Module name: **Electrical Circuits 1**
Module ID: **IS-FEE-10070W**
Module type: **Class**
Semester: **winter 2024/2025**
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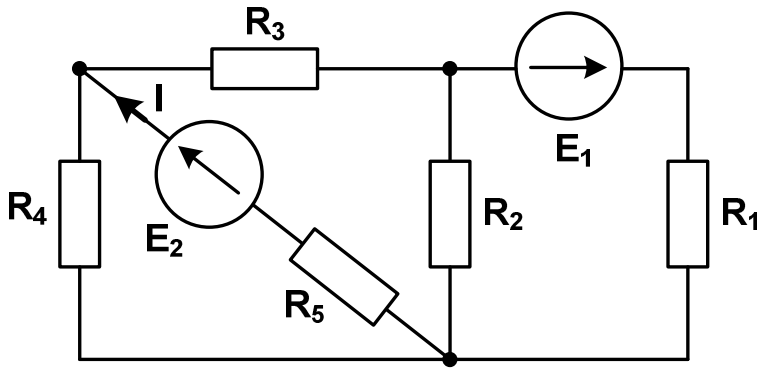
Class 08 (02.12.2024)

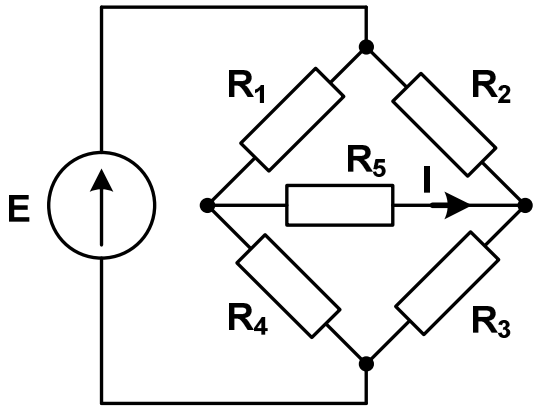
1. Calculate the power dissipated in resistor R_5 using **Thevenin's theorem**.

   $R_1 = 2\ \Omega$, $R_2 = 3\ \Omega$, $R_3 = 4\ \Omega$,
   $R_4 = 2\ \Omega$, $R_5 = 6\ \Omega$,
   $E_1 = 14$ V, $E_2 = 20$ V.



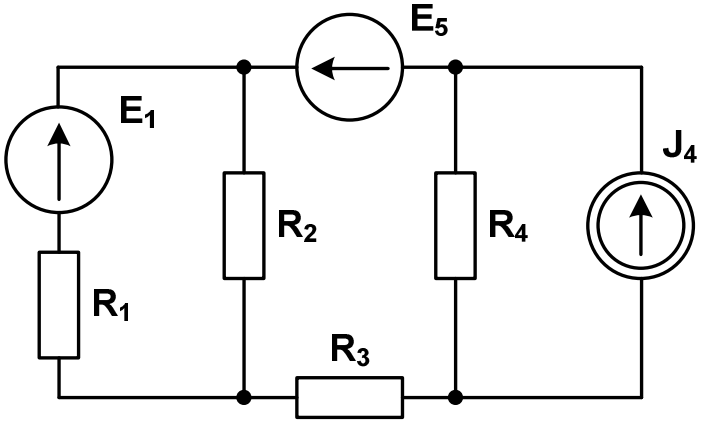
2. What should be the minimum power rating of resistor $\mathbf{R_5}$ in the circuit shown in the figure?
   Use **Thevenin's theorem**.

   $R_1 = 4\ \Omega$, $R_2 = 12\ \Omega$, $R_3 = 4\ \Omega$,
   $R_4 = 4\ \Omega$, $R_5 = 1\ \Omega$, $E = 12$ V



3. Use **Thevenin's theorem** to determine the voltage source $\mathbf{E_5}$ that will make the current through $\mathbf{R_3}$ equal to **0 A**.

   $R_1 = R_4 = 1\ \Omega$, $R_2 = R_3 = 2\ \Omega$,
   $J_4 = 1$ A, $E_1 = 3$ V



4. Determine the phasor representation (the complex form) of the following signals.

a) $u_1(t) = 230\sqrt{2}\sin(314 \cdot t)\ V$

b) $i_1(t) = 10\sin(314 \cdot t - 45°)\ A$

c) $u_2(t) = 25\cos(314 \cdot \mathrm{t})\ V$

d) $i_2(t) = \cos(314 \cdot t - 30°)\ A$

e) $u_3(t) = 100\sin(\mathrm{t})\ V$

5. Based on phasor representation, express the voltage and current signals as time functions in the form $f(t) = F_m \sin(\omega t + \varphi)$.

a) $\underline{U_1} = 100e^{j30°}\ V$

b) $\underline{I_1} = e^{j90°} A$

c) $\underline{U_2} = (20 + j45)\ V$

d) $\underline{I_2} = (5 - j5)\ A$