

Dashboard > Courses > School Of Engineering & Applied Sciences > B.Tech. > B.Tech. Cohort 2020-2024 > Semester-I Cohort 2020-24 > EECE105L-Odd 2020 > End Sem Exam > End Sem Exam

Started on Monday, 1 March 2021, 12:15 PM

State Finished

Completed on Monday, 1 March 2021, 2:30 PM

Time taken 2 hours 14 mins

Grade 27.00 out of 35.00 (77%)

Question 1

Correct

Mark 1.00 out of
1.00

Determine the bandgap energy (E_g in eV) of a light emitting diode whose operating wavelength is 953 nm.

Given, the Plank's constant is 6.626×10^{-34} Js, the Unit charge is 1.6×10^{-19} C, the velocity of light in the vacuum is 3×10^8 m/s.

Select one:

- ☐ 13.04
- ☐ 0.81
- ☐ 8.14
- ☒ 1.30 ✓

Your answer is correct.

The correct answer is: 1.30



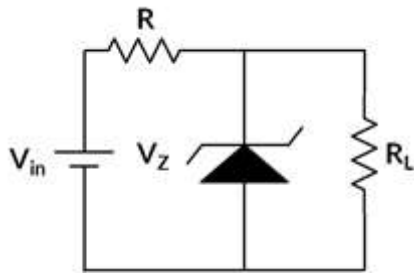
Question 2

Incorrect

Mark 0.00 out of

3.00

In the circuit shown below, the input voltage varies in the range of 168 to 248 Volts, $R = 6\text{ k}\Omega$, $R_L = 8\text{ k}\Omega$ and Zener breakdown $V_Z = 49\text{ Volts}$. Find the maximum and minimum values of current (in mA) flowing through the Zener diode.



Select one:

- ☐ 39.29 and 13.71
- ☐ 43.38 and 13.71
- ☒ 27.04 and 19.83 ✖
- ☐ 27.04 and 13.71

Your answer is incorrect.

The correct answer is: 27.04 and 13.71



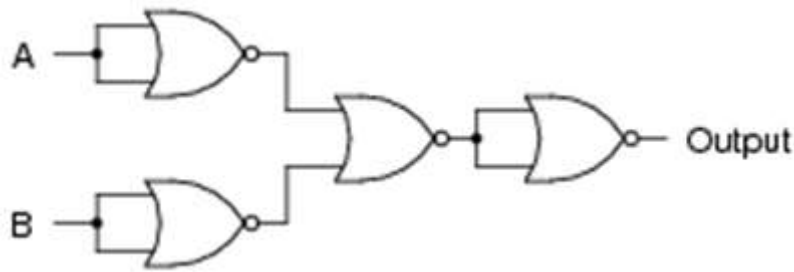
Question 3

Incorrect

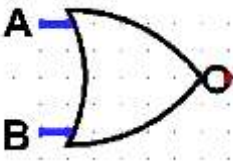
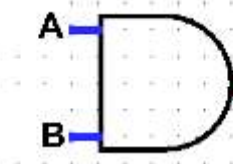
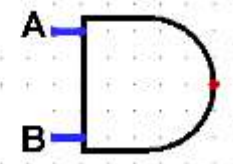
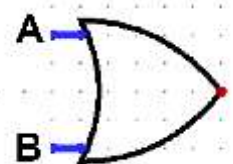
Mark 0.00 out of

2.00

Which of the following gates best represent the logic circuit shown in figure below?

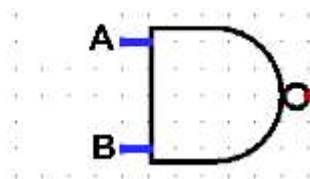


Select one:

- ☒  ✗
- ☐ 
- ☐ 
- ☐ 

Your answer is incorrect.

The correct answer is:



Question 4

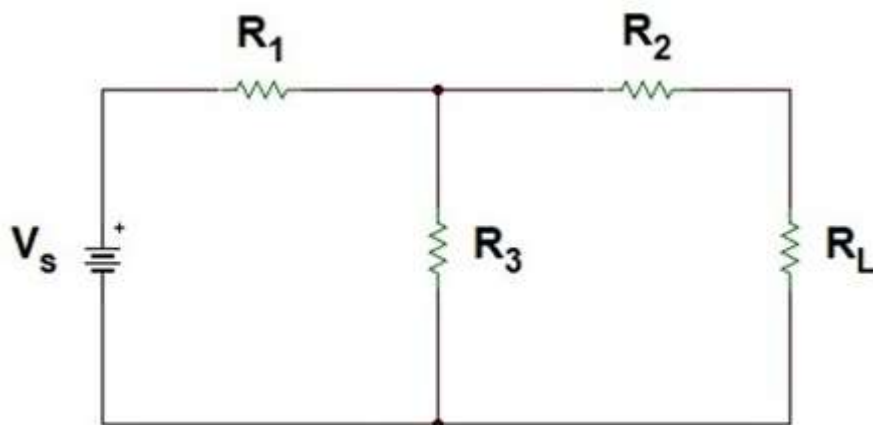
Correct

Mark 3.00 out of

3.00

Consider the circuit below. Let the maximum power delivered to the load resistor (R_L) is equal to P_{\max} . At what value of R_L (in Ω), the load resistor absorbs 87% of P_{\max} .

Given $V_s = 7$ V, $R_1 = 1021$ Ω , $R_2 = 2472$ Ω , $R_3 = 2262$ Ω .



Select one:

- ☐ 2704.78
- ☐ 257.38
- ☒ 1492.43 ✓
- ☐ 1402.71

Your answer is correct.

The correct answer is: 1492.43

Question 5

Correct

Mark 2.00 out of

2.00

Convert the decimal number 312 into octal

Select one:

- ☐ 456
- ☒ 470 ✓
- ☐ 474
- ☐ 464

Your answer is correct.

The correct answer is: 470



Question 6

Correct

Mark 2.00 out of
2.00

Three types of diodes are listed below. Match them with their suitable applications:

LED

Electrical to Light energy ✓

Zener Diode

Voltage regulator ✓

PN Junction Diode

AC to DC conversion ✓

Your answer is correct.

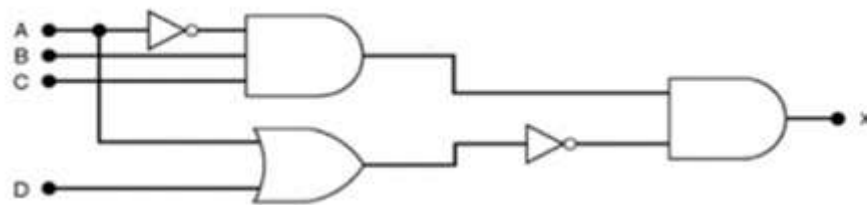
The correct answer is: LED → Electrical to Light energy, Zener Diode → Voltage regulator, PN Junction Diode → AC to DC conversion

Question 7

Correct

Mark 2.00 out of
2.00

Which of the following expression represents the output of the logic circuit shown in Figure below.



Select one:

- ☐ $ABC(\overline{C+D})$
- ☐ $ABC(\overline{A+D})$
- ☐ $\overline{ABC} + (\overline{A+D})$
- ☒ $\overline{ABC}(\overline{A+D})$ ✓

Your answer is correct.

The correct answer is: $\overline{ABC}(\overline{A+D})$



Question 8

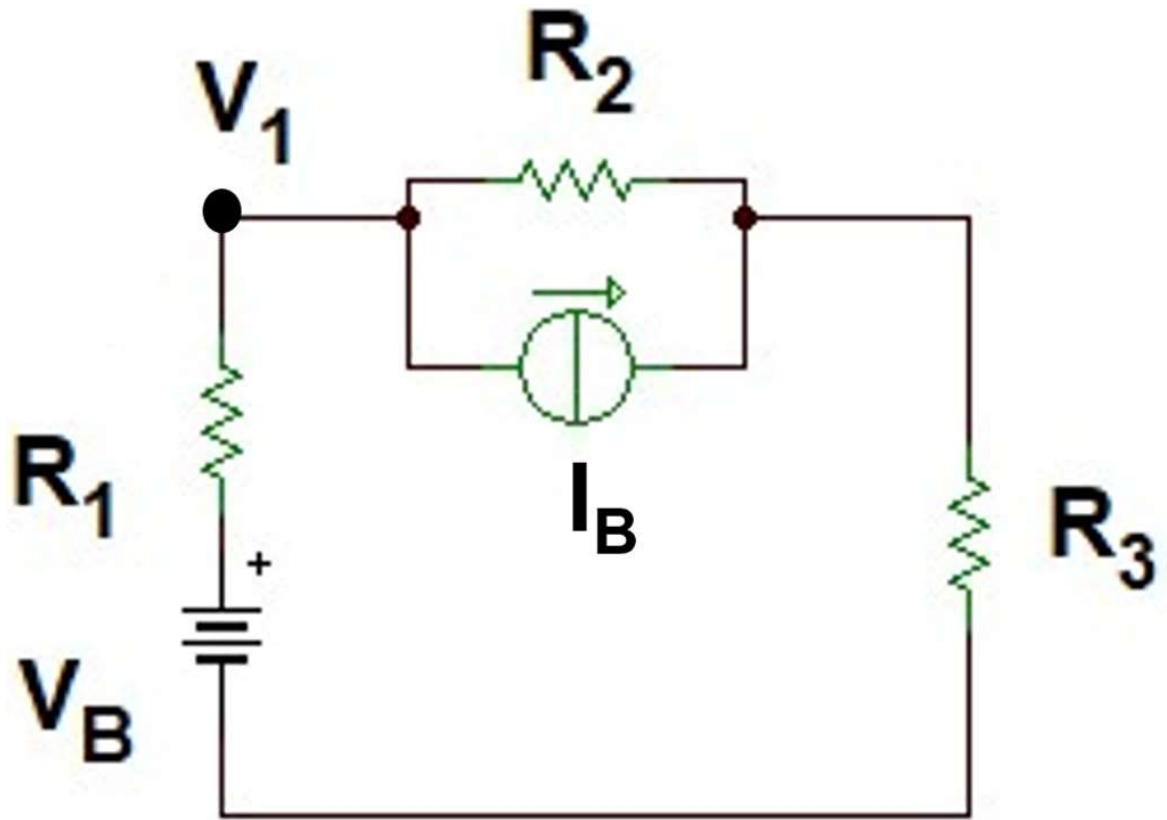
Correct

Mark 3.00 out of

3.00

Find the value of V_1 (in Volt) in the circuit shown below.

Given $V_B = 7\text{ V}$, $I_B = 12\text{ A}$, $R_1 = 14\ \Omega$, $R_2 = 22\ \Omega$ and $R_3 = 24\ \Omega$.



Select one:

- ☒ -56.23 ✓
- ☐ 66.97
- ☐ -66.97
- ☐ 56.23

Your answer is correct.

The correct answer is: -56.23



Question 9

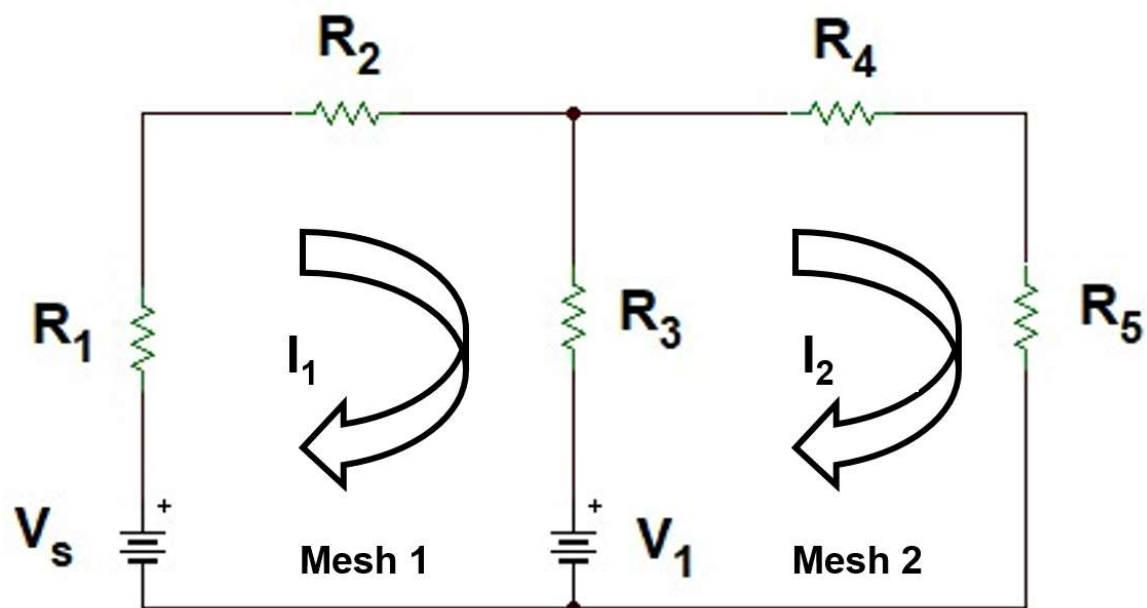
Correct

Mark 4.00 out of

4.00

What is the value of voltage source V_s (in Volt) such that current $I_2=1.1$ mA flows in *mesh-2* as shown in the circuit given below.

Given $R_1=432\ \Omega$, $R_2=625\ \Omega$, $R_3=2301\ \Omega$, $R_4=1787\ \Omega$, $R_5=2355\ \Omega$ and $V_1=13$ V.



Select one:

- ☐ 6.90
- ☐ 44.85
- ☒ 1.84 ✓
- ☐ 39.78

Your answer is correct.

The correct answer is: 1.84



Question 10

Correct

Mark 1.00 out of

1.00

Consider a bar of silicon doped with $4 \times 10^{16} \text{ cm}^{-3}$ Phosphorus atoms and kept at room temperature. The minority carrier type is _____ and concentration (in cm^{-3}) is_____ .

Given intrinsic carrier concentration $n_i = 1.5 \times 10^{10} \text{ cm}^{-3}$

Note: *In the given options 10E(x) represents 10^x*

Select one:

- ☐ electrons and 0.56×10^4
- ☒ holes and 0.56×10^4 ✓
- ☐ electrons and 4.00×10^{16}
- ☐ holes and 4.00×10^{16}

Your answer is correct.

The correct answer is: holes and 0.56×10^4



Question 11

Correct

Mark 3.00 out of

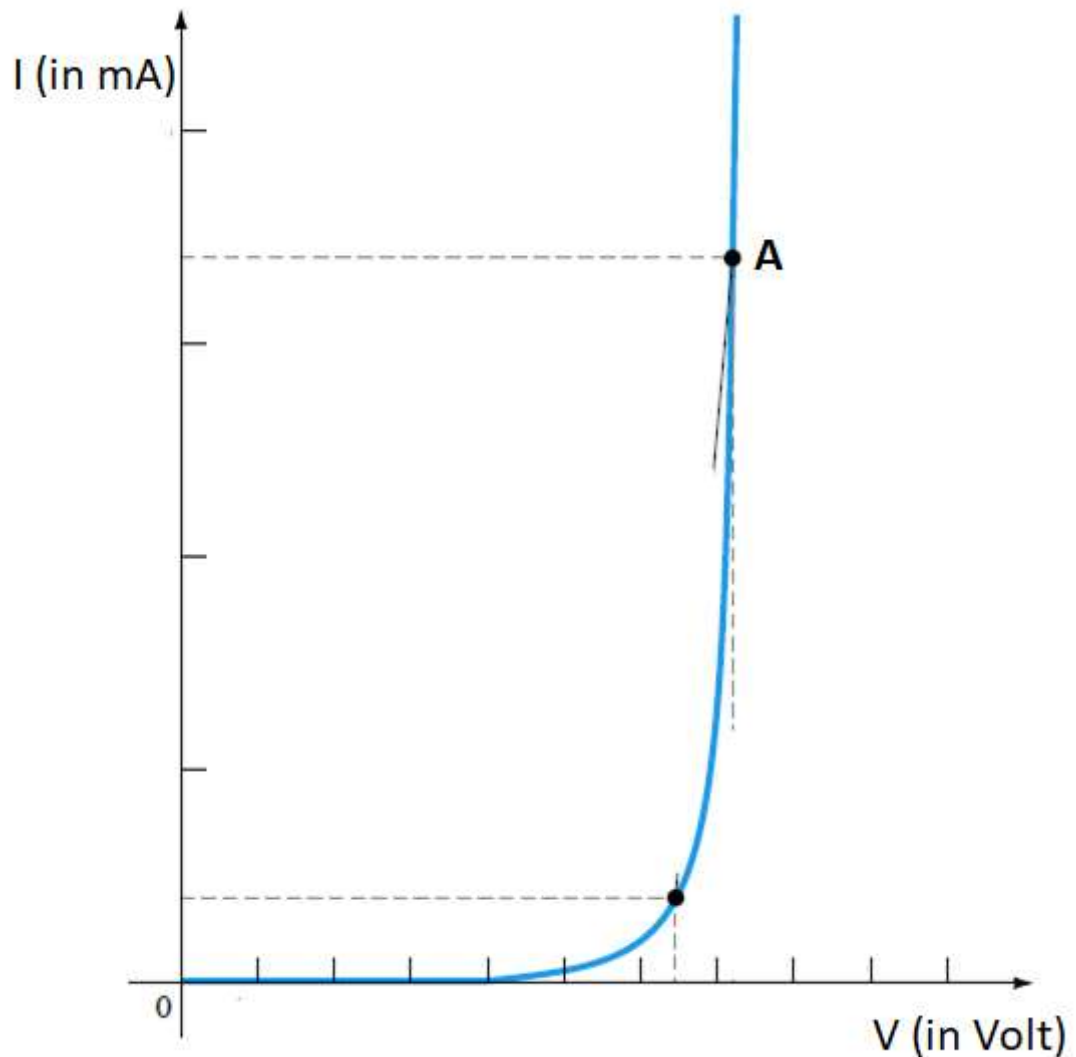
3.00

The voltage across diode is 0.6 Volt at point A as shown in the below diode characteristic curve.

The dynamic resistance (Ω) and static resistance (Ω) of the diode at point A are _____ and _____, respectively.

Given that the reverse saturation current is 72×10^{-15} A and the non-ideality factor is 1. Assume that the diode is working at 300K.

The Boltzmann constant (k) = $1.38 \times 10^{-23} \text{ JK}^{-1}$, unit charge (q) = $1.6 \times 10^{-19} \text{ C}$.



Select one:

- ☐ dynamic resistance is 30.55 Ohm and static resistance is 30.55 Ohm
- ☒ dynamic resistance is 30.55 Ohm and static resistance is 708.31 Ohm ✓
- ☐ dynamic resistance is 708.31 Ohm and static resistance is 708.31 Ohm
- ☐ dynamic resistance is 708.31 Ohm and static resistance is 30.41 Ohm



Your answer is correct.

The correct answer is: dynamic resistance is 30.55 Ohm and static resistance is 708.31 Ohm

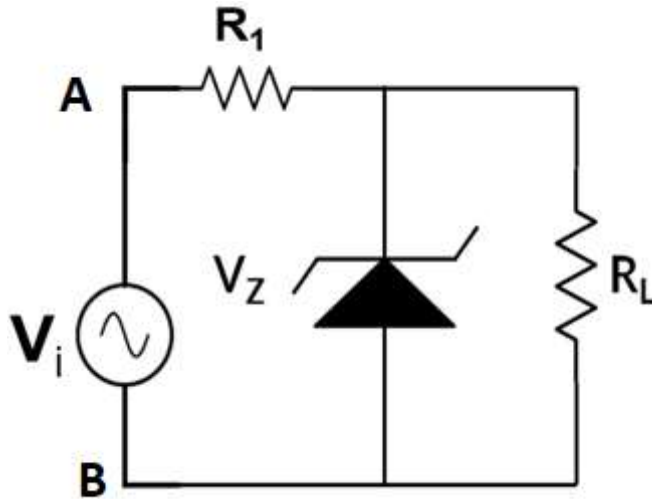
Question 12

Correct

Mark 2.00 out of
2.00

An input signal $V_i = 14.7\sin(\omega t)$ is applied to the circuit shown below. The silicon Zener diode has a Zener breakdown voltage of 4.5 V. When the output is observed across R_L in an oscilloscope. What is the maximum voltage level observed in the positive and negative half cycle of the output?

Given that $R_1 \ll R_L$, and in the positive half cycle, **node A** is positive.



Select one:

- ☒ positive half 4.50 V and negative half 0.7 V ✓
- ☐ positive half 0.7 V and negative half 4.50 V
- ☐ positive half 4.50 V and negative half 14.70 V
- ☐ positive half 14.70 V and negative half 0.7 V
- ☐ positive half 14.70 V and negative half 4.50 V
- ☐ positive half 0.7 V and negative half 14.70 V

Your answer is correct.

The correct answer is: positive half 4.50 V and negative half 0.7 V



Question 13

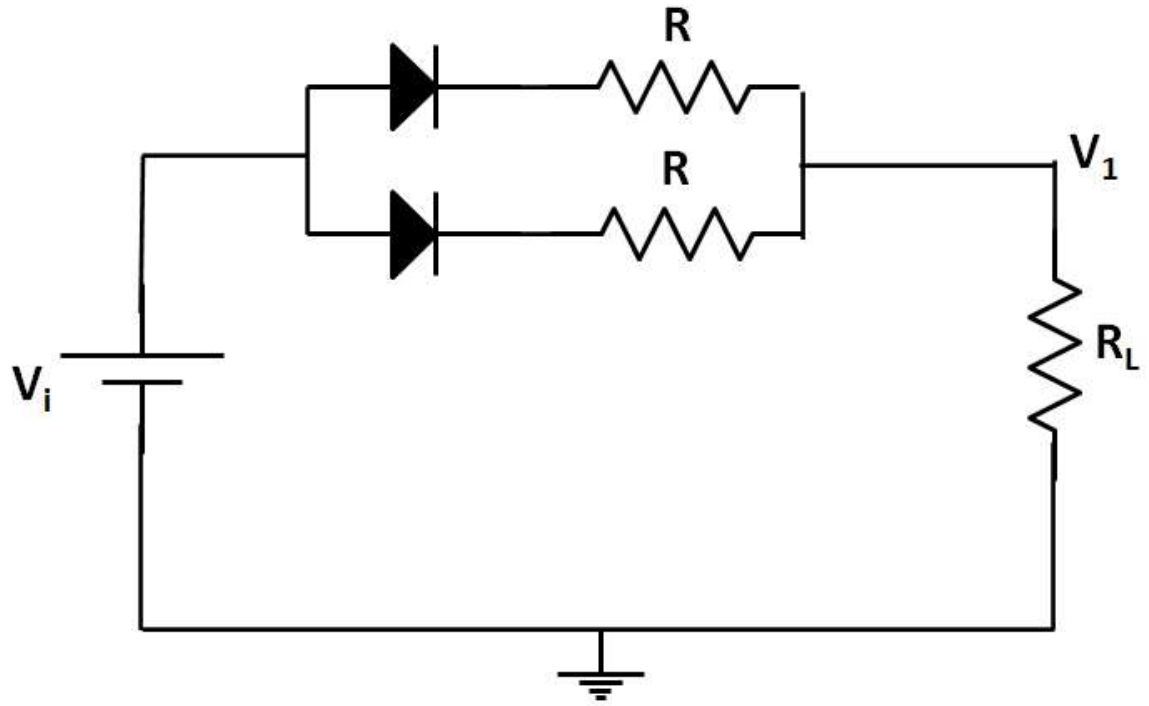
Correct

Mark 2.00 out of

2.00

In the given circuit find the value of V_1 (in Volt) across R_L .

Given that the two identical diodes are made of silicon, $V_i=24\text{ V}$, $R=16\ \Omega$ and $R_L=20\ \Omega$.



Select one:

- ☒ 16.64 ✓
- ☐ 12.94
- ☐ 13.33
- ☐ 6.47

Your answer is correct.

The correct answer is: 16.64



Question 14

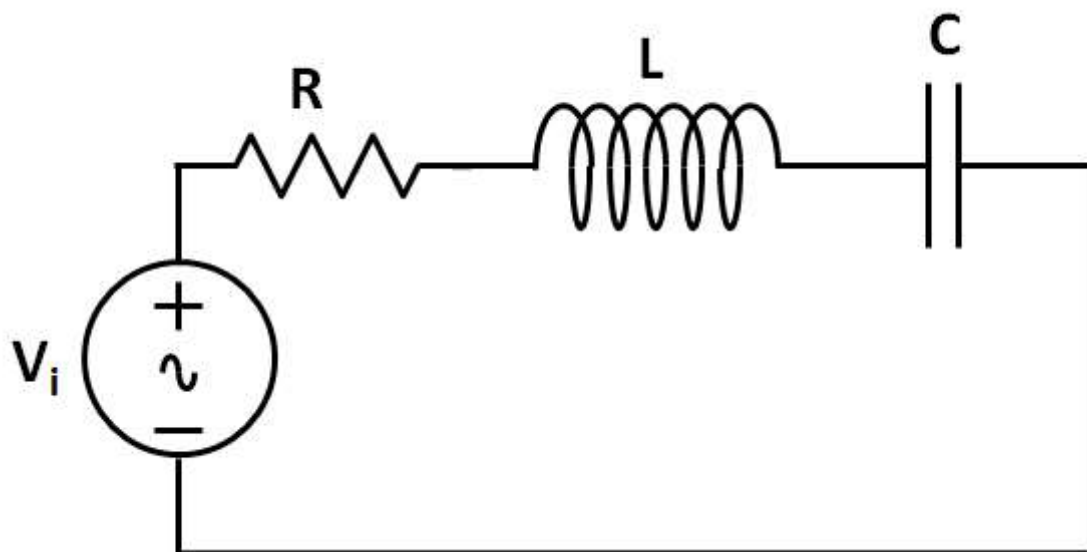
Incorrect

Mark 0.00 out of

3.00

Determine the frequency (in kHz) such that the imaginary part of the impedance of the RLC circuit shown below is zero.

Given $V_i = 10.6 \sin(\omega t)$ V, $R = 4579 \, \Omega$, $C = 36 \, \text{nF}$, $L = 28 \, \text{mH}$.



Select one:

- ☐ 881.92
- ☐ 5.01
- ☒ 31749.02 ✖
- ☐ 1133.89

Your answer is incorrect.

The correct answer is: 5.01



Question 15

Correct

Mark 2.00 out of
2.00

Convert the decimal number 184 into binary

Select one:

- ☐ 10110100
- ☐ 10101110
- ☒ 10111000 ✓
- ☐ 10111100

Your answer is correct.

The correct answer is: 10111000

