

PURDUE UNIVERSITY NORTH CENTRAL

Electrical & Computer Engineering Technology Department

ECET 157 (Prof. Smith)

PRE-TEST #2

Spring, 2009

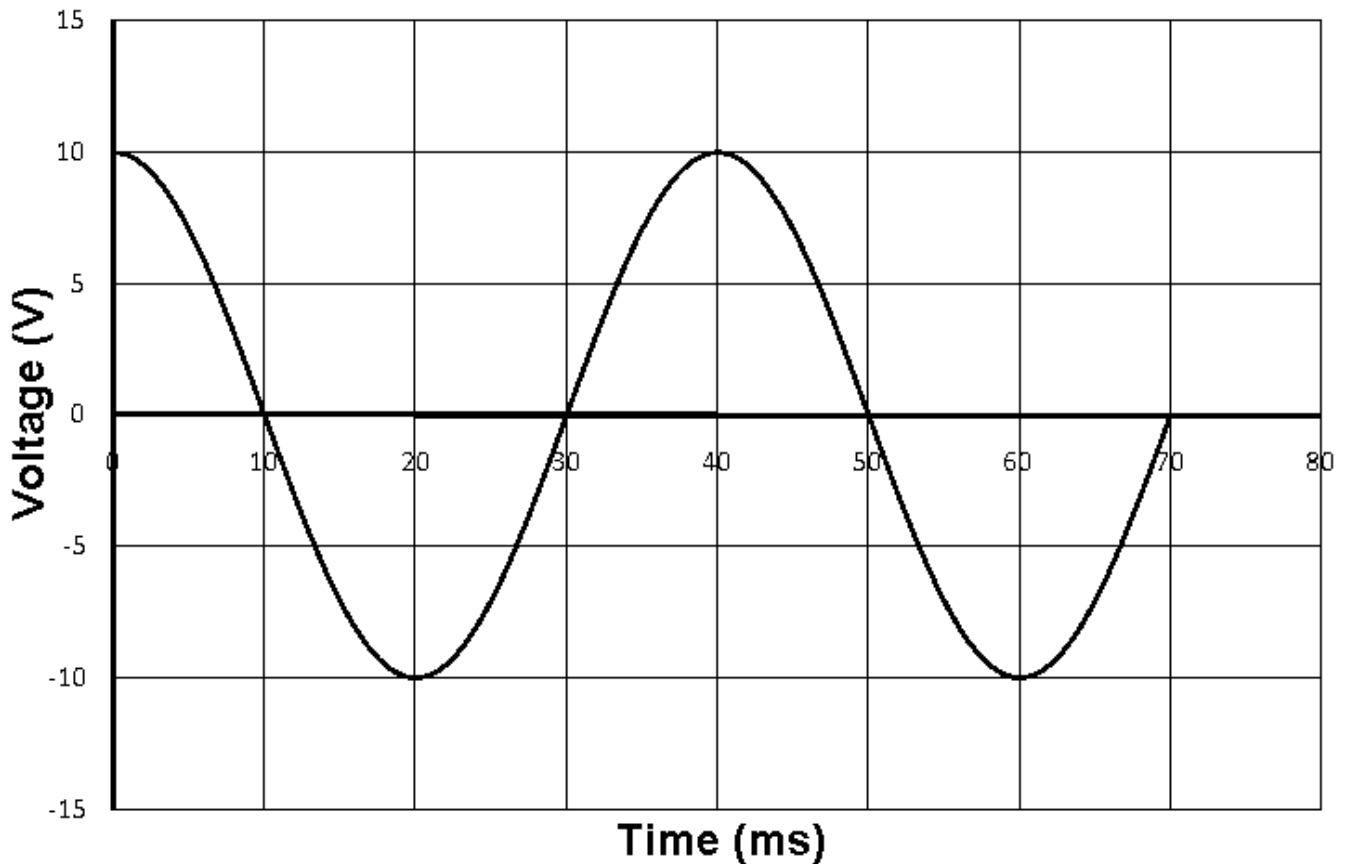
NAME: _____

Part I - - Sinusoidal Waveforms.

1. For the signal below, determine the following. $V_{dc} =$ _____ $V_{ampl} =$ _____
offset
- $V_{rms} =$ _____ $V_{pk} =$ _____ $V_{p-p} =$ _____ $V_{ave} =$ _____
- $f =$ _____ Hz period = _____ phase shift = _____ ° $\omega =$ _____ rad/s

Write the time domain equation for the signal. $v(t) =$ _____

Write the phasor notation for the signal. $\bar{V} =$ _____ \angle _____ °



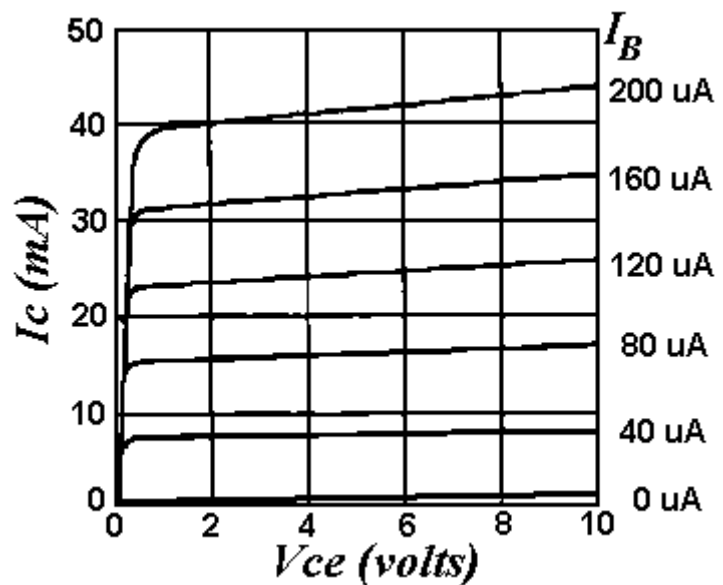
Part II - - True-False, Multiple-Choice and Short-Answer Questions.

NOTE: You should be familiar with all the True/False and Multiple-Choice questions from Pre-Test #1 and Test #1.

2. Name the three primary characteristics of op amps and tell why each is important.
3. Explain what Input Offset Voltage (V_{IO}) is and how it might affect an op amp circuit's operation.
4. Explain what Input Bias Current (I_B) is and how it might affect an op amp circuit's operation.
5. Explain what Input Offset Current (I_{OS}) is and how it might affect an op amp circuit's operation.
6. Explain the difference between Input Bias Current (I_B) and Input Offset Current (I_{OS}).
7. Explain what Slew Rate is and how it might affect an op amp circuit's operation.

Part III - - Circuits.

8. Refer to the characteristic curve shown.
 - (a) Pick a reasonable V_{CC} and $I_C(\max)$ and label these on the plot.
 - (b) Pick a Q-point & label it.
 - (c) Calculate the β .
 - (d) Calculate the α .
 - (e) Draw the universal-bias circuit.
 - (f) Calculate R_a , R_b , R_c and R_e and label these values on your circuit. (Use the approximate method.)
 - (g) Calculate I_B , I_C and I_E .
 - (h) Calculate the AC gain.



9. Draw an op amp Voltage Follower circuit. Assume that the op amp is ideal and attach a $5-V_{PK}$ sinewave source at the input. Sketch both this input and the output on the same graph, labelling which signal is which.
10. Draw an op amp Non-Inverting Amplifier circuit with a gain of ten. Assume that the op amp is ideal and attach a $5-V_{PK}$ sinewave source at the input. Sketch both this input and the output on the same graph, labelling which signal is which.
11. Draw an op amp Inverting Amplifier circuit with a gain of ten. Assume that the op amp is ideal and attach a $5-V_{PK}$ sinewave source at the input. Sketch both this input and the output on the same graph, labelling which signal is which.