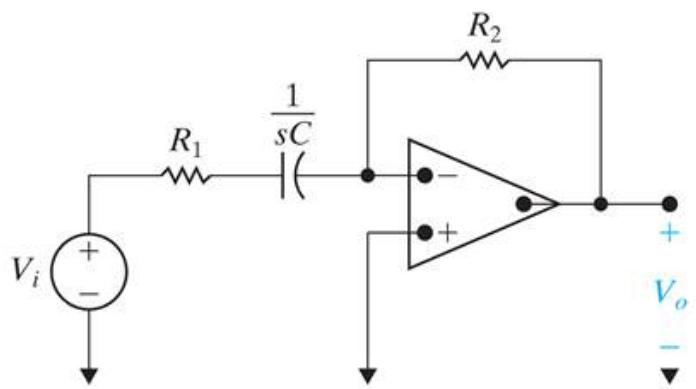
Started on	Friday, 14 April 2017, 2:59 PM
State	Finished
Completed on	Wednesday, 26 April 2017, 1:20 PM
Time taken	11 days 22 hours
Grade	**100.00** out of 100.00

Question 1

Correct

Mark 13.00 out of 13.00



P15.11_10ed

Given: R_1 = 159 Ω (Ohm) C_{in} = 250 nF (nano F) R_2 = 1,273 Ω (Ohm)

Assume the opamp is ideal.

The input to this high-pass filter is $v_i(t)$ = 2.5 cos(ωt) Volts.

The opamp has power input rails at +20V and -20V.

For the steady-state condition and letting the output voltage magnitude be negative:

a) Find the output voltage when the input frequency ω = ω_c. (ω = omega)

$v_o(t)$ = -14.15 ✓ cos(8000 ✓ π t + 45 ✓°) (Degrees) Volts

b) Find the output voltage when the input frequency ω = 0.125 ω_c.

$v_o(t)$ = -2.48 ✓ cos(1000 ✓ π t + 82.87 ✓°) (Degrees) Volts

c) Find the output voltage when the input frequency w = 8 ω_c.

$v_o(t)$ = -19.85 ✓ cos(64000 ✓ π t + 7.13 ✓°) (Degrees) Volts

After you get a numeric answer, create a PSpice simulation and compare your answer with the simulation results.

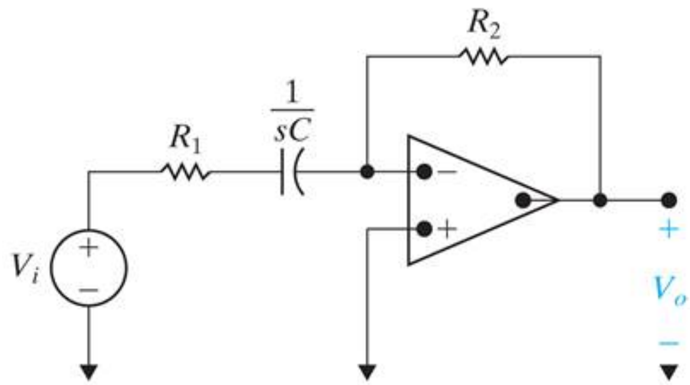
Correct

Marks for this submission: 13.00/13.00.

Question 2

Correct

Mark 14.00 out of 14.00



P15.8_10ed

Given: R_1 = ?? Ω (Ohm) C_{in} = 3.9 nF (nano F) R_2 = ?? Ω (Ohm)

Assume the opamp is ideal.

Design a high-pass filter with a passband gain of 14 dB and a cutoff frequency of 8 kHz.

R_1 = 5100 Ω (Ohm)

R_2 = 25550 Ω (Ohm)

After you get a numeric answer, consider creating a PSpice simulation and compare your answer with the simulation results.

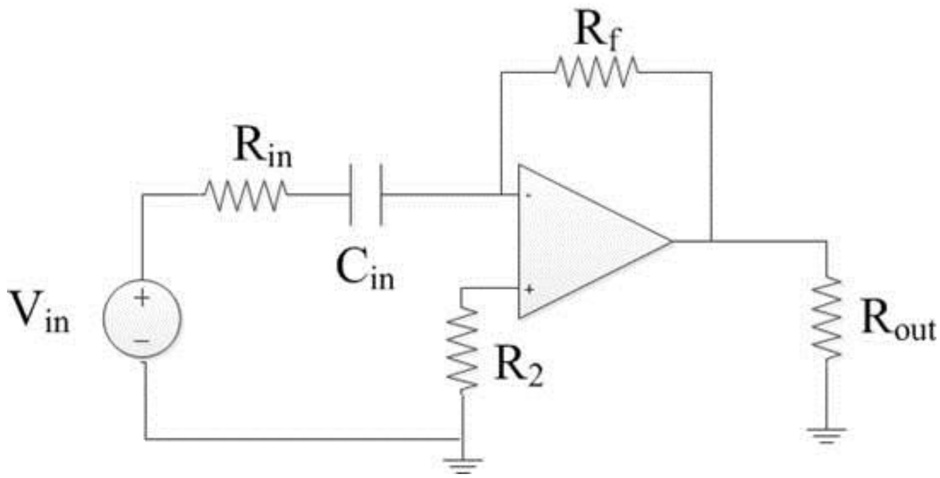
Correct

Marks for this submission: 14.00/14.00.

Question 3

Correct

Mark 14.00 out of 14.00



P15.1T

Given: R_{in} = 10 kΩ (kilo Ohm) C_{in} = 0.1 µF (micro F) R_2 = 10 Ω (Ohm)

R_{out} = 1 kΩ (kilo Ohm) R_f = 10 kΩ (kilo Ohm)

V_{in} = 20 cos(ωt) Volts

The opamp is not ideal and can only deliver up to 15 mA at the output.

The opamp has power input rails at +15V and -15V.

Determine the radian frequency ω where the opamp just begins saturation.

$\omega_{saturation}$ = 1138.9 rad/sec

After you get a numeric answer, consider creating a PSpice simulation and compare your answer with the simulation results.

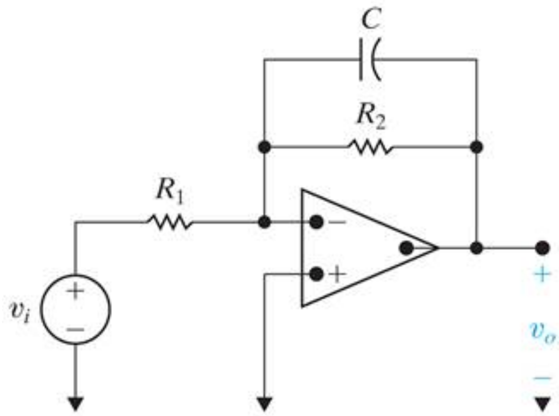
Correct

Marks for this submission: 14.00/14.00.

Question 4

Correct

Mark 14.00 out of 14.00



P15.1_10ed

Given: R_1 = ?? Ω (Ohm) C_{in} = 750 nF (nano F) R_2 = ?? Ω (Ohm)

Assume the opamp is ideal.

Design a low-pass filter with a passband gain of 10 dB and a cutoff frequency of 1 kHz.

R_1 = 67.16 Ω (Ohm)

R_2 = 212.21 Ω (Ohm)

After you get a numeric answer, consider creating a PSpice simulation and compare your answer with the simulation results.

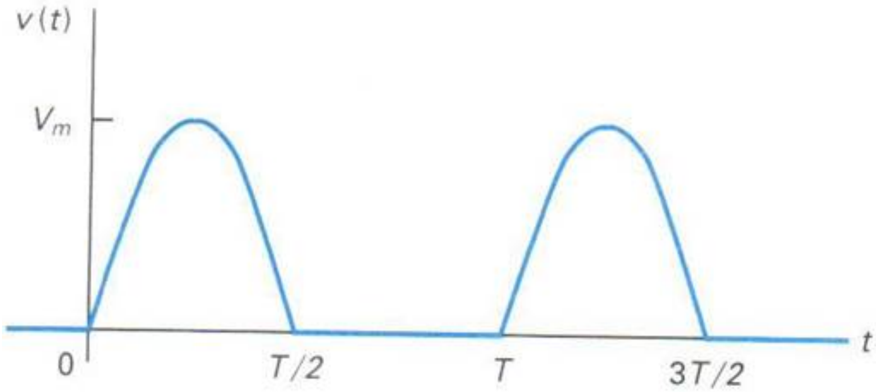
Correct

Marks for this submission: 14.00/14.00.

Question 5

Correct

Mark 15.00 out of 15.00



P16.03c_6ed

Find the Fourier series coefficients for this periodic waveform which is a half-wave rectified sine wave where $v(t) = V_m \sin(2\pi t / T)$ for $0 \leq t \leq T/2$.

Also given $V_m = 12$ V.

a) Find a_v.

a_v = 3.82 Volts

b) Find a_k.

a_k = 7.64 / (1 - k^2) Volts for all even

c) Find b_k.

b_k = 0 for k even and for k odd > 1.

b_1 = 6 $\sin(\omega_0 t)$ Volts

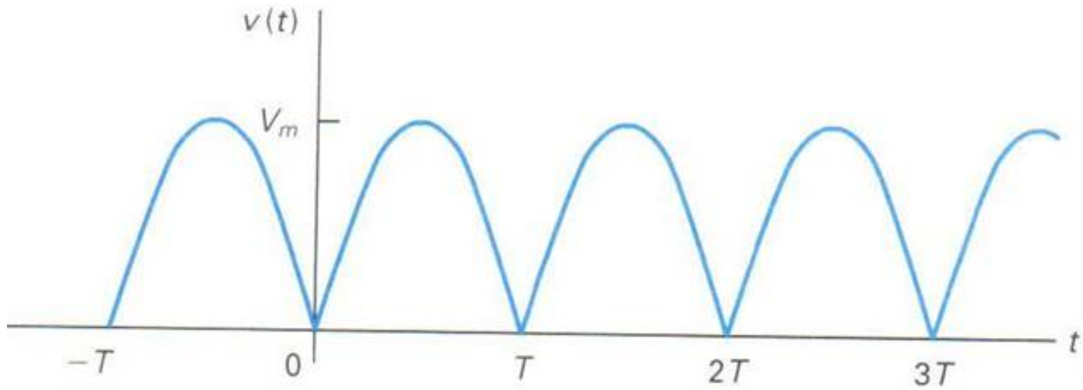
Correct

Marks for this submission: 15.00/15.00.

Question **6**

Correct

Mark 15.00 out of 15.00



P16.03b_6ed

Find the Fourier series coefficients for this periodic waveform which is a full-wave rectified sine wave where $v(t) = V_m \sin(\pi t/T)$ for $0 \le t \le T$.

a) Find a_v.

a_v = 2 ✓ V_m / π

b) Find a_k.

a_k = 4 ✓ $V_m / [\pi (1 -$ 4 ✓ $k^2]$ for all k

c) Find b_k.

b_k = 0 ✓

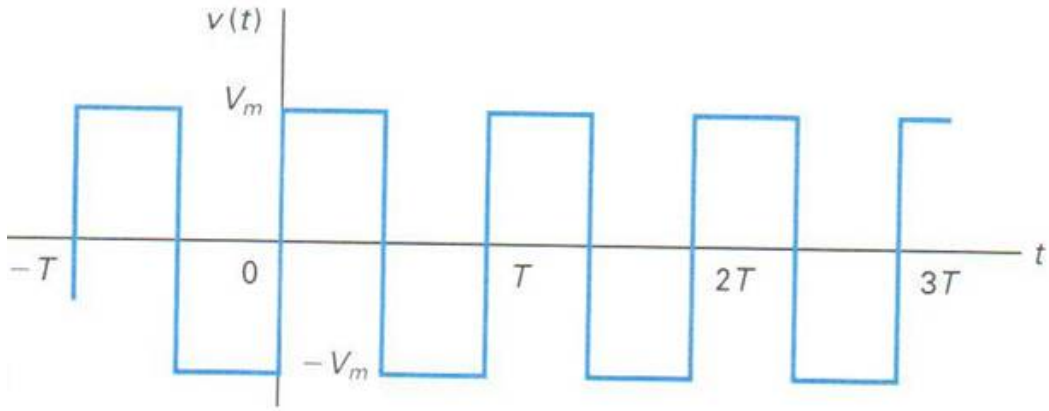
Correct

Marks for this submission: 15.00/15.00.

Question 7

Correct

Mark 15.00 out of 15.00



AP16.5_10ed

Find the Fourier series coefficients for this periodic waveform.

a) Find a_v.

a_v = 0

b) Find a_k.

a_k = 0

c) Find b_k.

b_k = 4 $V_m / \pi k$ for k Odd

Correct

Marks for this submission: 15.00/15.00.