Midterm Exam
EE 112
Date: November 2020

Name (print): _____ Instructor: Juan Castaneda

Score: _____

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1. Give the following instantaneous voltage and current (20 points)

$$v(t) = 120\sqrt{2}\cos(\omega t + 10) \text{ (Volts)}$$
$$i(t) = 10\sqrt{2}\cos(\omega t - 5) \text{ (Amps)}$$

a) Find the phasors for both voltage and current
b) Find the real power absorbed (W)
c) Find the reactive power absorbed (VARS)
d) Find the complex power absorbed (VA)
e) Draw the phasor diagram for the voltage and current

2. The voltage $v(t) = 678.8\cos(\omega t + 45)$ volts to a load consisting of a 10 Ohms resistor in series with an inductive reactance of $XL = 25$ Ohms (20 points)

a) Determine the voltage phasor in polar form
b) Determine the current on the circuit in polar form
c) Determine the power factor for the circuit
d) Determine the power absorbed by the resistor

3. three loads connected in parallel across a 1000-V (RMS), 60-Hz Single-phase source. (30 points)
   Load 1: Inductive load, 125 kVA, 0.28 p.f. lagging
   Load 2: Capacitive load, 10 kW, 40 kVAR
   Load 3: Resistive load, 15 kW

   Determine the total kW, kvar, kva, and supply power factor.

4. Given the current phasor for phase a $Va = 289 < 0\ degrees$ (kv) for a balanced three phase system, derive and draw phasor voltages for phases b and c and phasor voltages for phase ab, bc, and ca. (15 points)

5. Two balanced Y-connected loads, one drawing 10kW at 0.8 p.f. lagging and the other 15kW at 0.9 power factor leading, are connected in parallel and supplied by a three-phase Y-connected, 480-Volts source. Determine the source current (magnitude only) (15 points)