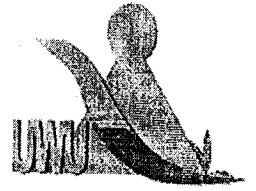


Uva Wellassa University, Sri Lanka
End Semester Examination – February/March 2012
SCT 362-2 Principles of Electricity



Time: Two (02) hours

Total 04 Questions
Answer All Questions

01)

I. Explain active circuit elements and passive circuit elements. Give two examples for each?

(10 marks)

II. What are the advantages of sinusoidal varying voltages?

(20 marks)

III. A 5 pF capacitor is connected series with a coil having internal resistance of 50Ω and 150 μH inductance across an alternating voltage of $V = 212.1 \sin(\pi 10^6 t + \pi/4)$ Volts. Calculate

- a) RMS value of the supplied voltage in polar coordinates,
- b) the circuit impedance,
- c) RMS value of the current flowing in polar coordinate,
- d) the Circuit phase angle,
- e) voltage across the resistor,
- f) voltage across the inductor,
- g) draw the phase diagram for the circuit.

(70 marks)



02)

- I. Explain why a network consists of diodes is not considered as a Bilateral Network. (10 marks)
- II. State Superposition theorem for an electric circuit (20 marks)
- III. For the A.C. network shown in Figure 1 determine, using the superposition theorem
- The current in each branch
 - The magnitude of the voltage across the $(6+j8)\Omega$ impedance
 - The total active power delivered to the network
- (70 marks)

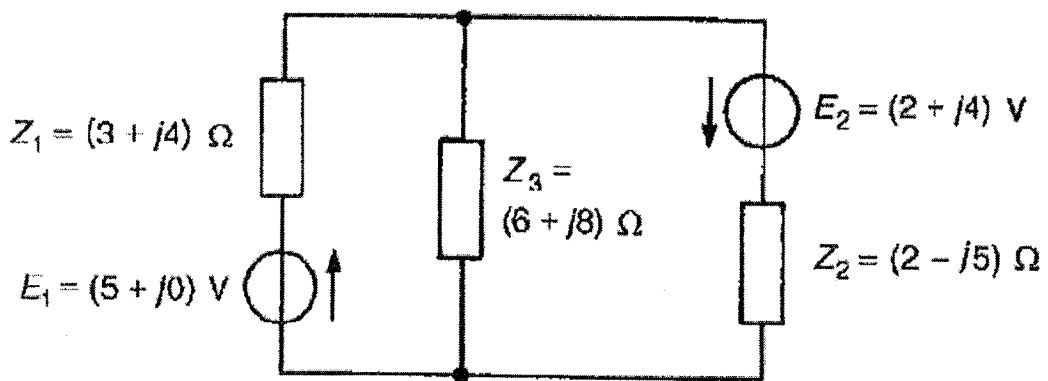


Figure 1

03)

- I. What is a three phase system? Draw the phasor diagram for a balance three phase system and derive the equation for line voltage using phase voltage (20 Marks)
- II. What is an unbalanced three phase system? What can you say about the line current and line voltage in each phase in an unbalanced three phase system? (20 marks)
- III. Each phase of a star-connected load consists of a resistance of $30\ \Omega$ and $80\ \mu\text{F}$ Capacitor in series. The load is connected to a star connected three phase supply with a line voltage 400V and frequency of $50\ \text{Hz}$.
- Draw the electrical circuit diagram of the above three phase system.
 - Draw the single line equivalent circuit for the above system.

- c.) Calculate phase current.
- d.) The line current
- e.) The total power dissipated
- f.) Draw the complete phasor diagram for the load.

(60 marks)

04)

- I. Explain what is meant by transient condition of an electric circuit.
(10 marks)
- II. What are the advantages of using Laplace Transform for analyzing transient conditions of an electric circuit?
(20 marks)
- III. For the circuit shown in the following figure obtain an equation which shows how current varies with time using Laplace Transform. Assume zero initial conditions when the switch is closed.

(70 marks)

