United International University
Department of CSE
CSE 2113: Electrical Circuits
Final Examination
Fall 2022

Time: 2 Hours   Full Marks: 40
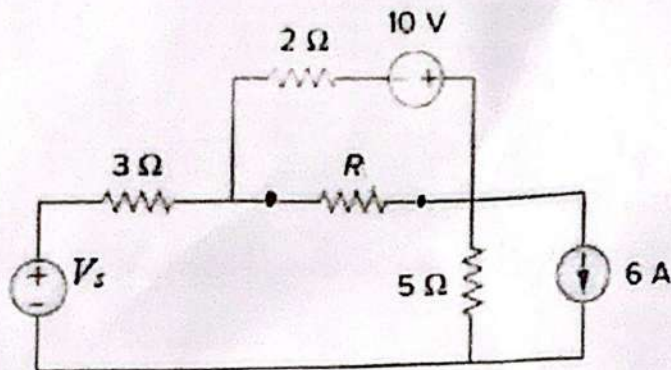
1.

2 Ω   10 V

3 Ω   R

V_s 5 Ω   6 A   15·625

Figure 1 for Question 1.

(a) Find the value of R that would result in the maximum power absorbed by that resistor. Assume that $V_s = 22\ V$. [7]

(b) Find the maximum power delivered to the resistor R. [2]

2.

5 V   1 Ω
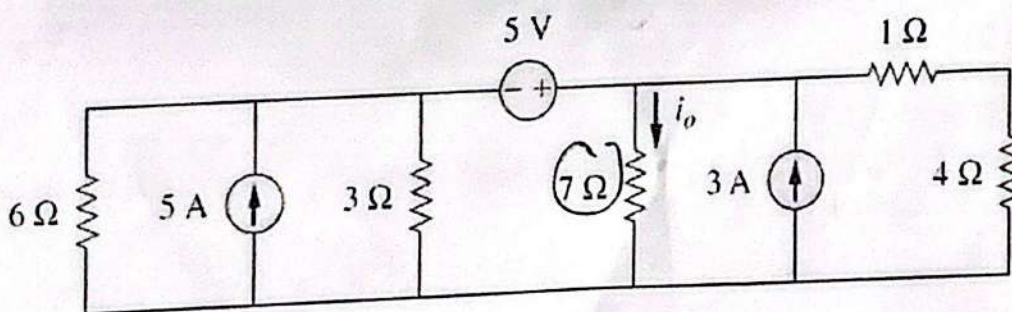
i_o

6 Ω   5 A   3 Ω   7 Ω   3 A   4 Ω

Figure 2 for Question 2.

For the above circuit shown in **Figure 2**, determine the power absorbed the in 7Ω resistor using Source transformation. [8]
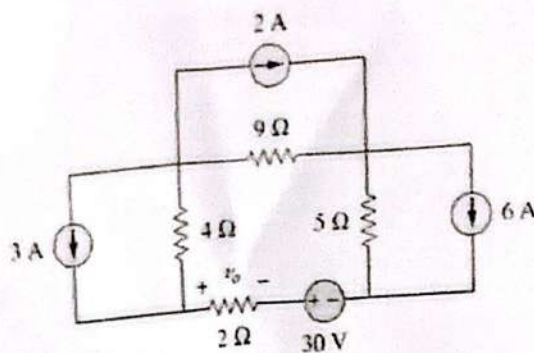
3

Figure 3 for Question 3.

For the above circuit shown in **Figure 3**, determine v_o using Superposition. [8]
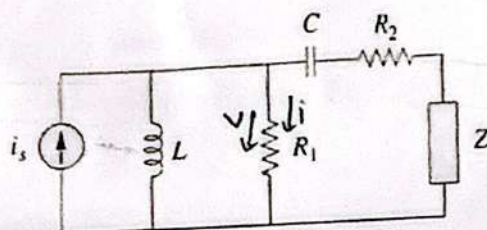
4.

Figure 4 for Question 4.

For the above circuit shown in **Figure 4**, the following information is given: $i_s = 5\sin(277t + 40^\circ)$, $L = 10mH$, $R_1 = 100\Omega$, $R_2 = 20\Omega$, $C = 100\mu F$, $v_{R_1} = 14.46\sin(277t + 125.2^\circ)$. Now, determine the followings:

i)   Power absorbed by R_1. [2]
ii) Value of Z.Explain what type of electrical component constitutes the impedance,Z.[4]
iii) Voltage across R_2 resistor. [2]
iv) Determine the phase angle difference between i_s & v_{R_2}. Explain which one is leading. [2]
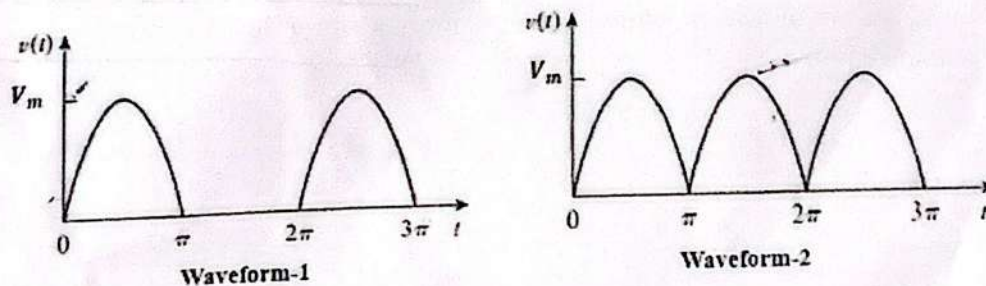
5.

Figure 5 for Question 5.

When the voltage shown in waveform-1 is applied across a 10Ω resistor, on average 2.5W power is absorbed by the resistor. If the voltage shown in waveform-2 is applied across the same resistor, then determine the average absorbed power. [5]