ANKARA YILDIRIM BEYAZIT UNIVERSITY

EE 214 – CIRCUIT THEORY II

Homework – 1 –

Only handwritten homeworks will be graded !!! Please explain the steps clearly, otherwise you cannot get the full credit.

Question 1:

Simplify the following expressions:

(a) $\dfrac{(5 - j6) - (2 + j8)}{(-3 + j4)(5 - j) + (4 - j6)}$

(b) $\dfrac{(240\angle 75^\circ + 160\angle -30^\circ)(60 - j80)}{(67 + j84)(20\angle 32^\circ)}$

(c) $\left(\dfrac{10 + j20}{3 + j4}\right)^2 \sqrt{(10 + j5)(16 - j20)}$

Question 2:

Transform the following sinusoids to phasors:

(a) $-20\cos(4t + 135^\circ)$ (b) $8\sin(20t + 30^\circ)$

(c) $20\cos(2t) + 15\sin(2t)$

Question 3:

Obtain the sinusoids corresponding to each of the following phasors:

(a) $\mathbf{V}_1 = 60\angle 15^\circ$ V, $\omega = 1$

(b) $\mathbf{V}_2 = 6 + j8$ V, $\omega = 40$

(c) $\mathbf{I}_1 = 2.8e^{-j\pi/3}$ A, $\omega = 377$

(d) $\mathbf{I}_2 = -0.5 - j1.2$ A, $\omega = 10^3$

Question 4:

Using phasors, determine $i(t)$ in the following equations:

(a) $2\frac{di}{dt} + 3i(t) = 4\cos(2t - 45°)$

(b) $10\int i\,dt + \frac{di}{dt} + 6i(t) = 5\cos(5t + 22°)$ A

Question 5:

9.42 Calculate $v_o(t)$ in the circuit of Fig. 9.49.