

<b>Started on</b>	Friday, 22 July 2022, 4:21 PM
<b>State</b>	Finished
<b>Completed on</b>	Friday, 22 July 2022, 8:33 PM
<b>Time taken</b>	4 hours 11 mins
<b>Grade</b>	<b>78.00</b> out of 106.00 ( <b>74%</b> )

Question **1**

Correct

Mark 2.00 out of 2.00

The gain for a transresistance amplifier has units of :

Select one:

- ☐ a. None of these
- ☐ b. Amps per Amp
- ☐ c. Volts per Volt
- ☐ d. Amps per Volt
- ☒ e. Volts per Amp



The correct answer is: Volts per Amp

**Correct**

Marks for this submission: 2.00/2.00.

Question **2**

Correct

Mark 2.00 out of 2.00

If an amplifier uses a current input and a current output, then it is :

Select one:

- ☐ a. A transconductance amplifier
- ☒ b. A current amplifier
- ☐ c. A voltage amplifier
- ☐ d. A transresistance amplifier
- ☐ e. None of these



The correct answer is: A current amplifier

**Correct**

Marks for this submission: 2.00/2.00.



Question **3**

Correct

Mark 2.00 out of 2.00

Which of the following is true for a DC coupled amplifier with a single high frequency pole?

Select one:

- ☐ a. At this pole frequency, the phase of the gain will be +45 degrees above the midband value
- ☐ b. Above this pole frequency, the magnitude of the gain will be approximately constant
- ☐ c. Below this pole frequency, the magnitude of the gain will roll off at -20dB/decade as frequency decreases
- ☒ d. None of these
- ☐ e. At this pole frequency, the magnitude of the gain will be +3dB above the midband value



The correct answer is: None of these

**Correct**

Marks for this submission: 2.00/2.00.

Question **4**

Correct

Mark 2.00 out of 2.00

For an amplifier with a single low frequency pole, which of the following is true?

Select one:

- ☐ a. At this pole frequency, the phase of the gain will be -45 degrees below the midband value
- ☐ b. Below this pole frequency, the magnitude of the gain will roll off at -20dB/decade as frequency increases
- ☐ c. All of these
- ☐ d. Below this pole frequency, the phase of the gain will increase at +45 degrees/decade as frequency increases
- ☒ e. At this pole frequency, the magnitude of the gain will be -3dB below the midband value



The correct answer is: At this pole frequency, the magnitude of the gain will be -3dB below the midband value

**Correct**

Marks for this submission: 2.00/2.00.



Question **5**

Correct

Mark 2.00 out of 2.00

An amplifier which needs a low input resistance and a low output resistance is :

Select one:

- ☒ a. A transresistance amplifier
- ☐ b. None of these
- ☐ c. A voltage amplifier
- ☐ d. A transconductance amplifier
- ☐ e. A current amplifier



The correct answer is: A transresistance amplifier

**Correct**

Marks for this submission: 2.00/2.00.

Question **6**

Correct

Mark 2.00 out of 2.00

Clipping of an opamp's output voltage can be caused by :

Select one:

- ☐ a. Increasing the load resistance used
- ☐ b. All of these
- ☐ c. Decreasing the amplitude of the input signal used
- ☒ d. Increasing the closed-loop amplifier gain used
- ☐ e. Increasing the power supply voltages used



The correct answer is: Increasing the closed-loop amplifier gain used

**Correct**

Marks for this submission: 2.00/2.00.



Question **7**

Correct

Mark 2.00 out of 2.00

Which of the following is NOT true for an inverting summing amplifier built using a single opamp?

Select one:

- ☐ a. The gain for each input will go up as the input resistance for that input goes down
- ☐ b. The gain for each input can be varied without changing the gain for any other input
- ☐ c. The gain for all inputs can be varied by changing the resistor connected in feedback
- ☒ d. The gain for each input depends only on the value of the resistor connected to that input
- ☐ e. None of these



The correct answer is: The gain for each input depends only on the value of the resistor connected to that input

**Correct**

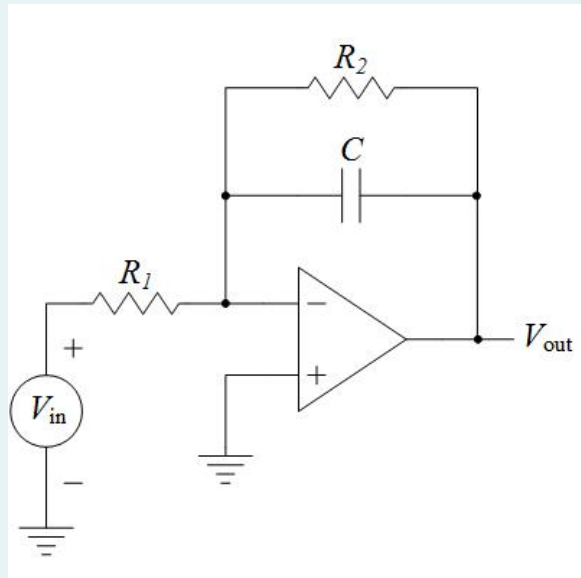
Marks for this submission: 2.00/2.00.



Question 8

Correct

Mark 2.00 out of 2.00



The active filter shown has a

Select one:

- ☐ a. High pass response
- ☒ b. Low pass response
- ☐ c. Bandpass response
- ☐ d. None of these
- ☐ e. Impossible to determine



The correct answer is: Low pass response

**Correct**

Marks for this submission: 2.00/2.00.


Question 9

Correct

Mark 2.00 out of 2.00

Which of the following is true for an opamp connected as an active filter?

Select one:

- ☐ a. None of these
- ☒ b. The ideal opamp assumptions will still be valid as long as the loop gain is high enough 
- ☐ c. Replacing both the input and feedback resistors in an inverting amp with capacitors will increase both the low and high frequency gains
- ☐ d. Replacing the feedback resistor in an inverting amp with a capacitor will increase the high frequency gain
- ☐ e. Replacing the input resistor in an inverting amp with a capacitor will increase the low frequency gain

The correct answer is: The ideal opamp assumptions will still be valid as long as the loop gain is high enough

**Correct**

Marks for this submission: 2.00/2.00.


Question 10

Correct

Mark 1.00 out of 2.00

Errors in the output voltage of an opamp can occur if the input signal changes too quickly due to :

Select one:

- ☐ a. Limited supply voltages
- ☐ b. Limited voltage gain
- ☐ c. None of these
- ☐ d. Limited input resistance
- ☒ e. Limited slew rate 

The correct answer is: Limited slew rate

**Correct**

Marks for this submission: 2.00/2.00. Accounting for previous tries, this gives 1.00/2.00.



Question **11**

Correct

Mark 2.00 out of 2.00

If an amplifier uses a current input signal and a current output signal, then it is a current amplifier.

Select one:

- ☒ True ✓
- ☐ False

The correct answer is 'True'.

**Correct**

Marks for this submission: 2.00/2.00.

Question **12**

Correct

Mark 2.00 out of 2.00

For an amplifier with a single-time constant high pass response, the magnitude of the gain decreases at -20dB/decade as the frequency is decreased below the corner frequency.

Select one:

- ☒ True ✓
- ☐ False

The correct answer is 'True'.

**Correct**

Marks for this submission: 2.00/2.00.

Question **13**

Correct

Mark 2.00 out of 2.00

For an AC coupled amplifier, the phase of the gain approaches +90 degrees for frequencies in the midband which are well below the upper corner frequency but still well above the lower corner frequency.

Select one:

- ☐ True
- ☒ False ✓

The correct answer is 'False'.

**Correct**

Marks for this submission: 2.00/2.00.



Question **14**

Correct

Mark 2.00 out of 2.00

The model for a voltage amplifier uses a Thevenin's equivalent circuit at its output.

Select one:

- ☒ True ✓
- ☐ False

The correct answer is 'True'.

**Correct**

Marks for this submission: 2.00/2.00.

Question **15**

Correct

Mark 2.00 out of 2.00

A transconductance amplifier needs a high input resistance and a low output resistance.

Select one:

- ☐ True
- ☒ False ✓

The correct answer is 'False'.

**Correct**

Marks for this submission: 2.00/2.00.

Question **16**

Correct

Mark 0.00 out of 2.00

In practical difference amplifiers, the CMRR can be as high as 120dB.

Select one:

- ☒ True ✓
- ☐ False

The correct answer is 'True'.

**Correct**

Marks for this submission: 2.00/2.00. Accounting for previous tries, this gives **0.00/2.00**.





Question **17**

Correct

Mark 0.00 out of 2.00

Ideal opamp differentiators without an extra resistor in series with the capacitor have infinite gain at DC.

Select one:

- ☐ True
- ☒ False ✓

The correct answer is 'False'.

**Correct**

Marks for this submission: 2.00/2.00. Accounting for previous tries, this gives **0.00/2.00**.

Question **18**

Correct

Mark 2.00 out of 2.00

The ideal opamp assumption that there is zero current into the + and – inputs is based on the fact that actual operational amplifiers are designed to have very high input resistance.

Select one:

- ☒ True ✓
- ☐ False

The correct answer is 'True'.

**Correct**

Marks for this submission: 2.00/2.00.

Question **19**

Correct

Mark 2.00 out of 2.00

The gain of an integrated circuit opamp multiplied by it's bandwidth is constant anywhere on the amplifier's frequency response plot below the -3dB frequency and above the unity gain frequency.

Select one:

- ☐ True
- ☒ False ✓

The correct answer is 'False'.

**Correct**

Marks for this submission: 2.00/2.00.



## Question 20

Correct

Mark 0.00 out of 2.00

The output voltage of an integrated circuit opamp will clip if the input voltage multiplied by the closed-loop amplifier gain exceeds the power supply voltage.

Select one:

☒ True ✓☐ False

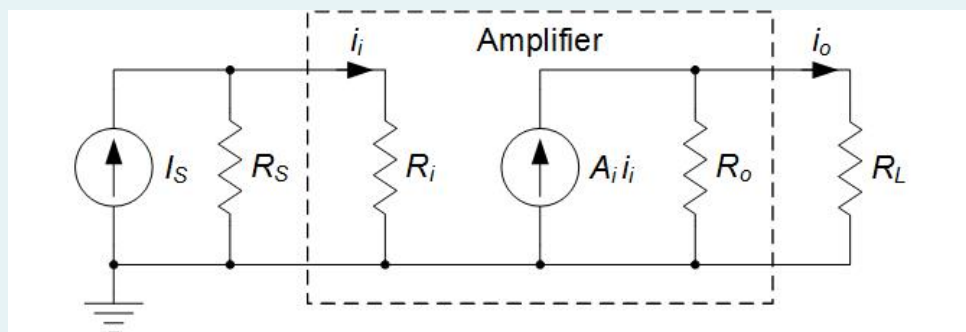
The correct answer is 'True'.

**Correct**Marks for this submission: 2.00/2.00. Accounting for previous tries, this gives **0.00/2.00**.

## Question 21

Correct

Mark 6.00 out of 6.00



What is the value of the current gain in dB for the amplifier circuit shown? Use  $R_S = 7.9\text{k}\Omega$ ,  $R_L = 1.3\text{k}\Omega$ ,  $R_i = 10.9\text{k}\Omega$ ,  $R_o = 8.8\text{k}\Omega$  and  $A_i = 907.6\text{ A/A}$ .

Answer: 50.43 ✓

The correct answer is: 50.43

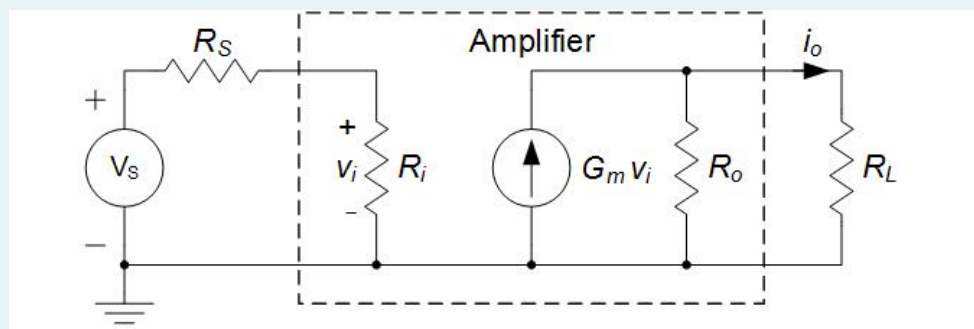
**Correct**

Marks for this submission: 6.00/6.00.

## Question 22

Correct

Mark 6.00 out of 6.00



For the amplifier shown, what is the smallest output resistance in  $k\Omega$  that can be used without losing more than 44.3 percent of the amplifier's short circuit output current  $= G_m V_i$  in  $R_o$ ? Use  $R_L = 74.7k\Omega$ .

Answer:  ✓

The correct answer is: 93.92

**Correct**

Marks for this submission: 6.00/6.00.

## Question 23

Correct

Mark 6.00 out of 6.00

If the output voltage for an amplifier can only swing up to 1.1V below the positive power supply voltage, and down to 1.9V above the negative power supply voltage, then what is the maximum peak-to-peak sine wave in Volts that this amplifier can output without clipping? Use  $V_{CC} = +5V$  and  $V_{EE} = -5V$ .

Answer:  ✓

The correct answer is: 7.00

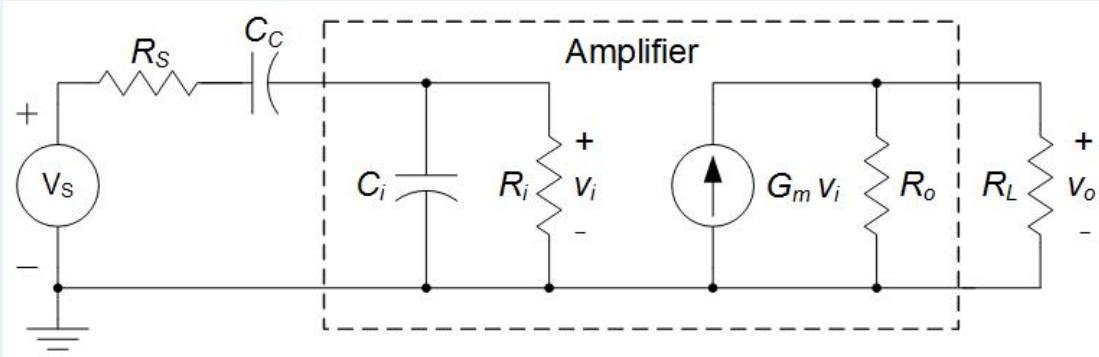
**Correct**

Marks for this submission: 6.00/6.00.

Question 24

Correct

Mark 6.00 out of 6.00



What is the value of the unity gain frequency in MHz for the amplifier shown? Use  $R_s = 1.7\text{k}\Omega$ ,  $R_i = 17.2\text{k}\Omega$ ,  $R_o = 32.8\text{k}\Omega$ ,  $R_L = 39.7\text{k}\Omega$ ,  $C_c = 271.7\text{pF}$ ,  $C_i = 9.0\text{pF}$  and  $G_m = 10.3\text{ mA/V}$ .

Answer: 1860.61 ✓

The correct answer is: 1924.39

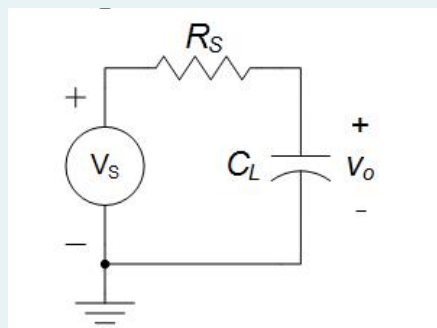
Correct

Marks for this submission: 6.00/6.00.

Question 25

Correct

Mark 3.00 out of 6.00



For the filter circuit shown, what is the phase in degrees of the transfer function  $V_o/V_s$  at a frequency of 18.5MHz? Use  $R_s = 4.5\text{k}\Omega$  and  $C_L = 1.7\text{pF}$ .

Answer: -41.64 ✓

The correct answer is: -41.644

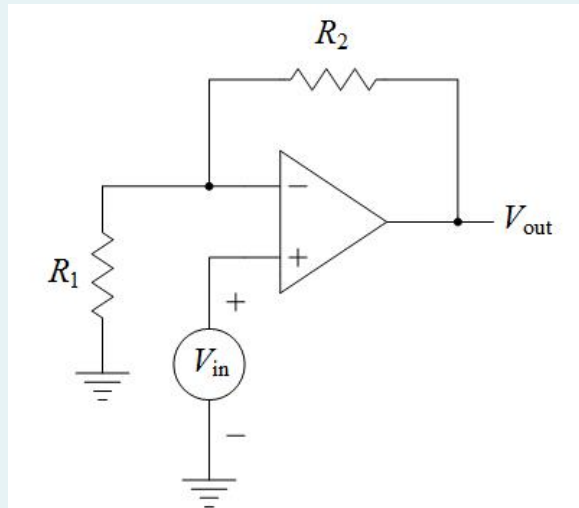
Correct

Marks for this submission: 6.00/6.00. Accounting for previous tries, this gives 3.00/6.00.

Question **26**

Correct

Mark 6.00 out of 6.00



For the operational amplifier circuit shown, what value must  $R_1$  be in kilohms in order to set the voltage gain to 30.9 dB ? Assume that the opamp is ideal, and use  $R_2 = 73.6\text{k}\Omega$ .

Answer:  ✓

The correct answer is: 2.16

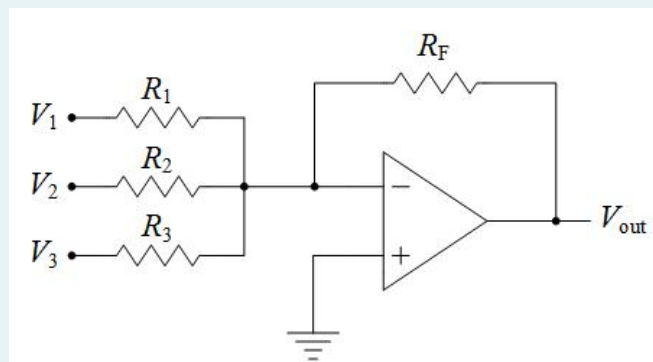
**Correct**

Marks for this submission: 6.00/6.00.

## Question 27

Correct

Mark 6.00 out of 6.00



What is the input resistance in kilohms seen by the  $V_2$  input for the operational amplifier circuit shown? Assume that the opamp is ideal, and use  $R_1 = 5.8\text{k}\Omega$ ,  $R_2 = 9.5\text{k}\Omega$ ,  $R_3 = 1.5\text{k}\Omega$  and  $R_F = 73.3\text{k}\Omega$ .

Answer:  ✓

The correct answer is: 9.50

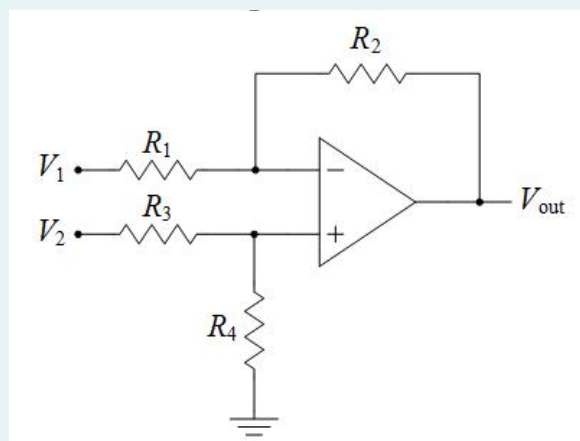
**Correct**

Marks for this submission: 6.00/6.00.

## Question 28

Not answered

Mark 0.00 out of 6.00



What is the common-mode voltage gain,  $A_{cm}$ , in  $V/V$  from the common-mode input voltage,  $V_{icm} = (V_2 + V_1)/2$ , to the output for the operational amplifier circuit shown? Assume that the opamp is ideal, and use  $R_1 = R_3 = 6.2\text{k}\Omega$  and  $R_2 = R_4 = 2.1\text{k}\Omega$ .

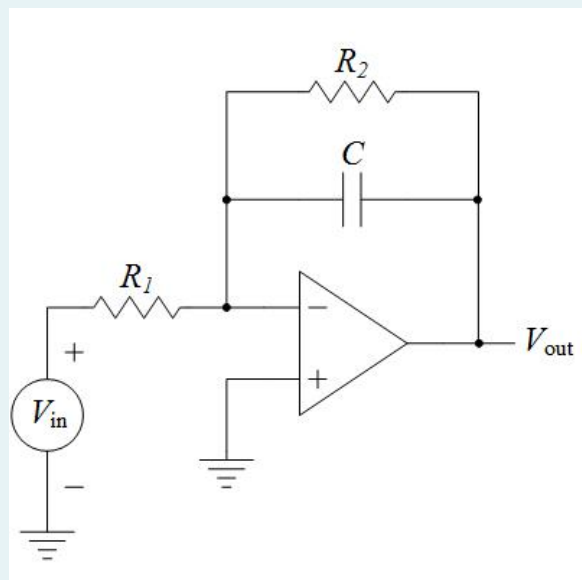
Answer:  ✗

The correct answer is: 0.0

## Question 29

Correct

Mark 6.00 out of 6.00



For the operational amplifier circuit shown, what is the magnitude of the voltage gain in dB at a frequency of 2.8MHz? Assume that the opamp is ideal, and use  $R_1 = 5.7\text{k}\Omega$ ,  $R_2 = 28.8\text{k}\Omega$  and  $C = 2.7\text{pF}$ .

Answer: 9.48



The correct answer is: 9.49

Correct

Marks for this submission: 6.00/6.00.

## Question 30

Incorrect

Mark 0.00 out of 6.00

If the output voltage for an operational amplifier can only swing up to 1.1V below the positive power supply voltage, and down to 2.5V above the negative power supply voltage, then at what DC voltage must the opamp output be biased in order to be able to output the largest peak-to-peak sine wave possible without clipping? Use  $V_{CC} = +15\text{V}$  and  $V_{EE} = -0\text{V}$ .

Answer: 11.4



The correct answer is: 8.20

Incorrect

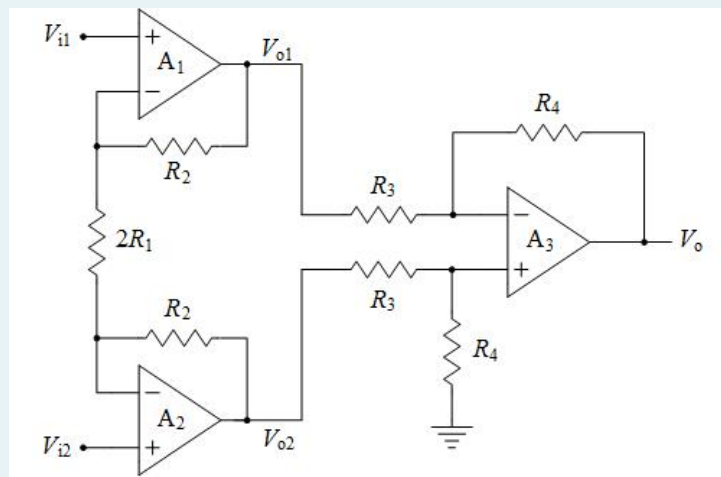
Marks for this submission: 0.00/6.00.



## Question 31

Not answered

Mark 0.00 out of 6.00



What is the differential-mode voltage gain,  $A_{dm}$ , in dB from the differential input voltage,  $V_{idm} = V_{i2} - V_{i1}$ , to the output for the operational amplifier circuit shown? Assume that all the opamps are ideal, and use  $R_1 = 5.2\text{k}\Omega$ ,  $R_2 = 63.5\text{k}\Omega$ ,  $R_3 = 5.5\text{k}\Omega$  and  $R_4 = 94.9\text{k}\Omega$ .

Answer:  ✖

The correct answer is: 47.16

◀ Practice Quiz 8 - BJT and MOS amplifiers

Jump to...

Practice Midterm Exam II ▶

