^3 ; 10^6 ; 10^9 ; 10^{12} .
- 1.2** Explain the difference between 1 ms, 1 m/s and 1 mS.
- 1.3** Explain the difference between 1 m Ω and 1 M Ω .
- 1.4** Define the terms 'direct current' and 'alternating current'.
- 1.5** What is the unit of measurement for resistance?
- 1.6** What is the unit of measurement for capacitance?
- 1.7** What is the unit of measurement for inductance?
- 1.8** In arrangement (a) $I_1 = 5\text{A}$ and $I_2 = 3\text{A}$. Calculate the undefined current I_3 .



In arrangement (b) $I_2 = 7\text{A}$ and $I_3 = 3\text{A}$. Calculate the undefined current I_1

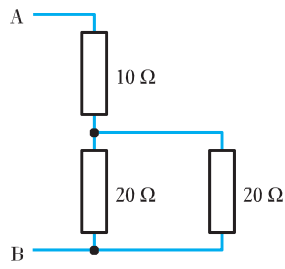


- 1.9** Given that $V_1 = 8\text{V}$ and $V_2 = 5\text{V}$, calculate the undefined voltage V_3 in the following arrangement

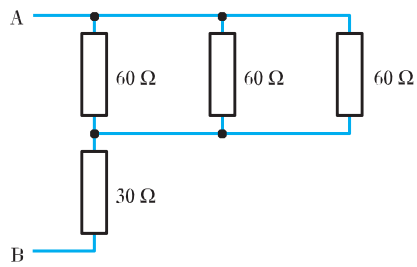


- 1.10** If a resistor of 1 k Ω has a voltage of 5 V across it, what is the current flowing through it?
- 1.11** A resistor has 9 V across it and a current of 1.5 mA flowing through it. What is its resistance?
- 1.12** A resistor of 25 Ω has a voltage of 25 V across it. What power is being dissipated by the resistor?
- 1.13** If a 400 Ω resistor has a current of 5 μA flowing through it, what power is being dissipated by the resistor?
- 1.14** What is the effective resistance of a 20 Ω resistor in series with a 30 Ω resistor?
- 1.15** What is the effective resistance of a 20 Ω resistor in parallel with a 30 Ω resistor?
- 1.16** What is the effective resistance of a series combination of a 1 k Ω resistor, a 2.2 k Ω resistor and a 4.7 k Ω resistor?
- 1.17** What is the effective resistance of a parallel combination of a 1 k Ω resistor, a 2.2 k Ω resistor and a 4.7 k Ω resistor?

1.18 Calculate the effective resistance between the terminals A and B in the following arrangements.

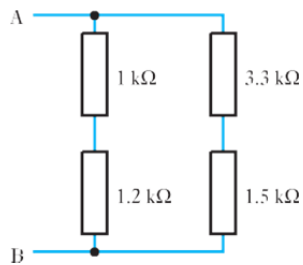


(a)

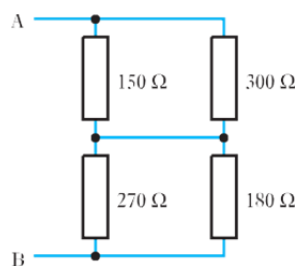


(b)

1.19 Calculate the effective resistance between the terminals A and B in the following arrangements

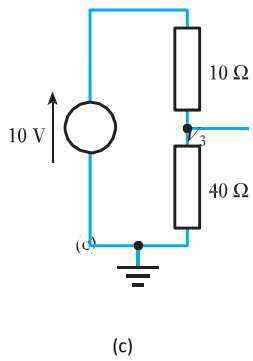
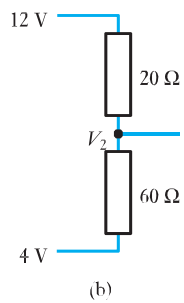
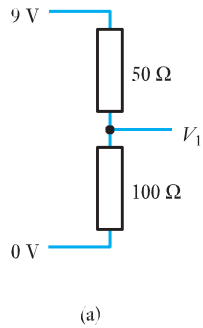


(a)

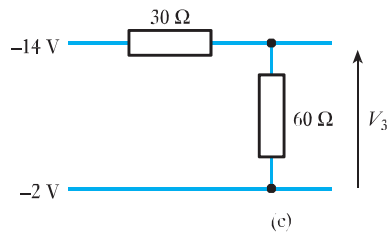
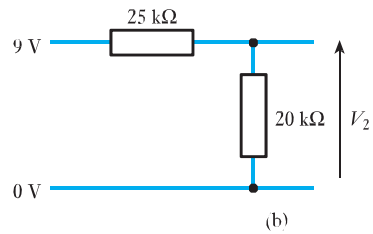
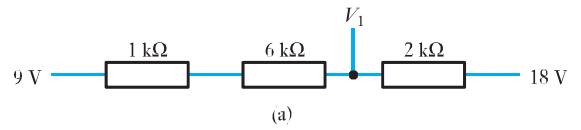


(b)

1.20 Calculate the voltages V_1 , V_2 and V_3 in the following arrangements.



1.21 Calculate the voltages V_1 , V_2 and V_3 in the following arrangements.



1.22 A sinusoidal quantity has a frequency of 1 kHz. What is its period?

1.23 A sinusoidal quantity has a period of $20 \mu\text{s}$. What is its frequency?