Week 9 Assignment 9

The due date for submitting this assignment has passed. Due on 2018-03-28, 23:59 IST.

Submitted assignment

Refer into the datasheets provided below:
LM741 Datasheet
MC1536 Datasheet
LM101A Datasheet

1) The voltage $V_o$ indicated in figure has been measured by an ideal voltmeter, which of the following can be calculated?

- Bias current of the non-inverting inputs only
- Both the bias currents and the input offset currents
- Bias current only
- Input offset current only

No, the answer is incorrect.
Score: 0

Accepted Answers:
Input offset current only

2) In continuation to question 1, comment on the effect of 1 MΩ at the feedback node.

- None of them
- The op-amp suffers due to shot noise
- Increase in noise due to low resistance
- Increase in noise due to high resistance

No, the answer is incorrect.
Score: 0

Accepted Answers:
Increase in noise due to high resistance

3) The LM741 op-amp is used to build the circuit shown. Consider the op-amp is suffering only from the input bias currents and compute the output voltage for maximum bias currents at a temperature of 25°C.

NOTE: Refer the datasheet

- 500 mV
- 50 µV
- 0.5 mV
- 5 mV

No, the answer is incorrect.
Score: 0

Accepted Answers:
5 mV

4) In continuation to question 3, given a modified circuit. Consider both maximum input bias current and offset current exists. Then calculate the new output voltage for maximum offset and bias currents at a temperature of 25°C.

Rom- offset minimizing resistor
NOTE: Refer the datasheet

- 50 µV
5) What is the value of R1 resistor in the previous circuit?
   - 909 Ω
   - 1 kΩ
   - 10 kΩ
   - 100 kΩ

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   - 909 Ω

6) For MC1536 practical op-amp. Refer the datasheet and determine the value of Voib-V1 for the given circuit. 
   Voib = The output offset voltage due to input bias current
   - 4.99 mV
   - 0.2 µV
   - 0.5 mV
   - -50 mV

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   - 0.5 mV

7) In continuation to question 5, analyse the given circuit and determine the correct option.
   Voo = The output offset voltage due to input offset voltage
   - Voo > Voib
   - Voo < Voib
   - Voo = Voib

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   - Voo > Voib

8) If the gain of the LM741 non-inverting amplifier is 12 and feedback resistor is 18 kΩ, then compute the output voltage for maximum bias currents at a temperature of 25°C.
   NOTE: Refer the datasheet.
   - 7 mV
   - -8.9 mV
   - 9 mV
   - -7.9 mV

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   - 9 mV

9) If an op-amp has a larger feedback resistance, what will be the effect on the output voltage due to the presence of very small input bias current.
   - Output voltage decreases
   - Output voltage has no effect
   - Output voltage increases

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   - Output voltage increases

10) Find out the correct statements
    - Input bias current is measured by connecting inverting and non-inverting terminals of an op-amp to ground
    - Input bias current is measured by applying 5 V at the inverting terminal of an op-amp
    - Input bias current is measured by connecting +Vcc and -Vcc (power supply pins) of an op-amp to ground
    - Input bias current is measured by applying 5 V at the non-inverting terminal of an op-amp
No, the answer is incorrect.
Score: 0
Accepted Answers:
Input bias current is measured by connecting inverting and non-inverting terminals of an op-amp to ground

1) A non-inverting amplifier with a gain of 40 dB is nulled at 25°C. What will happen to the output voltage if the temperature rises to 40°C?

- 0.11 mV
- 1.10 mV
- 1.65 mV

No, the answer is incorrect.
Score: 0
Accepted Answers:
165 mV

2) Calculate the maximum output voltage of an op-amp shown below, if the op-amp has $V_{in} = 5$ mV, $I_{ib} = 500$ nA, $R_1 = 1$ kΩ and $R_{om} = 909$ Ω.

- $0$ V
- 54.9 mV
- 20.8 mV
- 57 mV

No, the answer is incorrect.
Score: 0
Accepted Answers:
54.9 mV

3) If the op-amp in the figure has an input offset current of 30 nA, calculate the differential input voltage?

- $0$ V
- 30 µV
- 0.3 V
- 30 V

No, the answer is incorrect.
Score: 0
Accepted Answers:
30 µV

4) An LM101A op-amp has $I_{io} = 1.5$ nA. If $I_{b1}$ and $I_{b2}$ are the input bias currents at inverting and non-inverting input terminals respectively.

- $I_{io}$ and $I_{b2}$ may be equal to 1.5 nA
- $I_{b1}$ may be larger than $I_{b2}$ by 1.5 nA
- $I_{b2}$ may be larger than $I_{b1}$ by 1.5 nA
- All of the mentioned

No, the answer is incorrect.
Score: 0
Accepted Answers:
All of the mentioned

5) The LM101A op-amp with $V_{in} = 7$ mV, $I_{io} = 1.5$ nA, $I_{ib} = 25$ nA. Compute the value of total output voltage $V_{o+}$.

- $-0.75$ V
- 8.5 V
- $-0.69$ V
- 1.4 V

No, the answer is incorrect.
Score: 0
Accepted Answers:
$-0.69$ V