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Courses » Electronic Modules for Industrial Applications using Op-Amps

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Unit 2 - Introduction to Op-Amps

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Course outline

How to access
the portal

Introduction to Op-Amps

- Quiz : Week 0 Assignment
- Introduction to Op-amp
- Introduction Wafer Manufacturing Process and Clean room Protocols
- Introduction to Fabrication Process Technology and Op-amp
- Op-amp Characteristics and Datasheet Parameters
- Overview of Active Filters and Oscillators
- Overview of Op-amp Oscillators

Week 1 Assignment

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2019-03-13, 23:59 IST.**

1) The input impedance of an op-amp is higher for **1 point**

- Inverting Amplifier
- Difference Amplifier
- Voltage Follower
- None of the mentioned

No, the answer is incorrect.

Score: 0

Accepted Answers:
Voltage Follower

2) If a sine wave is given as input to the circuit shown, then the output will be **1 point**

- Triangular Wave
- Square Wave
- Half wave rectified sine wave
- Full wave rectified sine wave

No, the answer is incorrect.

Score: 0

Accepted Answers:
Square Wave

3) Let us consider an op-amp having a slew rate of $3V/\mu S$. Compute an undistorted peak-peak output voltage for an input sine wave of 2 MHz frequency **1 point**

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<p>Solution</p> <hr/> <p>Experiment: Op-amp based ECG Signal Acquisition, Conditioning and Processing for Computation of BPM</p>	<p>Score: 0</p> <p>Accepted Answers: 0.477 V</p> <p>4) Consider an op-amp with input offset voltage of 10 mV. Given $R_1 = 2 \text{ k}\Omega$ and $R_2 = 6 \text{ M}\Omega$, then calculate the output voltage V_{out}. 1 point</p> <p> <input type="radio"/> 30 V <input type="radio"/> 0 V <input type="radio"/> $\pm 10 \text{ mV}$ <input type="radio"/> - 0.5 V </p> <p>No, the answer is incorrect. Score: 0</p> <p>Accepted Answers: 30 V</p>
<p>Photolithography (Heart of Microengineering Process), Understanding Atrial Fibrillation, Catheter Ablation Procedure and Experiment on ECG Signal Conditioning</p>	<p>5) Select the correct op-amp when working with high input source resistance 1 point</p> <p> <input type="radio"/> Op-amp with low bias current <input type="radio"/> Op-amp with higher slew rate <input type="radio"/> Buffer or voltage follower <input type="radio"/> All the mentioned </p> <p>No, the answer is incorrect. Score: 0</p> <p>Accepted Answers: All the mentioned</p>
<p>Sensors for measuring ETM properties of tissues, Experiment: DC Motor Speed Control using Op-amp (Part I)</p>	<p>6) Consider $R_1 = 1 \text{ k}\Omega$, $R_2 = 2 \text{ k}\Omega$, $R_3 = 4 \text{ k}\Omega$, $R_f = 8 \text{ k}\Omega$, $V_1 = 4 \text{ V}$, $V_2 = 2 \text{ V}$ and $V_3 = 1 \text{ V}$ respectively. Compute the output voltage V_o for the circuit shown 1 point</p> <p> <input type="radio"/> - 42 V <input type="radio"/> 42 V <input type="radio"/> 22 V <input type="radio"/> - 22 V </p> <p>No, the answer is incorrect. Score: 0</p> <p>Accepted Answers: - 42 V</p>
<p>Experiment on DC Motor Speed Control using Op-amp (Part II)</p> <p>DC Speed Control using DAQ and Introduction to Hot-Wire Anemometer</p>	<p>7) Which is the necessary condition of gain while designing Wien bridge oscillator to ensure the sustained oscillations? 1 point</p> <p> <input type="radio"/> $A \geq 29$ <input type="radio"/> $A \geq 3$ <input type="radio"/> $A \geq 1$ <input type="radio"/> None of the options </p> <p>No, the answer is incorrect. Score: 0</p> <p>Accepted Answers:</p>
<p>Introduction to Gas Sensors and Experiment on Signalconditioning Circuit for Operating Heater Voltage of MQ-7 Gas Sensor</p>	
<p>Electrophysiological Recordings from the Human Body and its Applications, Experiment using Data Acquisition device and simulation of MEMS sensors</p>	

Interaction
Session $A \geq 3$

8) A tuned amplifier has peak output at 3 MHz and quality factor 40. **1 point**
The bandwidth and 3-dB frequencies shall be at what values respectively?

- 75 kHz, 3.04 MHz, 2.96 MHz
- 75 kHz, 2.04 MHz, 1.96 MHz
- 800 kHz, 3.04 MHz, 1.96 MHz
- 80 kHz, 2.08 MHz, 1.92 MHz

No, the answer is incorrect.

Score: 0

Accepted Answers:

75 kHz, 3.04 MHz, 2.96 MHz

9) Given $V_i = 5 \sin \omega t$, $C_1 = 30 \text{ nF}$, $C_2 = 10 \text{ nF}$, $R_1 = 20 \text{ k}\Omega$ and $R_2 = 10 \text{ k}\Omega$. **1 point**
Calculate the lower cut-off frequency (ω_L) and higher cut-off frequency (ω_H)

- $\omega_H = 1 \text{ kHz}$ and $\omega_L = 10 \text{ kHz}$
- $\omega_L = 1.67 \text{ kHz}$ and $\omega_H = 10 \text{ kHz}$
- $\omega_L = 3.7 \text{ kHz}$ and $\omega_H = 100 \text{ kHz}$
- $\omega_H = 2.04 \text{ kHz}$ and $\omega_L = 1 \text{ kHz}$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\omega_L = 1.67 \text{ kHz}$ and $\omega_H = 10 \text{ kHz}$

10) Select the correct option for a phase shift oscillator **1 point**

- A phase shift oscillator uses a voltage follower as an amplifier with a phase shifting network
- It can be constructed only with op-amps
- Op-amp with any gain and a feedback phase shifting network is enough to act as a phase shift oscillator
- None of the mentioned

No, the answer is incorrect.

Score: 0

Accepted Answers:

None of the mentioned

11) What will be the output of a difference op-amp when the voltages **1 point**
connected to the both input terminals are same?

- The output will be zero
- The output voltage will be saturated
- The output voltage will be nearly equal to zero but not zero
- None of the mentioned

No, the answer is incorrect.

Score: 0

Accepted Answers:

The output voltage will be nearly equal to zero but not zero

12) Which oscillator uses two inductors and 1 capacitor in the tank **1 point**
circuit?

- Hartley Oscillator
- Colpitts Oscillator
- Wein Bridge Oscillator
- None of the mentioned

No, the answer is incorrect.

Score: 0

Accepted Answers:

Hartley Oscillator

13 Given the stages of the op-amp, arrange them in an appropriate order. Consider the flow from input stage to output stage **1 point**

1. Differential amplifier stage
2. Level shifting stage
3. Impedance matching stage
4. Voltage gain stage

- 1, 4, 2, 3
- 1, 2, 3, 4
- 2, 1, 4, 3
- 4, 3, 2, 1

No, the answer is incorrect.

Score: 0

Accepted Answers:

1, 4, 2, 3

14 Calculate the maximum output voltage of an op-amp shown below, if **1 point** the op-amp has $V_{os} = 10 \text{ mV}$ and $I_B = 300 \text{ nA}$

- 0 mV
- 55 mV
- 220 mV
- 110 mV

No, the answer is incorrect.

Score: 0

Accepted Answers:

110 mV

15 Calculate the maximum output voltage of an op-amp for the circuit **1 point** shown in Question 14, if the op-amp has $V_{os} = 10 \text{ mV}$, $I_B = 300 \text{ nA}$ and input offset current (I_{OS}) = 55 nA

- 0 mV
- 110.55 mV
- 110 mV
- 0.12 mV

No, the answer is incorrect.

Score: 0

Accepted Answers:

110.55 mV

