Department of ECE, Bennett University

EECE105L: Fundamentals of Electrical and Electronics Engineering

Tutorial Sheet-8

1. Consider the signals given in (a) - (g). In each case, two waves $f(t)$ and $g(t)$ are described by corresponding equations. From the wave equations, find which wave leads and which wave lags. Also find the angle of leading/lagging.

$$f(t)=10\sin\left(\omega t+30^0\right)$$
$$g(t)=10\sin\left(\omega t+40^0\right)$$ (a)

$$f(t)=10\sin\left(\omega t+20^0\right)$$
$$g(t)=10\sin\left(\omega t-80^0\right)$$ (b)

$$f(t)=10\sin\left(\omega t-20^0\right)$$
$$g(t)=10\cos\left(\omega t+80^0\right)$$ (c)

$$f(t)=-10\sin\left(\omega t+20^0\right)$$
$$g(t)=10\sin\left(\omega t-80^0\right)$$ (d)

$$f(t)=10\sin\left(\omega t-20^0\right)$$
$$g(t)=-10\sin\left(\omega t+80^0\right)$$ (e)

$$f(t)=-A\sin\left(\omega t+\theta\right)$$
$$g(t)=B\cos\left(\omega t-\phi\right)$$ (f)

$$f(t)=A\sin\left(\omega t+\theta\right)$$
$$g(t)=B\sin\left(\omega t+\phi\right)$$ (g)

2. Consider the wave form shown in fig. 1 through fig. 4. Answer the following questions.
   a. Peak value, peak amplitude, peak to peak value
   b. Average value and RMS over one period
   c. Average value over half period

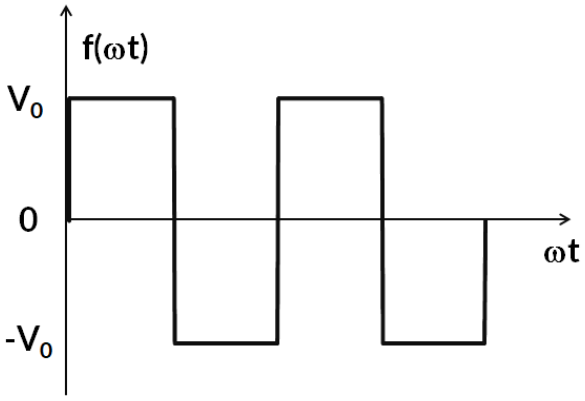

Fig. 1

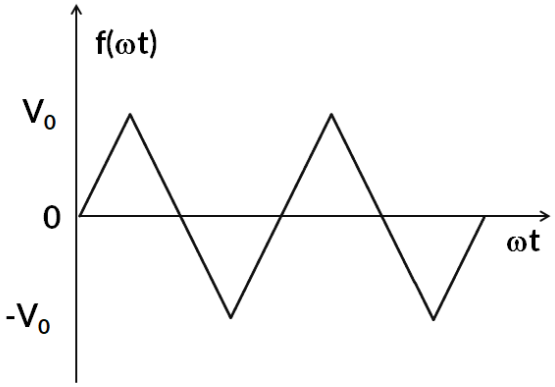

Fig. 2

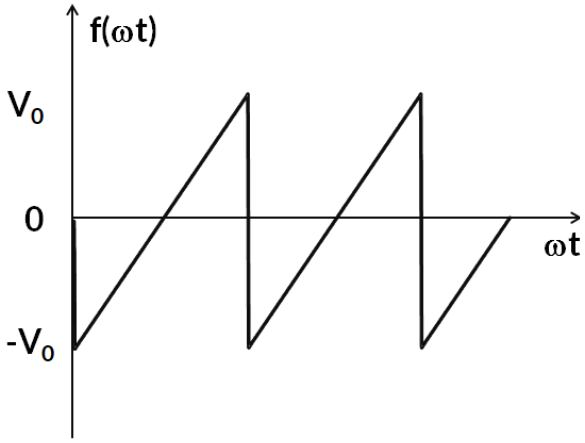

Fig. 3

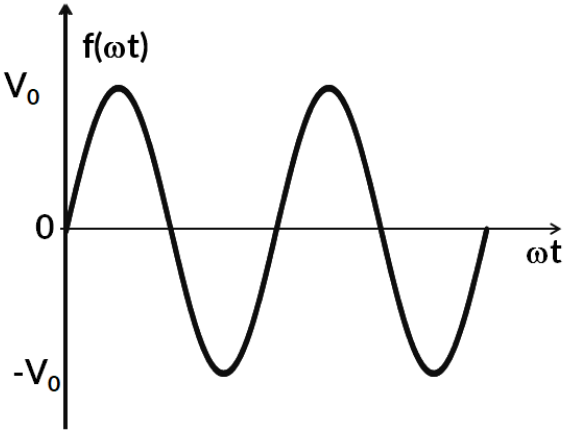

Fig. 4

3. Consider the signals shown in fig. 5 through fig. 8. Evaluate
   a. Peak value, peak amplitude, peak to peak value
   b. Over one period, find average value and RMS value

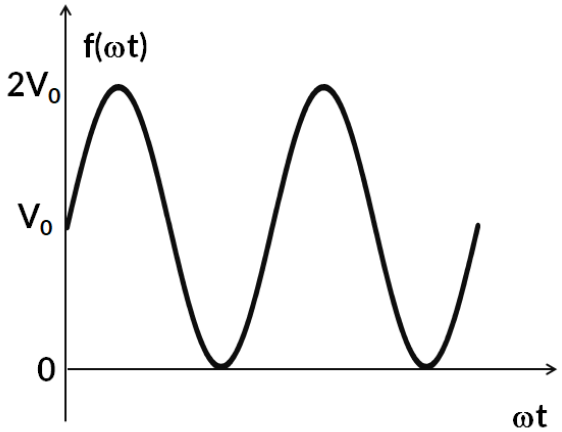

Fig. 5

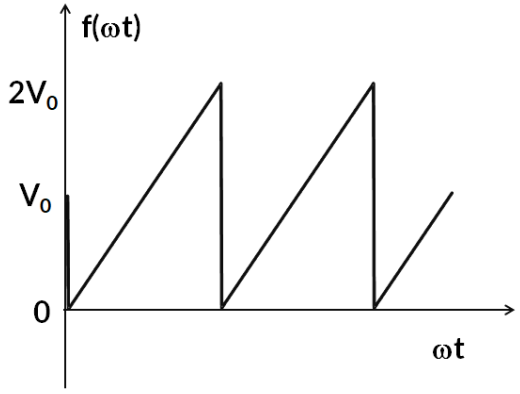

Fig. 6

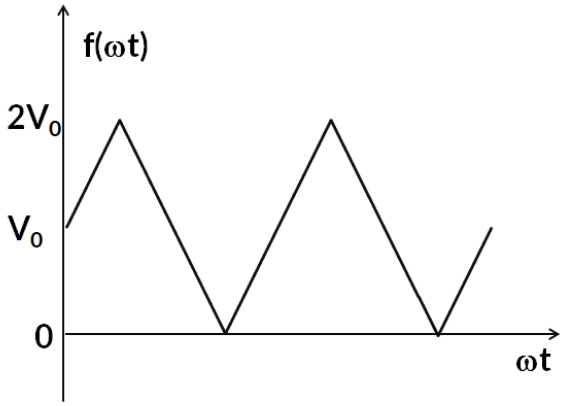

Fig. 7

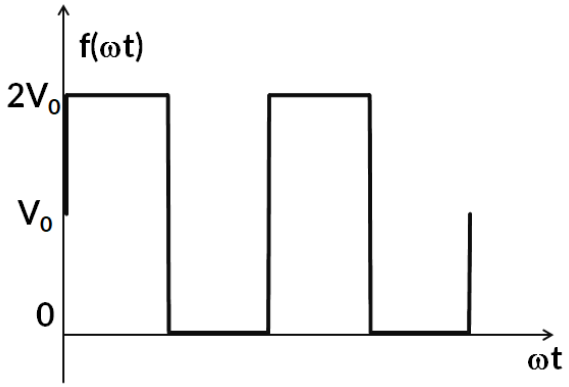

Fig. 8

4. For the waveforms shown in fig. 9 and 10. Evaluate
   a. Peak value, peak amplitude, peak to peak value
   b. Over one period, find average value and RMS value

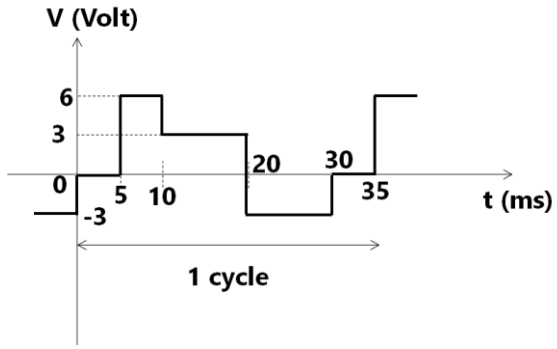

Fig. 9

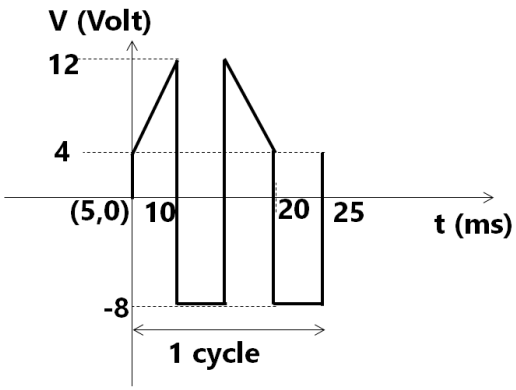

Fig. 10

---------- END OF QUESTIONS ----------

Answers:

Q. 1: No answers are provided, as answer is the complete solution.

Q. 2:

	Peak value	Peak amplitude	Peak to peak value	Average value over one period	RMS Value over one period	Average value over half period
Fig. 1	V_0	V_0	$2V_0$	0	V_0	V_0
Fig. 2	V_0	V_0	$2V_0$	0	$V_0/\sqrt{3}$	$V_0/4$
Fig. 3	V_0	V_0	$2V_0$	0	$V_0/\sqrt{3}$	$(V_0^2/2)- V_0$
Fig. 4	V_0	V_0	$2V_0$	0	$V_0/\sqrt{2}$	$V_0/(\pi/2)$

Q. 3

	Peak value	Peak amplitude	Peak to peak value	Average value over one period	RMS Value over one period
Fig. 5	$2V_0$	V_0	$2V_0$	V_0	$V_0\sqrt{(3/2)}$
Fig. 6	$2V_0$	V_0	$2V_0$	V_0	$2V_0/\sqrt{3}$
Fig. 7	$2V_0$	V_0	$2V_0$	V_0	$2V_0/\sqrt{3}$
Fig. 8	$2V_0$	V_0	$2V_0$	V_0	V_0

Q. 4

	Peak value (V)	Peak amplitude (V)	Peak to peak value (V)	Average value over one period (V)	RMS Value over one period (V)
Fig. 9	6	36/7	9	6/7	3.2
Fig. 10	12	12	20	0	8.16