Tutorial 5
EE1100

Problem 1

A square wave current source of amplitude 200 mA is passed through a capacitor of 100 μF. Time period of the positive and negative half cycles is 100 ms. Plot the voltage waveform, find its average and RMS values.

Ans: Average voltage = 100 V; RMS voltage = 115.47 V

Problem 2

The current through an inductor in series with 10 ohm resistor is given by i(t) = 3 + 4sin(100t+45) + 4sin(300t+60) A . Find the RMS of current through the resistor .

Problem 3

The waveform shown in Fig.1 is a half-wave rectified sine wave. Find the RM value and the amount of average power dissipated in a 10-Ω resistor.

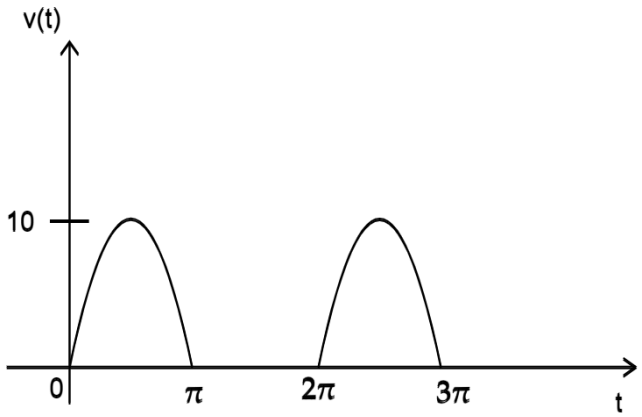

Figure 1: For problem 3

Ans: V_{rms} = 5V, P = 2.5W

Problem 4

Find the RMS and average values of the currents given below, assuming all three currents are periodic and have a period of $200\mu s$:

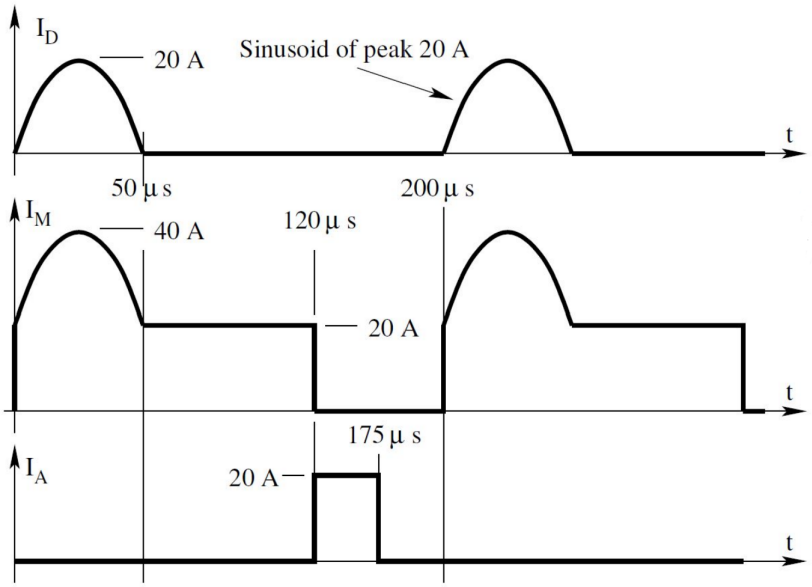

Figure 2: Waveforms for problem 4

Answers:
$I_{d-avg} = 3.183A$, $I_{d-rms} = 7.071A$,
$I_{M-avg} = 15.183A$, $I_{M-rms} = 20.37A$,
$I_{A-avg} = 5.5A$, $I_{A-rms} = 10.488A$

Problem 5.(a)

Find the rms value of figure shown. Ans:- 64.42V

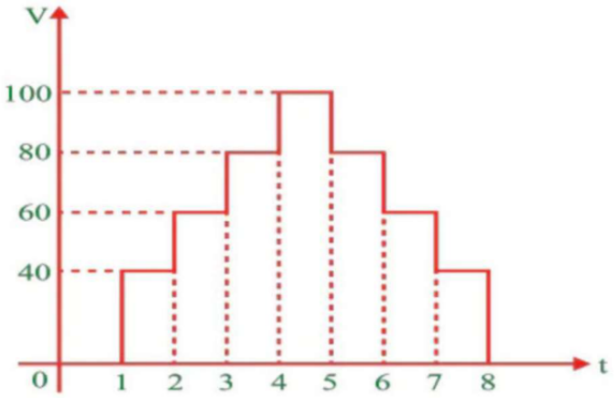

Figure 3: 5 (a)

Problem 5.(b)

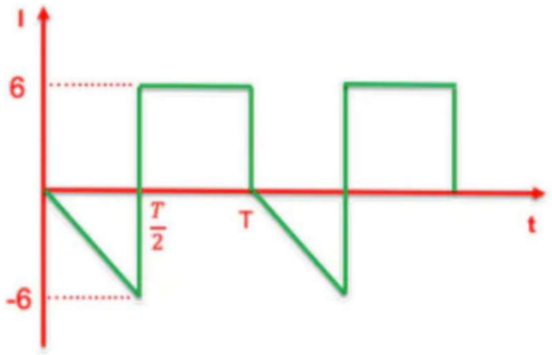

Figure 4: 5 (b)

ANS:- 4.89

Problem 6

A 1000 W load is connected to a sinusoidal voltage source of peak amplitude 200 V which draws a current with a peak amplitude of 10 A as shown in figure 5. Find the total power factor of the source.

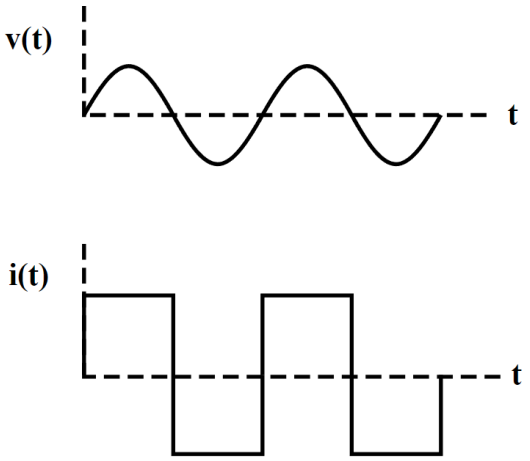

Figure 5:

Ans: 0.866