

Steady State AC Analysis

Tutorial Sheet No. 2

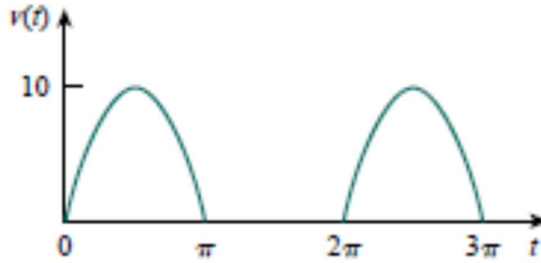
RMS, Average and Phasor

1. An alternating current varying sinusoidally with a frequency of 50 Hz has an RMS value of 20 A. Write down the equation for the instantaneous value.

A. $28.2\sin 100\pi t$ B. $28.2\sin 50\pi t$ C. $28.2\cos 100\pi t$ D. $28.2\cos 50\pi t$

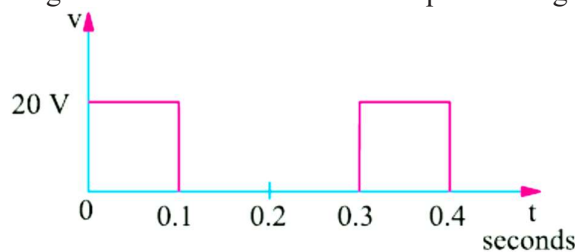
Ans. A

2. Find the average, RMS, form factor and peak factor of the given waveform.



Ans: 3.18V, 5 V, 1.57, 2

3. Compute the average and effective values of the square voltage wave shown in fig.



Ans. 6.67 V, 11.5V

4. Find the corresponding phasor voltages and currents and draw their phasor diagram for the following:

(A) $v = \sqrt{2}(50)\sin(377t - 35^\circ)$ V (C) $v = 83.6\cos(400t - 15^\circ)$ V

(B) $i = \sqrt{2}(90.4)\sin(754t + 48^\circ)$ mA (D) $i = 3.46\cos(815t + 30^\circ)$ A

Ans. (A) 50V, -35° (B) 90.4mA, 48° (C) 59.1V, 75° (D) 2.45 A, 120°

5. Convert the following numbers to polar form:

(A) $6 + j9$ (B) $-21.4 + j33.3$

Ans: $10.8\angle 56.3^\circ$, $39.6\angle 122.7^\circ$

6. Solve the equations given below:

(a) $(6.21 + j3.24) + (4.13 - j9.47)$

(b) $(7.34 - j1.29) - (5.62 + j8.92)$

(c) $(-24 + j12) - (-36 - j16) - (17 - j24)$

Ans: (a) $10.34 - j6.23$ (b) $1.72 - j10.21$ (c) $-5 + j52$

7. Find the following products and express them in rectangular form:

(a) $(4 + j2)(3 + j4)$ (b) $(6 + j2)(3 - j5)(2 - j3)$

Ans: (a) $4 + j22$, (b) $-16 - j132$