Started on	Friday, 22 July 2022, 10:05 PM
State	Finished
Completed on	Friday, 22 July 2022, 11:24 PM
Time taken	1 hour 18 mins
Grade	**93.00** out of 106.00 (**88**%)

Question **1**

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 transresistance amplifier
- b. A transconductance amplifier
- c. A current amplifier ✔
- d. A voltage amplifier
- e. None of these

Correct

Marks for this submission: 2.00/2.00.

Question **2**

Correct

Mark 2.00 out of 2.00

A voltage amplifier has :

Select one:

- a. A current input and a voltage output
- b. A voltage input and a voltage output ✔
- c. None of these
- d. A current input and a current output
- e. A voltage input and a current output

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 an AC coupled amplifier with a single high frequency pole?

Select one:

- a. Below the lower corner frequency, the phase of the gain will increase at +45 degrees/decade for one decade as frequency decreases ✔
- b. Above the lower corner frequency, the magnitude of the gain will roll off at -20dB/decade as frequency increases
- c. Below the upper corner frequency, the magnitude of the gain will roll off at -20dB/decade as frequency decreases
- d. Below the upper corner frequency, the phase of the gain will decrease at -45 degrees/decade for one decade as frequency decreases
- e. 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. None of these
- b. Below this pole frequency, the magnitude of the gain will roll off at -20dB/decade as frequency increases
- c. At this pole frequency, the phase of the gain will be +45 degrees above the midband value ✔
- d. At this pole frequency, the magnitude of the gain will be +3dB above the midband value
- e. Below this pole frequency, the phase of the gain will increase at +45 degrees/decade as frequency increases

Correct

Marks for this submission: 2.00/2.00.

Question **5**

Correct

Mark 2.00 out of 2.00

In order to minimize signal loss, a voltage amplifier needs :

Select one:

- a. None of these
- b. A low input resistance and a low output resistance
- c. A high input resistance and a high output resistance
- d. A high input resistance and a low output resistance ✔
- e. A low input resistance and a high output resistance

Correct

Marks for this submission: 2.00/2.00.

Question **6**

Correct

Mark 2.00 out of 2.00

If an instrumentation amplifier has a connection between the resistors in the first stage and ground, then it will suffer from which of the following disadvantages?

Select one:

- a. None of these
- b. The two signal paths in the first stage will be very symmetric
- c. In the first stage the common-mode gain will be just as large as the differential-mode gain ✔
- d. Varying the gain of the first stage will require changing the value of a resistor
- e. The two amplifiers in first stage will have the same gain

Correct

Marks for this submission: 2.00/2.00.

Question **7**

Correct

Mark 2.00 out of 2.00

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

Select one:

- a. Change by 20dB if the frequency changes by a octave
- b. None of these
- c. Be equal to the frequency of the signal divided by the unity gain frequency
- d. Decrease with increasing frequency ✔
- e. Change by 6dB if the frequency changes by an decade

Correct

Marks for this submission: 2.00/2.00.

Question **8**

Correct

Mark 2.00 out of 2.00

Which of the following is one of the ideal opamp assumptions?

Select one:

- a. Ideal opamps have infinite gain for common-mode input signals
- b. All of these
- c. Ideal opamps have zero input resistance
- d. Ideal opamps have zero output resistance ✔
- e. Ideal opamps have zero gain for differential-mode input signals

Correct

Marks for this submission: 2.00/2.00.

Question **9**

Correct

Mark 2.00 out of 2.00

Which of the following is one of the ideal opamp assumptions?

Select one:

- a. Ideal opamps have infinite input resistance ✔
- b. Ideal opamps have infinite gain for common-mode input signals
- c. None of these
- d. Ideal opamps have zero gain for differential-mode input signals
- e. Ideal opamps have infinite output resistance

Correct

Marks for this submission: 2.00/2.00.

Question **10**

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

Correct

Marks for this submission: 2.00/2.00.

Question **11**

Correct

Mark 2.00 out of 2.00

Transconductance amplifiers use a voltage input signal and a current output signal.

Select one:

- True ✔
- False

Correct

Marks for this submission: 2.00/2.00.

Question **12**

Correct

Mark 0.00 out of 2.00

For an AC coupled amplifier with a single low frequency pole, the magnitude of the gain increases at +6dB/octave as the frequency is decreased below the lower corner frequency.

Select one:

- True
- False ✔

Correct

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

Question **13**

Correct

Mark 0.00 out of 2.00

For a DC coupled amplifier with a single high frequency pole, the magnitude of the gain increases at +6dB/octave as the frequency is increased above the corner frequency.

Select one:

- True
- False ✔

Correct

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

Question **14**

Correct

Mark 2.00 out of 2.00

If an amplifier needs a low input resistance and a low output resistance, then it is a transresistance amplifier.

Select one:

- True ✔
- False

Correct

Marks for this submission: 2.00/2.00.

Question **15**

Correct

Mark 2.00 out of 2.00

The model for a current amplifier uses a Thevenin's equivalent circuit at it's output.

Select one:

- True
- False ✔

Correct

Marks for this submission: 2.00/2.00.

Question **16**

Correct

Mark 2.00 out of 2.00

It is usually easy to minimize errors due to the input offset current of an opamp by adding a resistor in the + input terminal, but this still leaves a small error due to the input bias current.

Select one:

- True
- False ✔

Correct

Marks for this submission: 2.00/2.00.

Question **17**

Correct

Mark 2.00 out of 2.00

If the input voltage of an integrated circuit opamp changes too quickly, then the output voltage of the opamp may not be able to keep up and only ramp up linearly at the opamp's slew rate.

Select one:

- True ✔
- False

Correct

Marks for this submission: 2.00/2.00.

Question **18**

Correct

Mark 2.00 out of 2.00

Instrumentation amplifiers provide a much higher input resistance and CMRR than a simple Difference amplifier, but require additional opamps to accomplish this.

Select one:

- True ✔
- False

Correct

Marks for this submission: 2.00/2.00.

Question **19**

Correct

Mark 2.00 out of 2.00

An ideal opamp has zero output resistance.

Select one:

- True ✔
- False

Correct

Marks for this submission: 2.00/2.00.

Question **20**

Correct

Mark 2.00 out of 2.00

Actual integrated circuit opamps typically use internal compensation which causes their voltage gain to roll off at +20db/decade as frequency increases.

Select one:

- True
- False ✔

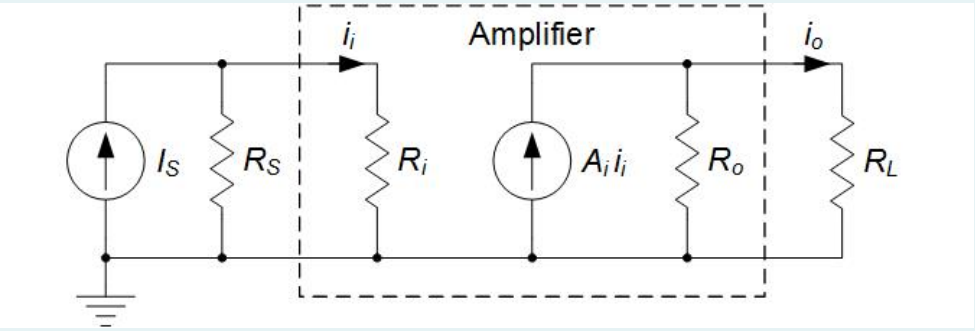
Correct

Marks for this submission: 2.00/2.00.

Question **21**

Correct

Mark 0.00 out of 6.00



What is the value of the current gain in A/A for the amplifier circuit shown? Use Rs = 13.1kΩ, RL = 6.6kΩ, Ri = 12.9kΩ, Ro = 11.6kΩ and Ai = 1926.5 A/A.

Answer: 618.66 ✔

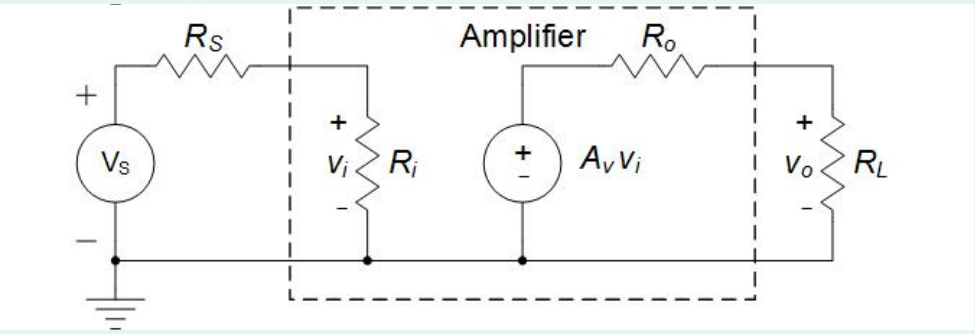
Correct

Marks for this submission: 6.00/6.00. Accounting for previous tries, this gives **0.00/6.00**.

Question **22**

Correct

Mark 6.00 out of 6.00



For the amplifier shown, what is the largest output resistance in kΩ that can be used and still get at least 70 percent of the amplifier's open circuit output voltage = AvVi to appear across RL? Use RL = 97.8kΩ.

Answer: 41.91 ✔

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 0.6V below the positive power supply voltage, and down to 0.7V 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 VCC = +5V and VEE = -5V.

Answer: 8.7 ✔

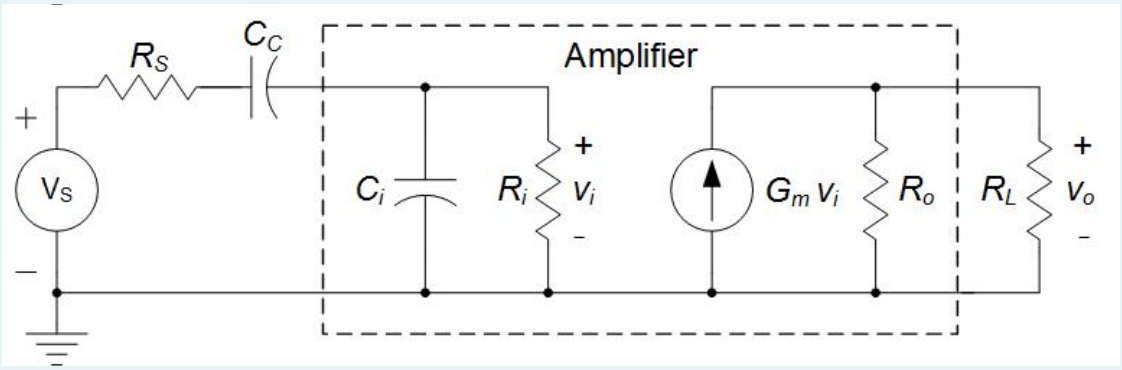
Correct

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 Rs = 1.7kΩ, Ri = 17.2kΩ, Ro = 32.8kΩ, RL = 39.7kΩ, Cc = 271.7pF, Ci = 9.0pF and Gm = 10.3 mA/V.

Answer: 1860.61 ✔

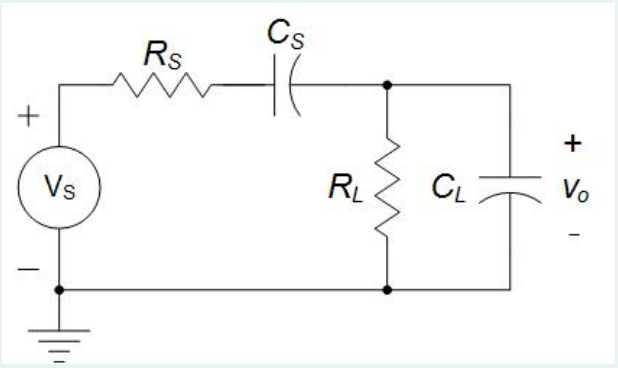
Correct

Marks for this submission: 6.00/6.00.

Question **25**

Correct

Mark 6.00 out of 6.00



For the filter circuit shown, what is the magnitude of the transfer function Vo/Vs at midband frequencies? (Note: Midband refers to frequencies that are well above the low frequency pole and also well below the high frequency pole.) Use Rs = 7.2kΩ, RL = 15.2kΩ, Cs = 235.5pF and CL = 6.0pF.

Answer: 0.68 ✔

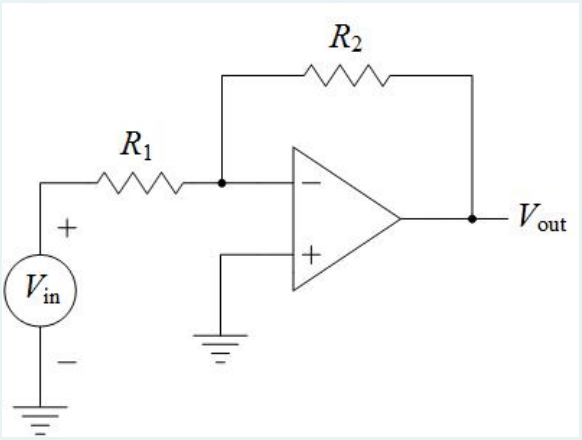
Correct

Marks for this submission: 6.00/6.00.

Question **26**

Correct

Mark 6.00 out of 6.00



What is the output resistance in kilohms for the operational amplifier circuit shown? Assume that the opamp is ideal, and use R1 = 4.0kΩ and R2 = 90.0kΩ.

Answer: 0 ✔

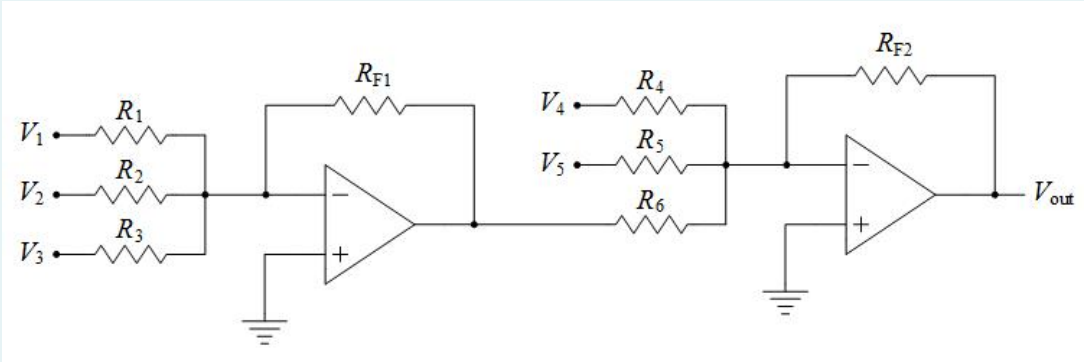
Correct

Marks for this submission: 6.00/6.00.

Question **27**

Correct

Mark 6.00 out of 6.00



What is the voltage gain in V/V from the V3 input to the output for the operational amplifier circuit shown? Assume that the opamp is ideal, and use R1 = 8.3kΩ, R2 = 9.8kΩ, R3 = 5.9kΩ, R4 = 4.8kΩ, R5 = 2.4kΩ, R6 = 8.6kΩ, RF1 = 9.6kΩ and RF2 = 4.2kΩ.

Answer: 0.79 ✔

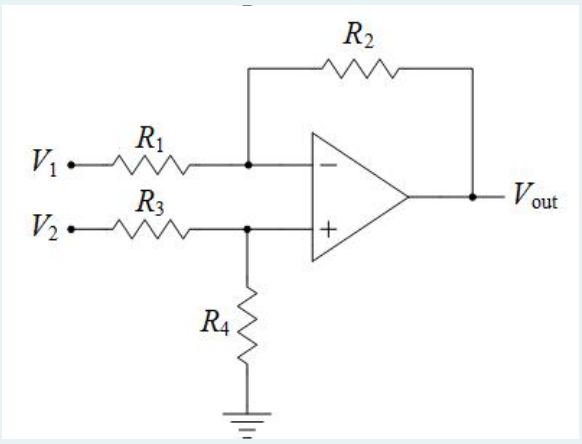
Correct

Marks for this submission: 6.00/6.00.

Question **28**

Correct

Mark 6.00 out of 6.00



What is the differential-mode input resistance, Ridm, in kilohms that is seen by the differential input voltage, Vidm = V2-V1 ? Assume that the opamp is ideal, and use R1 = R3 = 6.6kΩ and R2 = R4 = 7.9kΩ.

Answer: 13.2 ✔

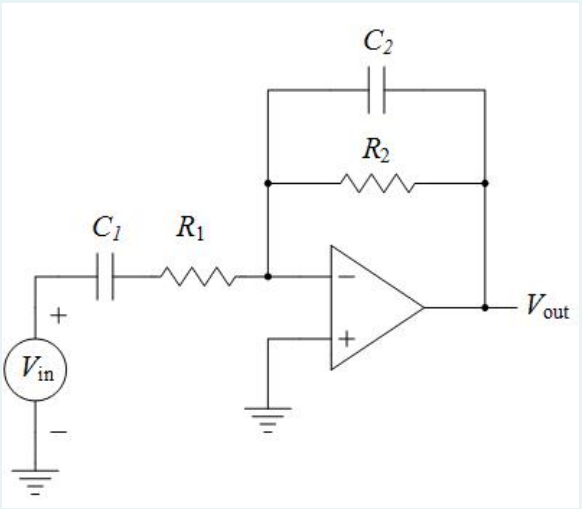
Correct

Marks for this submission: 6.00/6.00.

Question **29**

Correct

Mark 6.00 out of 6.00



For the operational amplifier circuit shown, what is the phase of the voltage gain in degrees at a frequency of 3.5MHz? Assume that the opamp is ideal, and use R1 = 1.2kΩ, R2 = 45.5kΩ, C1 = 2.7pF and C2 = 3.3pF.

Answer: -167.2 ✔

Correct

Marks for this submission: 6.00/6.00.

Question **30**

Correct

Mark 6.00 out of 6.00

If the full-power bandwidth is 108.1 kHz for an operational amplifier with a maximum output voltage swing of ± 10.1 V, then what is the slew-rate for this opamp in V/µsec?

Answer: 6.86 ✔

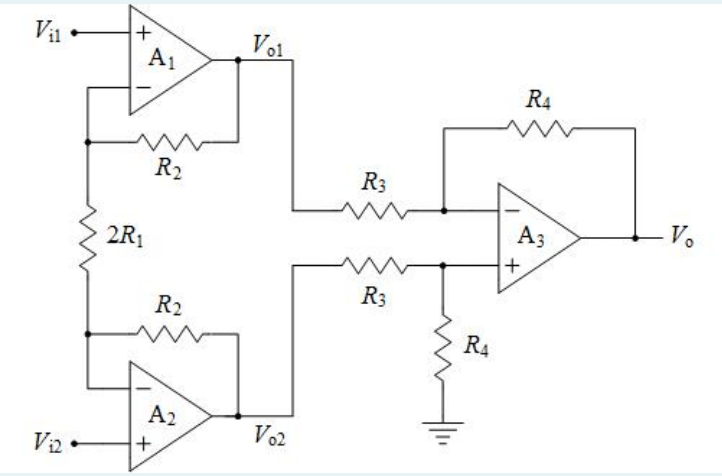
Correct

Marks for this submission: 6.00/6.00.

Question **31**

Correct

Mark 3.00 out of 6.00



For the operational amplifier circuit shown, what is the common-mode voltage gain in V/V from the common-mode input voltage, Vicm = (Vi2+Vi1)/2, to the common-mode output voltage of the first stage, Vocm1 = (Vo2+Vo1)/2 ? Assume that all the opamps are ideal, and use R1 = 5.1kΩ, R2 = 67.2kΩ, R3 = 4.4kΩ and R4 = 29.0kΩ.

Answer: 1 ✔

Correct

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

◄ Quiz 8 - BJT and MOS amplifiers

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Midterm Exam II ►