ELEMENTS OF ELECTRICAL ENGINEERING

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Numerical Examples on
Star Delta Transformations

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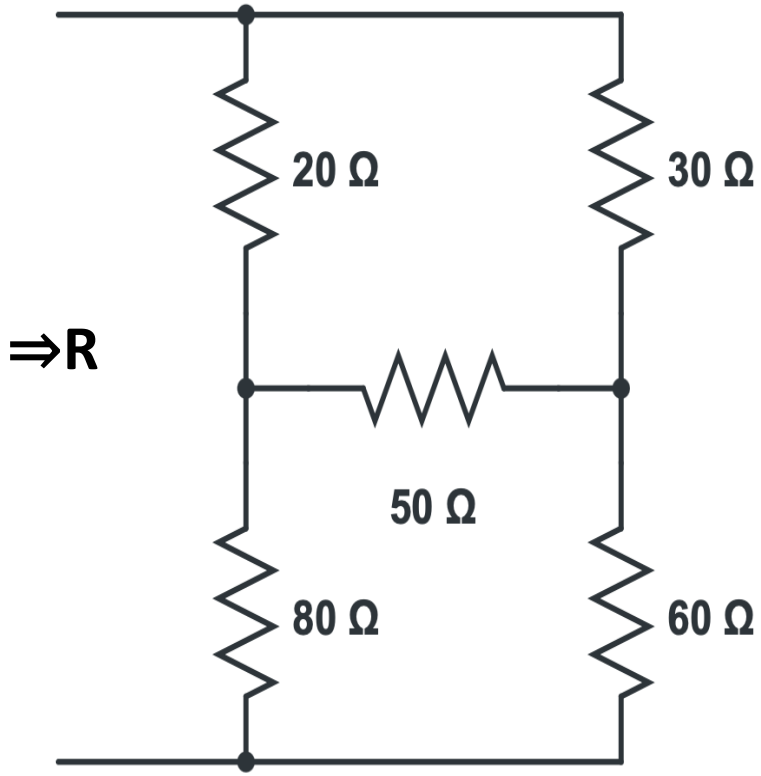
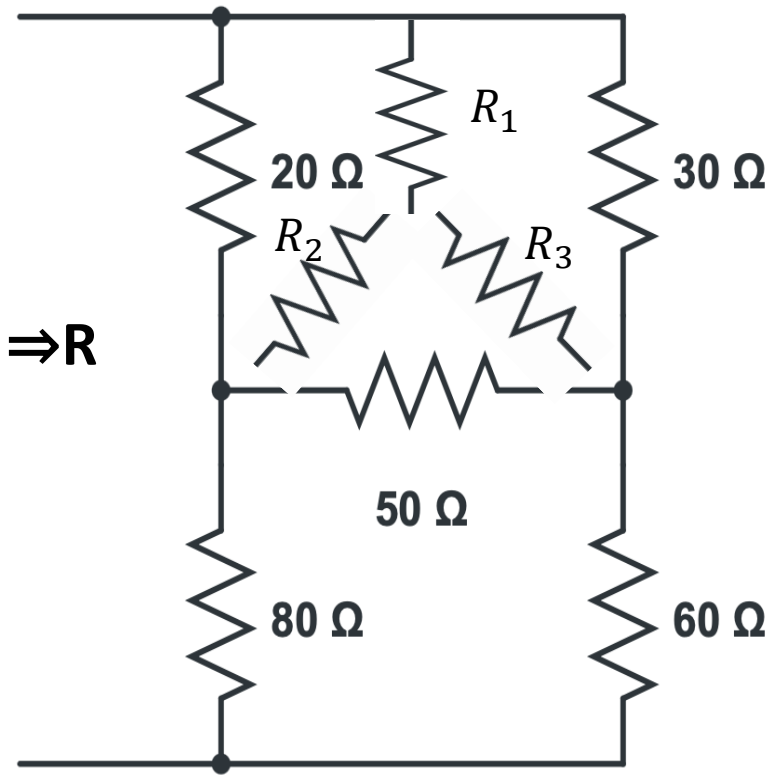
Numerical Example 1

Find the input resistance R for network shown below :



Numerical Example 1

SOLUTION:



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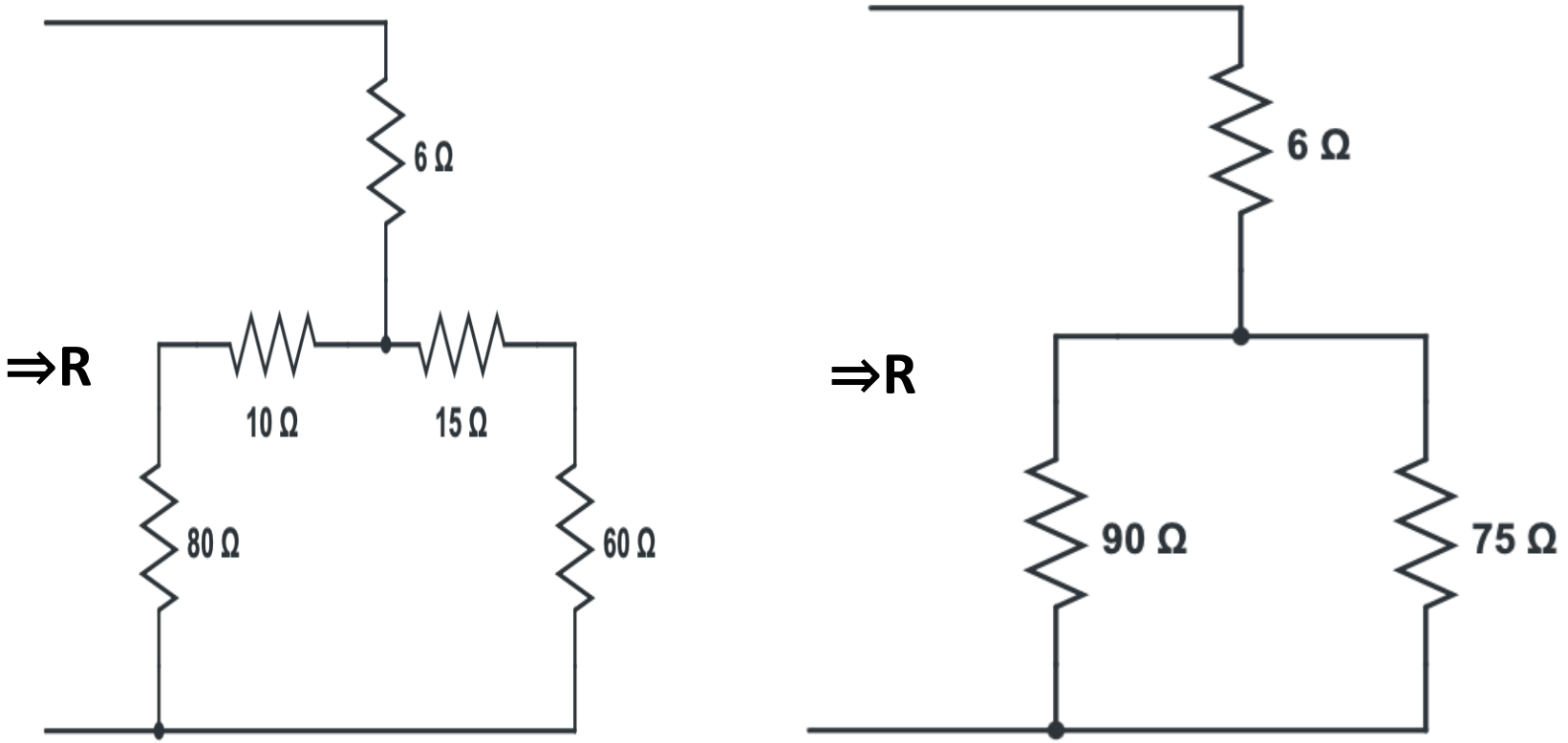
Numerical Example 1

$$R_1 = \frac{20 \times 30}{20 + 30 + 50} = 6\Omega \qquad R_2 = \frac{20 \times 50}{20 + 30 + 50} = 10\Omega$$

$$R_3 = \frac{30 \times 50}{20 + 30 + 50} = 15\Omega$$



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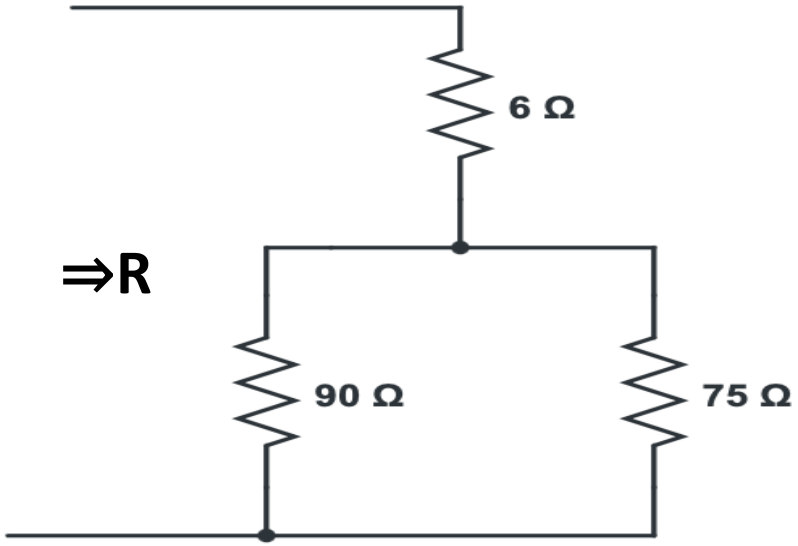
Numerical Example 1



$$R = 6 + \frac{90 \times 75}{90 + 75}$$

$$= 46.9\Omega$$

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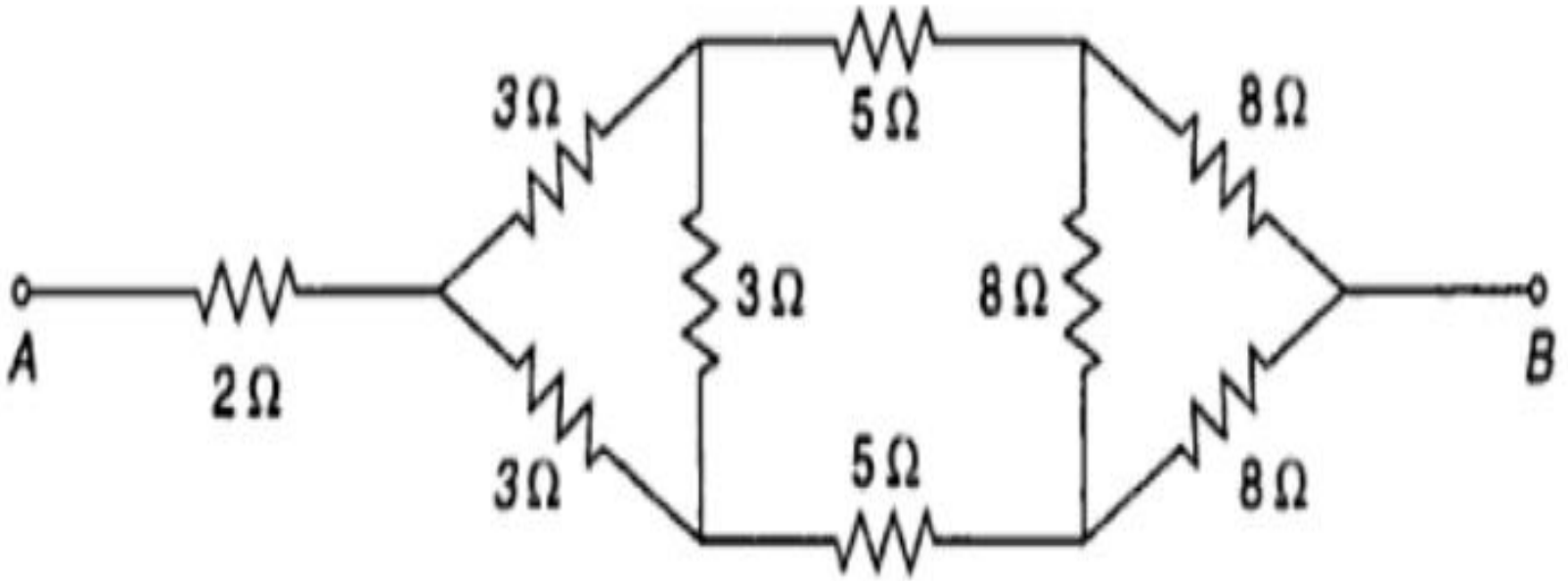
Numerical Example 2

Find the resistance across terminals A and B in network shown below :



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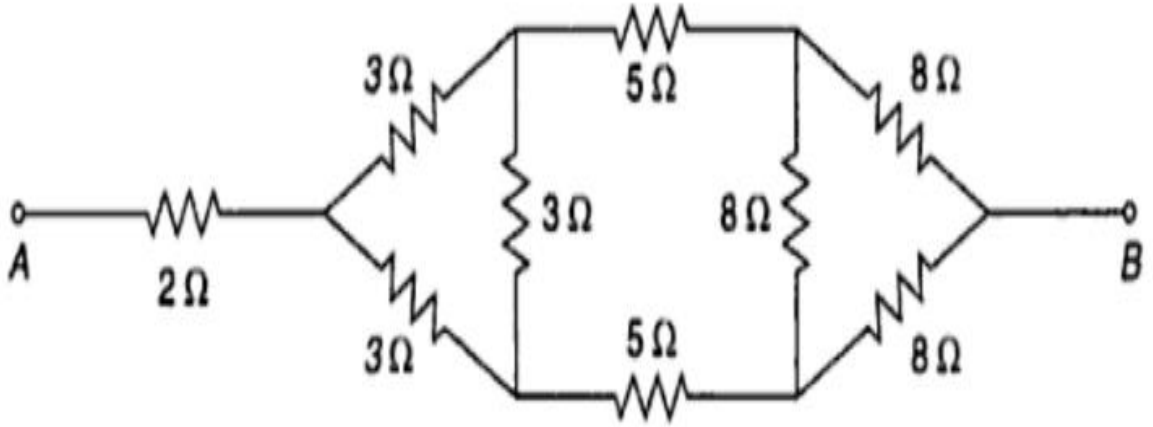
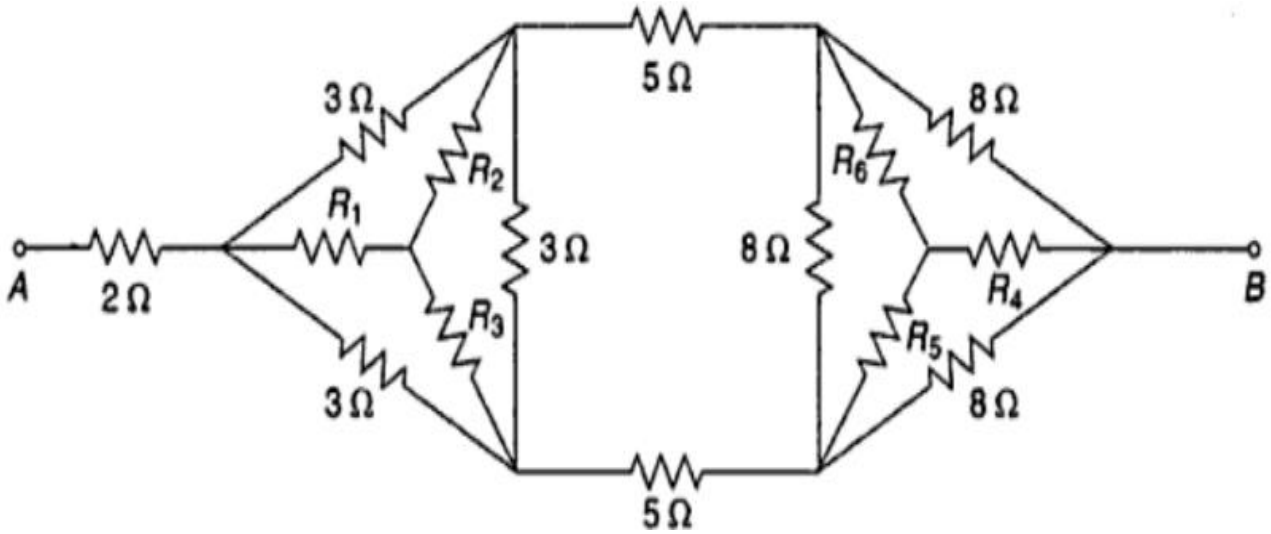
Numerical Example 2

SOLUTION:

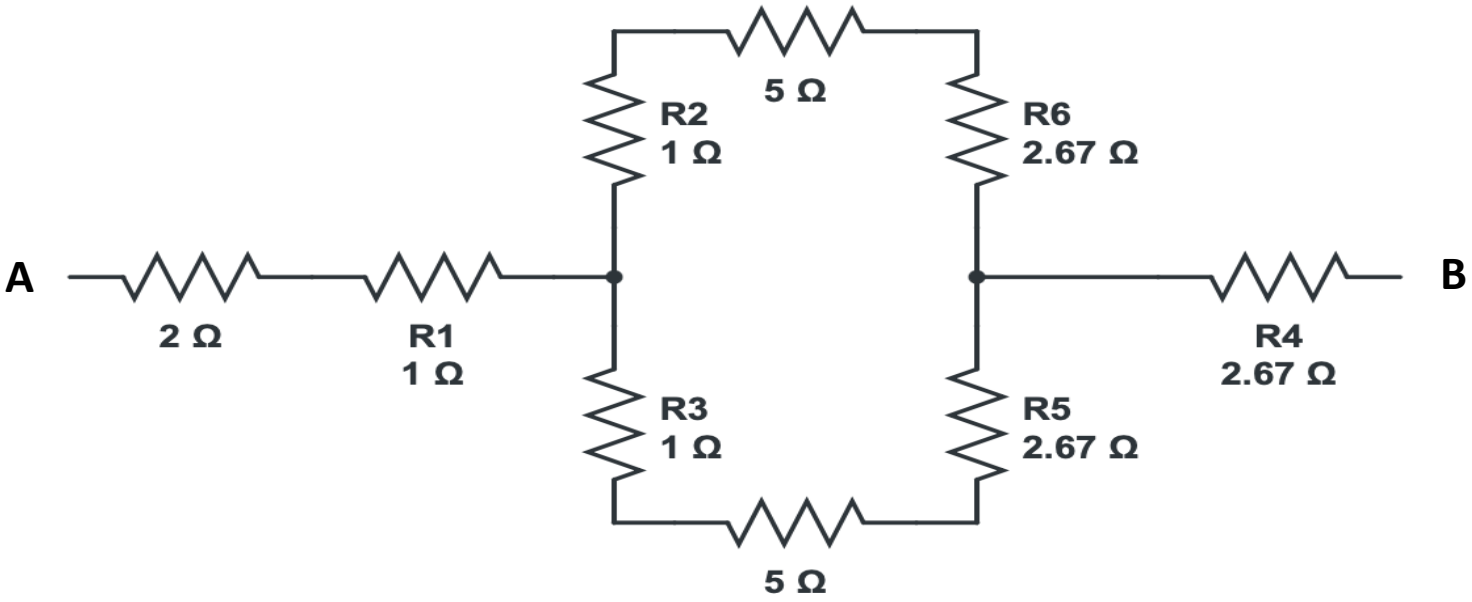




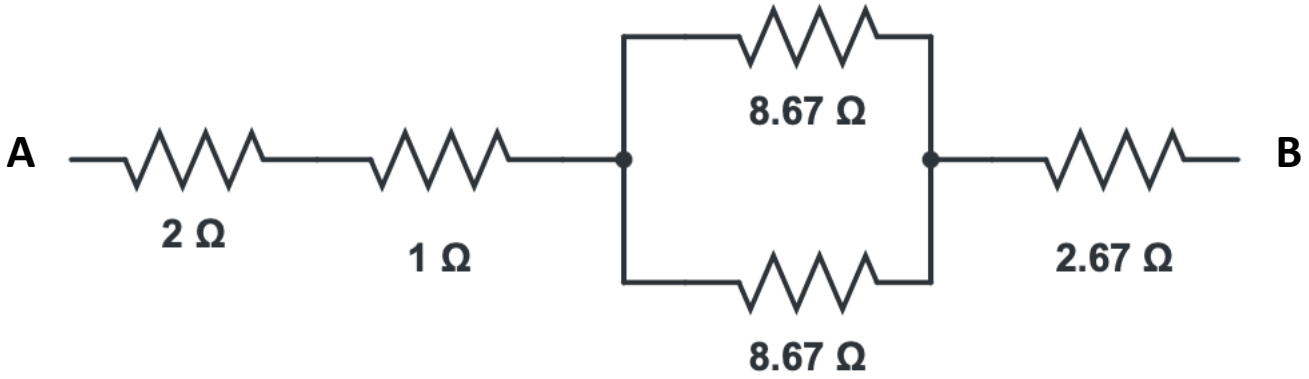
Numerical Example 2

$$R_1 = R_2 = R_3 = \frac{3 \times 3}{3 + 3 + 3} = 1\Omega$$

$$R_4 = R_5 = R_6 = \frac{8 \times 8}{8 + 8 + 8} = 2.67\Omega$$



Numerical Example 2

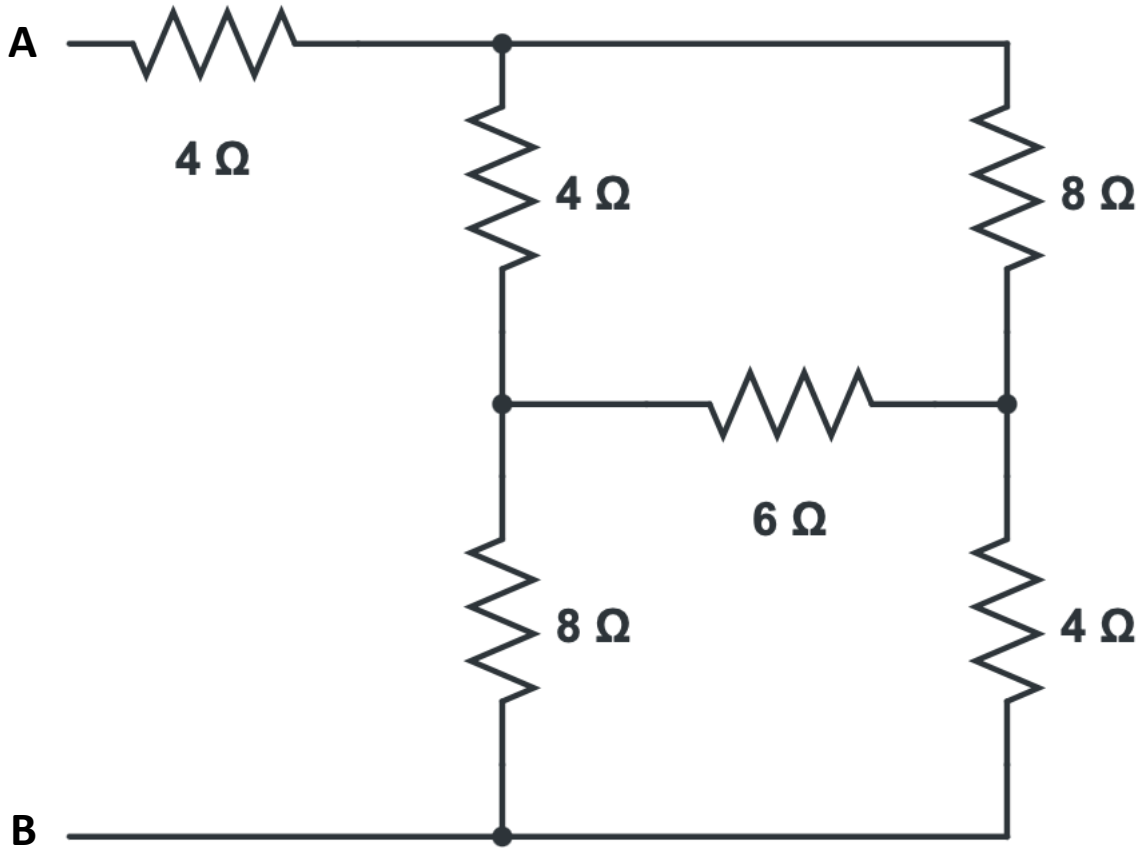


$$\frac{8.67 \times 8.67}{8.67 + 8.67} = 4.33\Omega$$

$$R_{AB} = 2 + 1 + 4.33 + 2.67 = 10\Omega$$

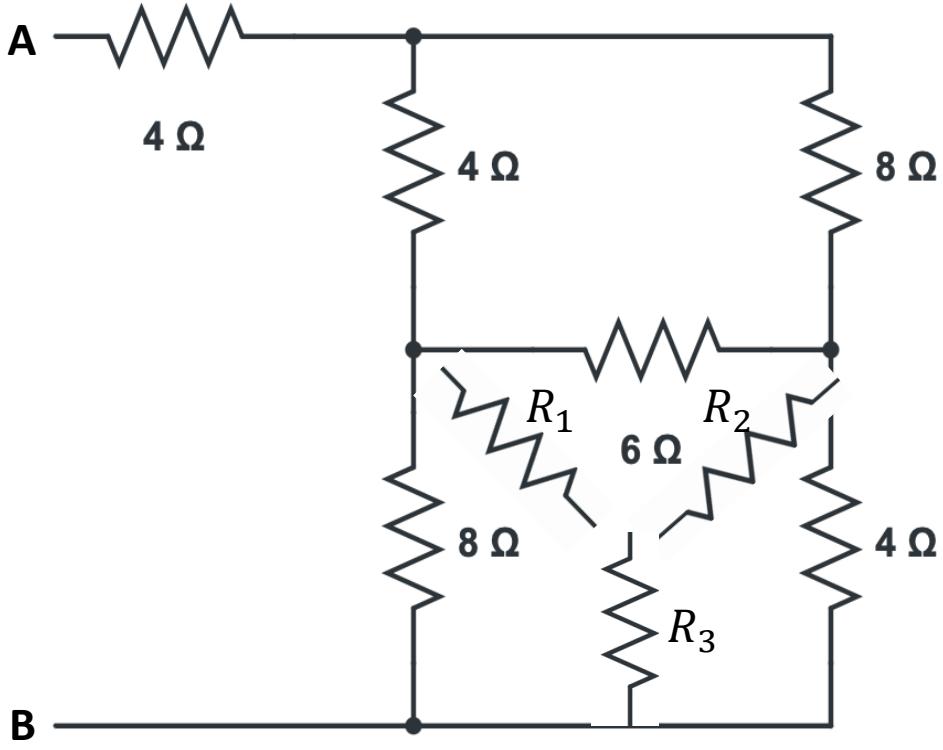
Numerical Example 3

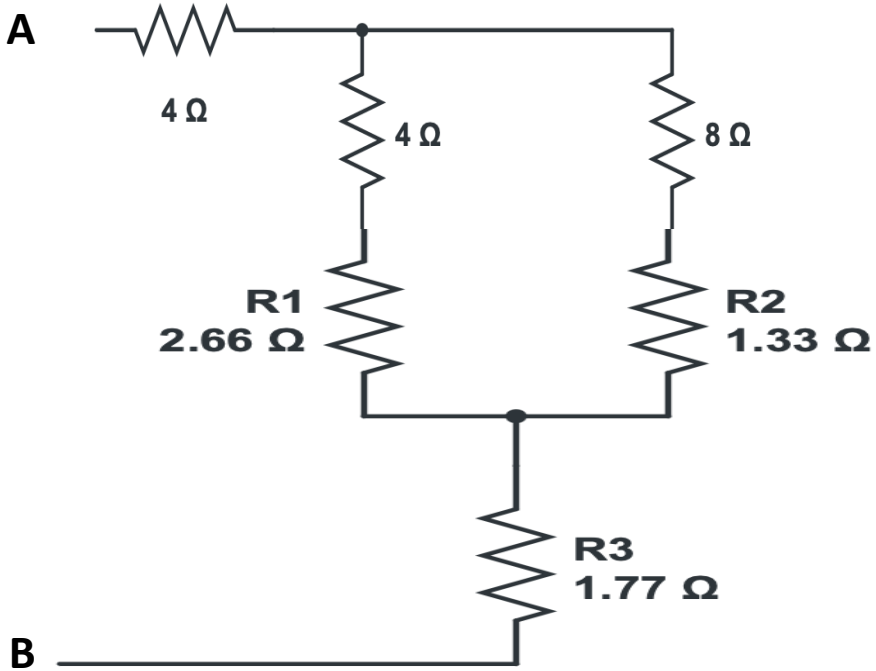
Find the equivalent resistance between A and B in the given network.



Numerical Example 3

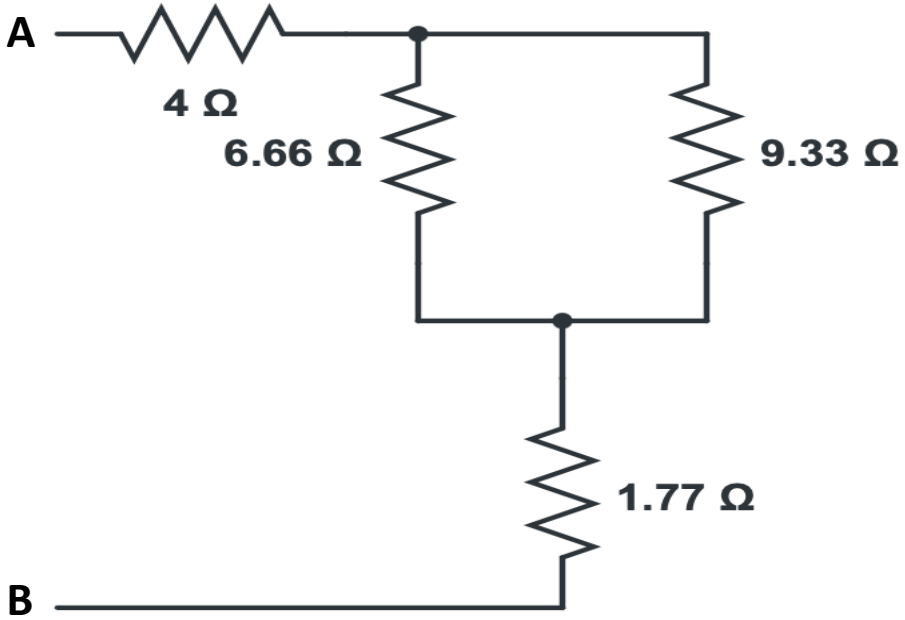
SOLUTION:

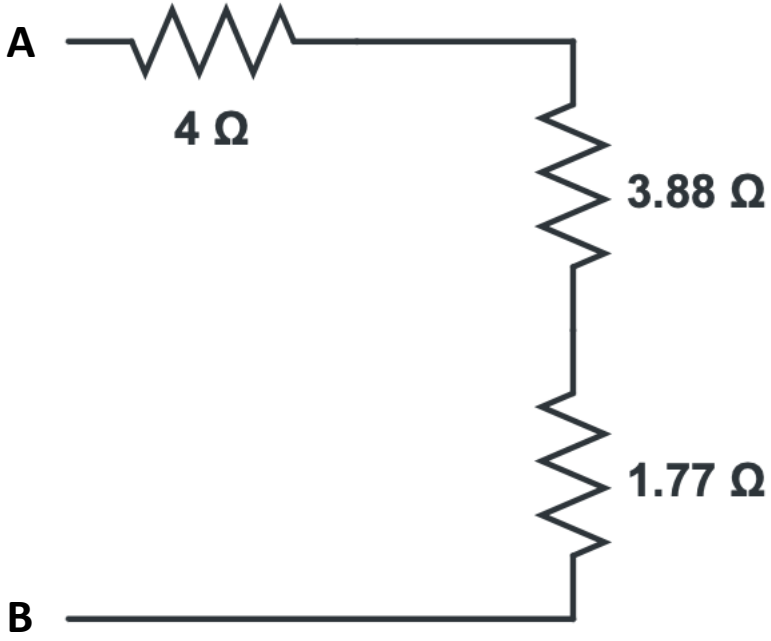




$$R_1 = \frac{8 \times 6}{8+6+4} = 2.66\Omega \qquad R_2 = \frac{6 \times 4}{8+6+4} = 1.33\Omega \qquad R_3 = \frac{8 \times 4}{8+6+4} = 1.77\Omega$$

Numerical Example 3





$$\frac{6.66 \times 9.33}{6.66 + 9.33} = 3.88\Omega$$

$$R_{AB} = 4 + 3.88 + 1.77 = 9.65\Omega$$

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Text Book & References

Text Book:

1.“Basic Electrical Engineering”, D. C. Kulshreshta, 2nd Edition, McGraw-Hill. 2019

Reference Books:

1. “Engineering Circuit Analysis” William Hayt, Jack Kemmerly, Jamie Phillips and Steven Durbin, 10th Edition McGraw Hill, 2023

2. “Electrical and Electronic Technology” E. Hughes (Revised by J. Hiley, K. Brown & I.M Smith), 12th Edition, Pearson Education, 2016.

THANK YOU

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