

## Period and Frequency (21:28)

Determine the frequency of a rotor driven at 3600rpm.

Determine the period of 1 full revolution of a rotor driven at 3600rpm.

Illustrate the relationship of frequency and period.

Given the following data, determine the missing properties:

|           |   |   |
|-----------|---|---|
| n=1800rpm | f | T |
| f=50Hz    | n | T |
| T=12ms    | n | F |

Given a generator with a 50Hz frequency and a peak value of 325.3V determine voltage and time at: 90°, 180°, 270°, 360°

Identify the easiest, most recognizable points on the sine wave to calculate the period.

Given a generator with a 50Hz frequency and a 325.3V peak value determine the voltage and angle 2.8ms into a revolution.

Given a generator with a 50Hz frequency and a 325.3V peak value express voltage output as a function of time. Identify a general format for sinusoidal voltage as a function of time.

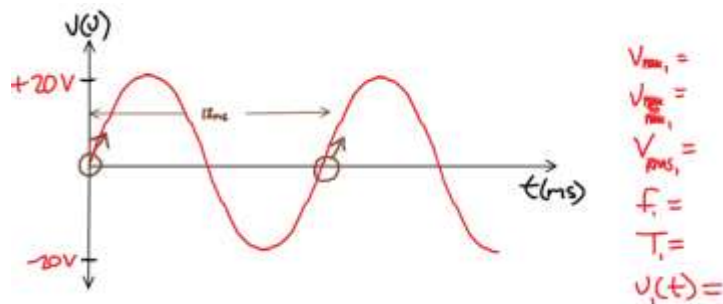
For the expressions  $v(t) = \text{peak} \cdot \sin(360^\circ \cdot t/T)$  and  $v(t) = \text{peak} \cdot \sin(360^\circ \cdot f \cdot t)$  explain the unit conversion occurring inside the parenthesis.

Given  $v(t) = 325.3V \sin(360^\circ \cdot 50 \cdot t)$  determine output voltage at  $t=3.5\text{ms}$ .

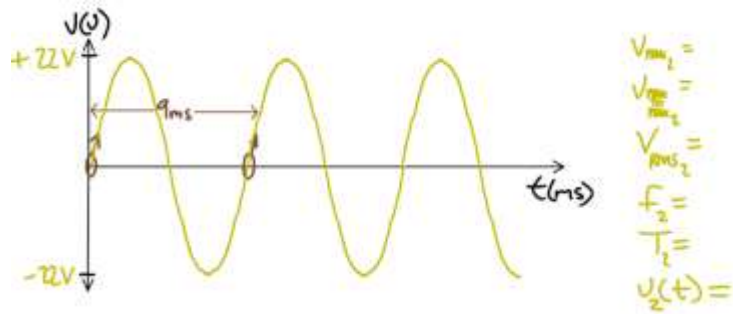
Given the following data, determine the instantaneous voltage at the specified times:

|          |                                   |                     |
|----------|-----------------------------------|---------------------|
| f=60Hz   | $V_{\text{PEAK}} = 169.7V$        | $v(2.2\text{ms}) =$ |
| T=12ms   | $V_{\text{PEAK}} = 59.4V$         | $v(8\text{ms}) =$   |
| f=150Hz  | $V_{\text{RMS}} = 24V$            | $v(1.3\text{ms}) =$ |
| f=1.2kHz | $V_{\text{PEAK TO PEAK}} = 70.5V$ | $v(1.5\text{ms}) =$ |

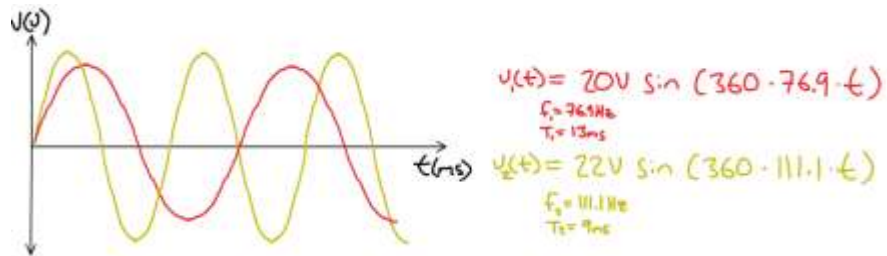
Given the following graphical information determine the desired properties for  $v_1(t)$



Given the following graphical information determine the desired properties for  $v_2(t)$



Comment on the differences between  $v_1(t)$  and  $v_2(t)$  when displayed on the same plot using the same scale.



Determine the instantaneous values of the above functions  $v_1(t)$  and  $v_2(t)$  at 16ms. Calculate the instantaneous differential between these two functions at 16ms. Comment on moments when there is no instantaneous differential between these two functions.