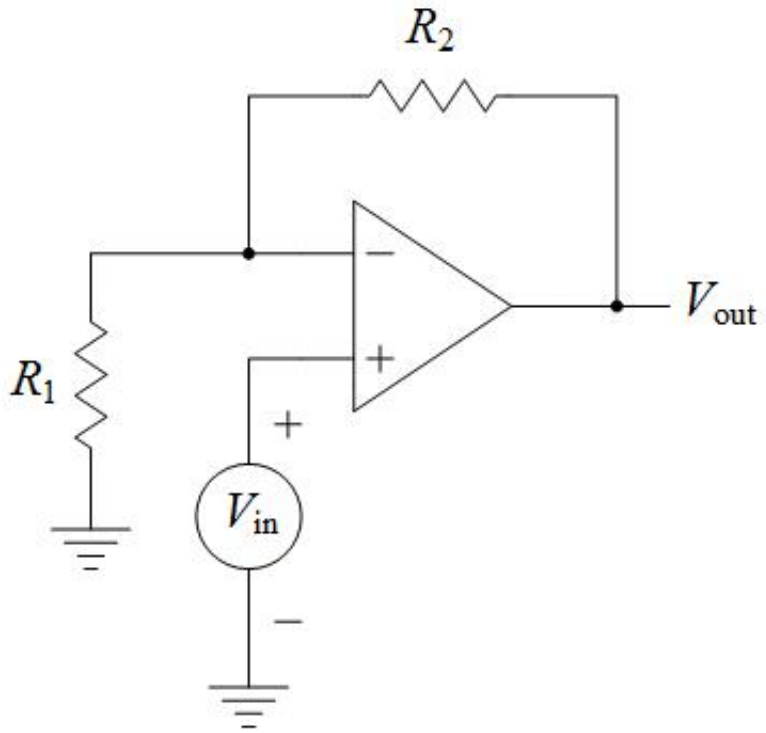
Started on	Thursday, 21 September 2017, 1:07 PM
State	Finished
Completed on	Friday, 22 September 2017, 1:37 PM
Time taken	1 day
Grade	**10.0** out of 10.0 (**100**%)

Question 1

Correct

Mark 2.0 out of 2.0



For the operational amplifier circuit shown, what is the percentage error in the closed-loop voltage gain due to the finite open-loop voltage gain of the opamp? Assume that the opamp has an open-loop voltage gain of 69 V/V, and is ideal in all other respects. Use R1 = 1.9kΩ and R2 = 55.5kΩ.

Answer: -30.21

The correct answer is: -30.45

Correct

Marks for this submission: 2.0/2.0.

Question 2

Correct

Mark 2.0 out of 2.0

The Slew Rate of an integrated circuit opamp is the maximum frequency which the opamp can amplify with a gain larger than one.

Select one:

- True
- False ✓

The correct answer is 'False'.

Correct

Marks for this submission: 2.0/2.0.

Question 3

Correct

Mark 2.0 out of 2.0

Above the -3dB frequency of an integrated circuit opamp, the open-loop voltage gain will :

Select one:

- a. Decrease with decreasing frequency
- b. Be equal to the frequency of the signal divided by the unity gain frequency
- c. Change by 6dB if the frequency changes by an decade
- d. Change by 20dB if the frequency changes by a decade ✓
- e. All of these

The correct answer is: Change by 20dB if the frequency changes by a decade

Correct

Marks for this submission: 2.0/2.0.

Question 4

Correct

Mark 2.0 out of 2.0

The maximum frequency sine wave which an opamp can output at full amplitude without hitting the slew rate limit is called the Full-power Bandwidth.

Select one:

- (•) True ✓
- ( ) False

The correct answer is 'True'.

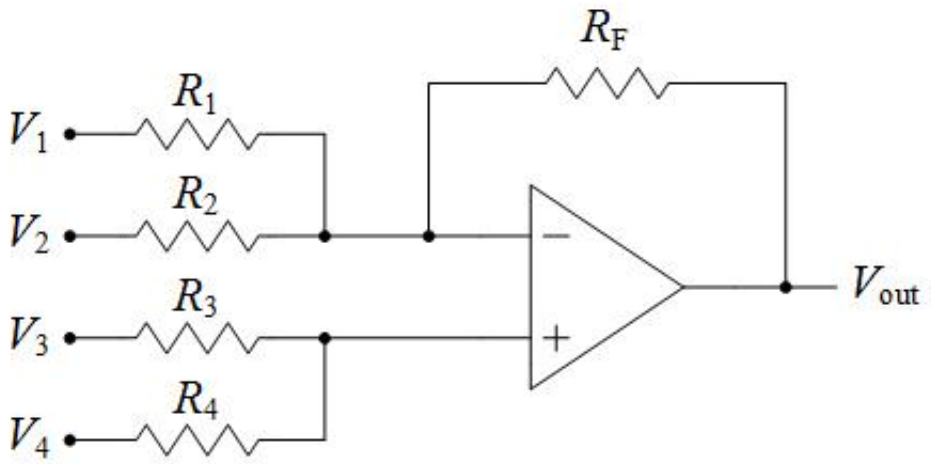
Correct

Marks for this submission: 2.0/2.0.

Question 5

Correct

Mark 2.0 out of 2.0



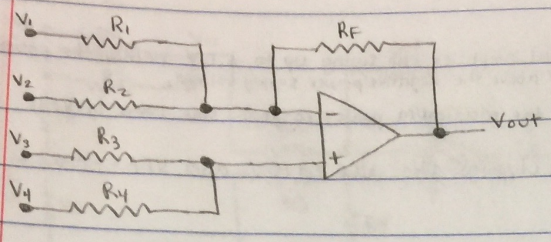
For the operational amplifier circuit shown, what is the output voltage if V1 = 0.106V, V2 = 0.649V, V3 = 0.629V and V4 = 1.122V ? Assume that the opamp is ideal, and use R1 = 9.1kΩ, R2 = 2.6kΩ, R3 = 7.3kΩ, R4 = 6.9kΩ and RF = 3.3kΩ.

Answer: 1.46 ✓

The correct answer is: 1.460

Correct

Marks for this submission: 2.0/2.0.



For the opamp circuit, what is the output voltage if V1 = 0.106V, V_2 = 0.649V, V_3 = 0.629V, and V_4 = 1.122V? Assume the opamp is ideal, and use R1 = 9.1k, R2 = 2.6k, R3 = 7.3k, R4 = 6.9k, and RF = 3.3k

$$\frac{Va - 0.106}{9100} + \frac{Va - 0.649}{2600} + \frac{Va - Vout}{3300} = 0$$

$$Va\left[\frac{1}{9100} + \frac{1}{2600} + \frac{1}{3300}\right] - Vout\left[\frac{1}{3300}\right] = \frac{0.106}{9100} + \frac{0.649}{2600}$$

① $Va[0.000797536] - Vout[0.000030303] = 0.0002612264$

$$\frac{Va - 0.629}{7300} + \frac{Va - 1.122}{6900} = 0$$

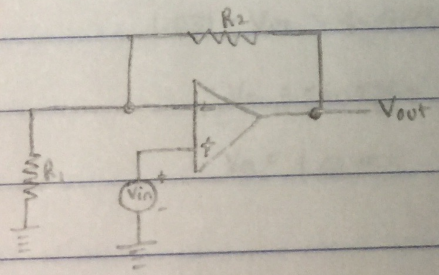
$$Va\left[\frac{1}{7300} + \frac{1}{6900}\right] = \frac{0.629}{7300} + \frac{1.122}{6900}$$

$$Va[0.000281914] = 0.000248773$$

② $Va = \frac{0.000248773}{0.000281914} = 0.8824V$

$(0.8824)(0.797536) - 0.2612264 = Vout[0.30303]$

$\frac{0.442481766}{0.30303} = \boxed{1.46V} = Vout$



For the operational amplifier, what is the percentage error in the closed-loop voltage gain due to the finite open-loop voltage gain of the opamp? Open loop voltage gain 69V/V

R_1 = 1.9kΩ, R_2 = 55.5kΩ

$$-1\left[1 + \left(\frac{R_2}{R_1}\right)\right] = \boxed{-30.21}$$