Name: _____ Roll No: _____

Pre-lab Quiz for EE Expt 2 / Sample Set

Duration: 10 min. Marks: 5 × 1 mark = 5 marks. No partial marks for any of the questions. Do your rough work in this paper itself. No extra sheets will be given. No clarifications/explanations will be given.

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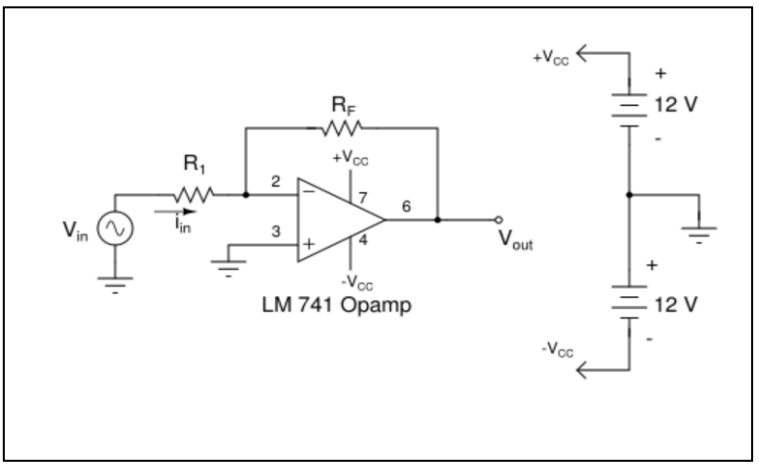
1) The inverting amplifier circuit of Expt 2 is shown in the figure, Given: $v_{in}(t) = 0.5 \sin(\omega t + \theta)$ V of frequency 1 kHz, $R_1 = 4$ kΩ, $R_F = 1$ kΩ . Mark **all the correct options** with regard to this circuit.



A) The voltage gain is –4.

B) The voltage gain is –0.25.

C) V_{in} is a differential signal, and V_{out} is a single-ended signal.

D) V_{in} is a single-ended signal, and V_{out} is also a single-ended signal.

E) The input resistance (V_{in}/I_{in}) is 4 kΩ.

F) The input resistance (V_{in}/I_{in}) is 1 kΩ.

G) The circuit qualifies as an amplifier because it can provide a power gain larger than unity.

H) The circuit qualifies as an amplifier because the output voltage amplitude is larger than the input voltage amplitude.

Answer(s): _____

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2) In the circuit shown above, $R_1 = 2$ kΩ, $R_F = 20$ kΩ . Assume that the v_{out} limits are $+V_{cc}$ and $-V_{cc}$. Mark **all the correct options** with regard to this circuit.

A) The input $v_{in}(t)$ is a triangular wave going from −2 V to + 2V. The output $v_{out}(t)$ will also be a triangular wave.

B) The input $v_{in}(t)$ is a square wave with the maximum and minimum levels of +2 V and −2 V. The output $v_{out}(t)$ will be a square wave with the maximum and minimum levels of +20 V and −20 V.

C) The input $v_{in}(t)$ is a square wave with the maximum and minimum levels of +2 V and −2 V. The output $v_{out}(t)$ will be a square wave with the maximum and minimum levels +12 V and −12 V.

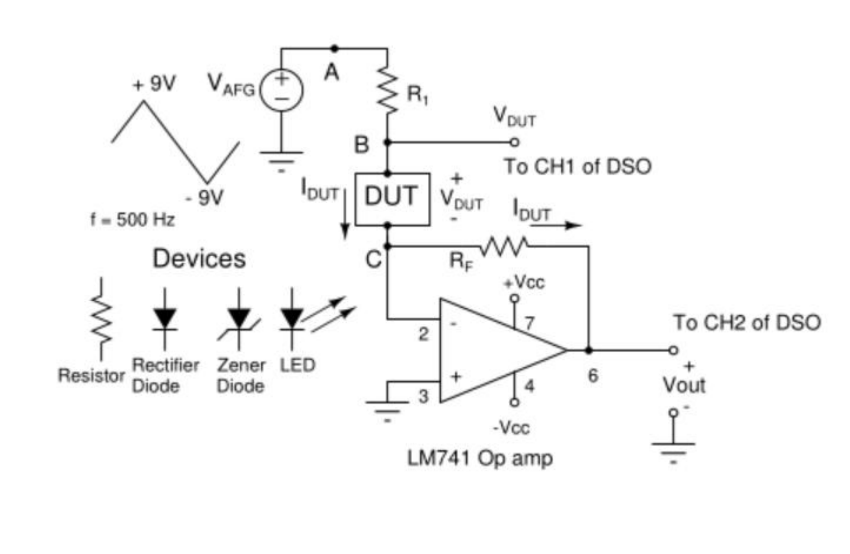
D) If the connections to the op amp input terminals are interchanged, the circuit will not work as a linear amplifier.

E) If the connections to the op amp input terminals are interchanged, the circuit will work as a non-inverting amplifier.

Answer(s): _____

3&4) The current-to-voltage converter circuit of Expt 2 is shown in the figure. Given: R_1 = 10 kΩ, R_F = 20 kΩ, $+V_{cc}$ = +12 V, $-V_{cc}$ = −12 V.

A rectifier diode is connected as the device-under-test (DUT) with its cathode at terminal B and anode at terminal C. The diode I-V characteristic has a forward voltage drop of 0.6 V, and negligible reverse saturation current. Calculate the current through the device (I_{DUT}) and the voltage across it (V_{DUT}) at the instant when V_{AFG} = +5.6 V.



I_{DUT} = __________ mA

V_{DUT} = _________ V

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5) In the circuit shown above, R_1 = 10 kΩ, R_F = 20 kΩ, $+V_{cc}$ = +12 V, $-V_{cc}$ = −12 V. A resistor of 2 kΩ is connected across the nodes B and C as the device-under-test (DUT). Calculate output voltage (V_{out}) at the instant when V_{AFG} = −3 V.

V_{out} = __________ V

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