Reg. No. _____

Karunya University
(Karunya Institute of Technology and Sciences)
(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – November/December 2010

Subject Title: ELECTRIC CIRCUIT ANALYSIS   **Time: 3 hours**
Subject Code: EE201   **Maximum Marks: 100**

Answer ALL questions
### PART – A (10 x 1 = 10 MARKS)

1. Obtain the voltage current relation of a capacitor.
2. What is a linear circuit?
3. When is an AC circuit said to be in resonance?
4. What is the quality factor of the circuit which resonates at 200 rad/sec and has a bandwidth of 25 rad/sec.
5. Write down the equation of coefficient of coupling.
6. What is dot convention?
7. State reciprocity theorem.
8. When is Millman's theorem used?
9. What is impulse function?
10. Write the equation of an exponentially increasing function with the final value of 20 and time constant 0.5 sec.

PART – B (5 x 3 = 15 MARKS)

11. How do you convert current source into voltage source and vice versa.
12. A series circuit has R = 10 ohms, L = 50 mH and C = 100 μ f is supplied with 200 V, 50 Hz. Find (i) the impedance   (ii) current and (iii) the power.
13. What is an ideal transformer?
14. State the Maximum Power Transfer theorem.
15. Given I(s) = $\dfrac{s+3}{s^2 + 4s + 8}$ find the initial and final values of i(t).

PART – C (5 x 15 = 75 MARKS)

16. a. Three resistors a, b, and c are connected in parallel and take a total current of 7.9 amps. R_a = 48 ohm and takes 2.5 amps, $I_b = 2I_c$. Calculate
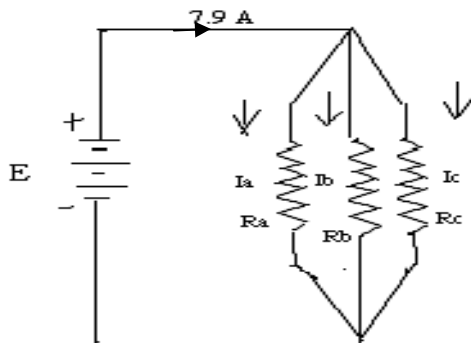

    (i) I_b and I_c (ii) The line voltage and (iii) R_b and R_c (8)

   b. Two batteries A and B are properly connected to supply a current of 160 amps to a load resistance R_L. E_A = 160 V, R_A = 0.15 ohm, R_B = 0.10 ohm and I_B = 60 amp. Calculate: (i) E_B and (ii) The load power for the figure given below: (7)

                                                          [P.T.O]

RA = 0.15 Ohm   RB = 0.1 ohm
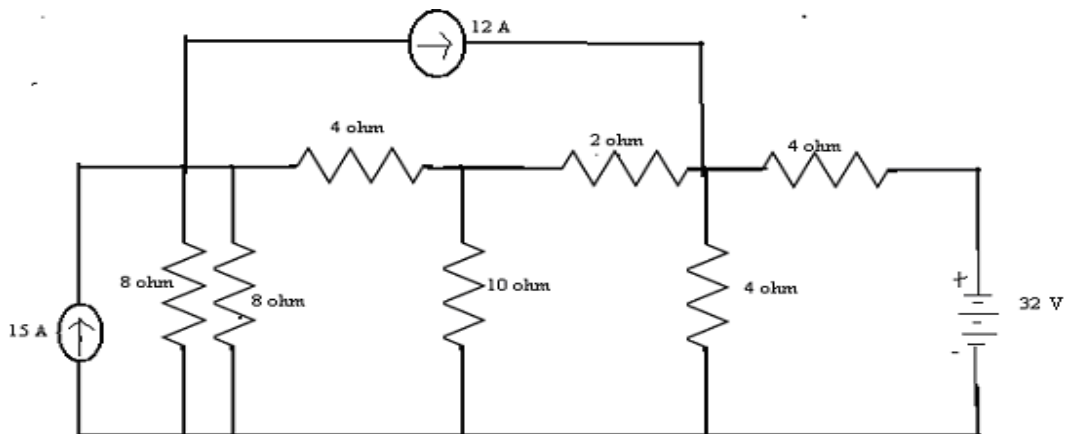
160 A

EA 160 V   RL   EB
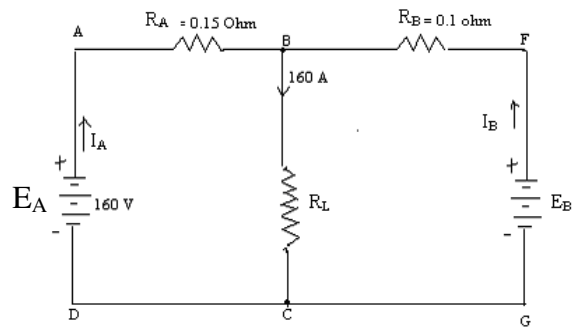
(OR)

17. a. In the circuit given below, find (i) the equivalent resistance of the circuit (ii) the total current and (iii) the current in the resistor between points B and C. The applied voltage is 200 V.   (8)
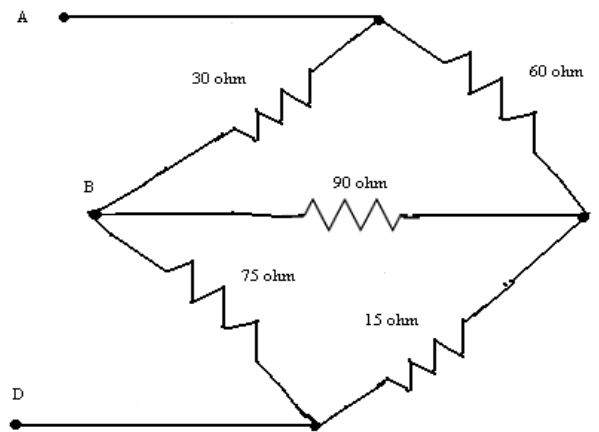

b. Find the power dissipated in 10 ohm resistor as shown in the figure given below: (7)

18. In an AC circuit consisting of two elements in series, the equation for voltage and current are $e = 180 \sin 314t$ and $i = 28.4 \sin (314t - \pi/3)$. Calculate (i) the effective voltage and current, (ii) the frequency, (iii) the power factor, (iv) the power and (v) the values of the circuit constants.

(OR)

19. An unbalanced star connected load is supplied from a 3-phase, 440V, and symmetrical system. Determine the line currents and the power input to the circuit shown below:
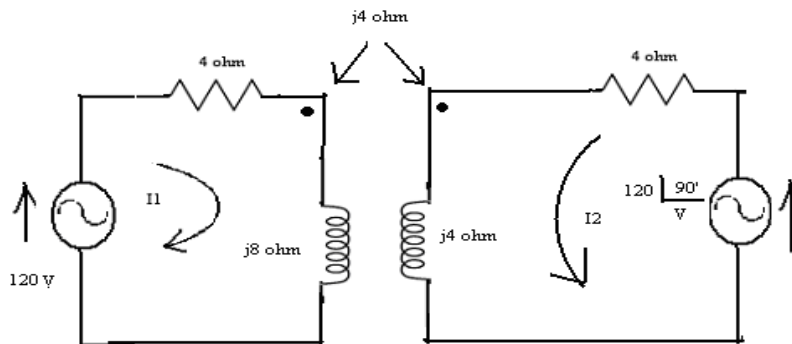
[P.T.O]
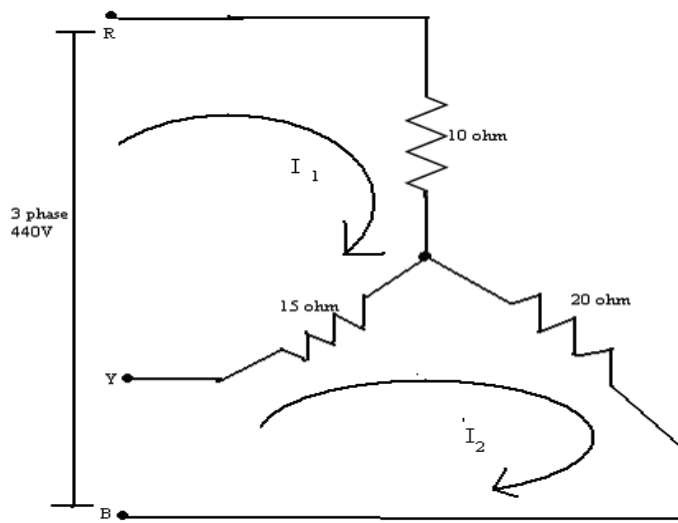
20. Find the magnitude of the voltage source V of the figure given below which results in an effective voltage of 20 volts across the 5 ohm resistor.
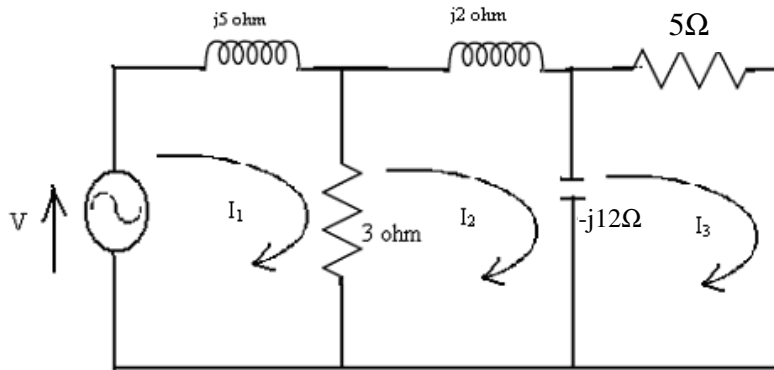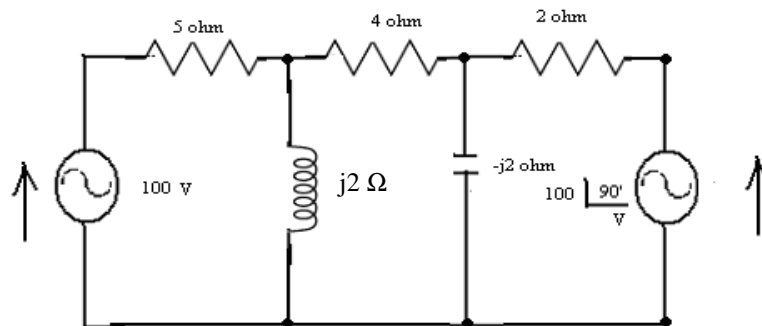

(OR)

21. Find the vector values of the currents in the network given below. Find also the power supplied by each source.
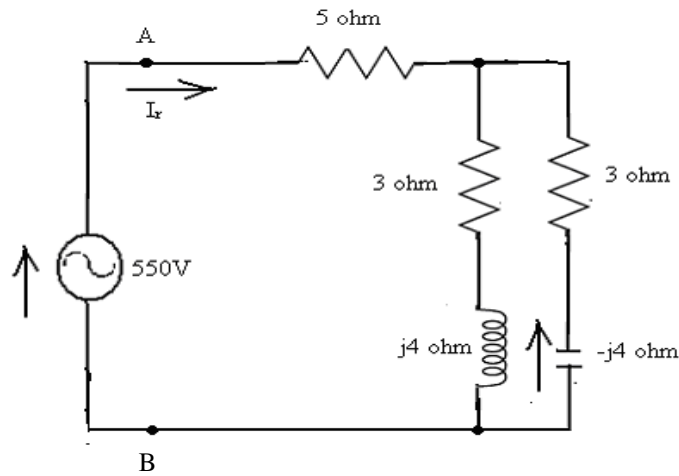

22. Using the principle of superposition, calculate the current I in the network given below.

(OR)

23. Verify the reciprocity theorem for the network of figure given below. Find the current in the (3 – j4) ohm impedance.

24. In the series circuit as shown in the figure given below, the switch is closed on the position 1 at t = 0. At t = 1 milli-second, the switch is moved to position 2. Obtain the equation for the current in both intervals and draw the transient current curve.
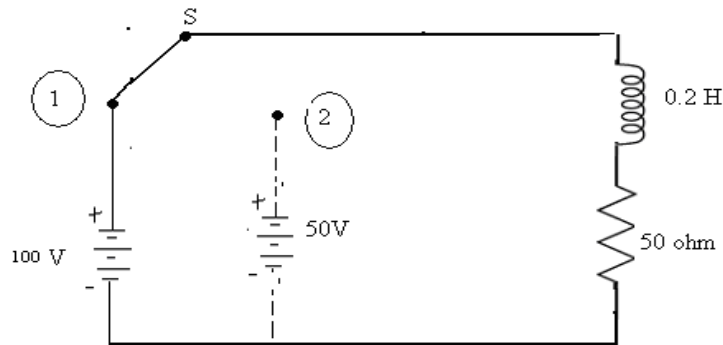
(OR)

25. The RC series circuit in the figure given below has an initial charge Q_0= 2 x 10^{-2} coulomb. Find the transient current if the switch is closed at t = 0.