Reg. No. : | | | | | | | | | | |

Question Paper Code: 31237

B.E. / B.Tech. DEGREE EXAMINATION, NOVEMBER 2015

Second Semester

Electrical and Electronics Engineering

01UEE207- ELECTRIC CIRCUITS

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Draw the VI characteristics of ideal and practical voltage sources.
2. A fluorescent tube choke is connected across $230V$, $50Hz$ AC supply. If the resistance and reactance of the choke are 100Ω, $1H$ respectively, determine the current through the choke.
3. A 12 V DC source has internal resistance of 1Ω. The maximum power that can be delivered by the source is _____.
4. Two resistors 10Ω and 20Ω are connected in parallel. If the total current is $3A$, what will be the current through each resistor?
5. Determine the resonance frequency of a RLC series circuit with R= 5 Ω, L = 0.02 H and C= 5 μF.
6. Two identical coils with L = 0.03 H have a coupling coefficient k = 0.8. Find the mutual inductance and the equivalent inductance with the coils connected in series opposing mode.
7. The time constant of an RC circuit with R=1k and C= 100μF is _____.

8. Write the condition for under damping and critical damping in RLC series circuit.

9. The phase voltage of a balanced three phase system is 230*V*. What will be the line voltage?

10. A star connected balanced load draws a current of 35 *A* per phase when connected to a 440 *V* supply. Determine the apparent power.

PART - B (5 x 16 = 80 Marks)

11. (a) Calculate (a) the equivalent resistance across the terminals of the supply (b) total current supplied by the source and (c) power delivered to 16 Ω resistors in the circuit shown in figure 1. (16)

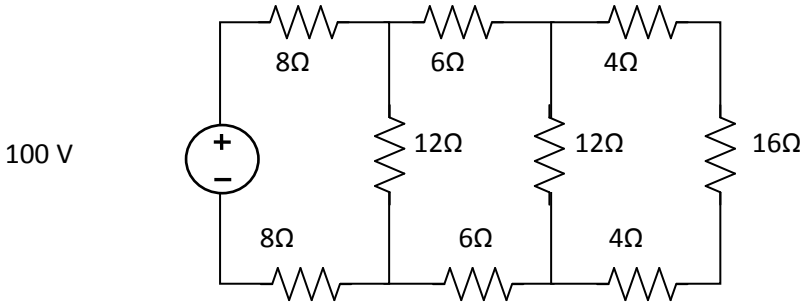

Figure 1

Or

(b) (i) A series *RL* circuit with $R = 5\Omega$ and $L = 2mH$ has an applied voltage $V = 150\sin 5000t$ Volts. Calculate current and power factor. (8)

(ii) For the circuit shown in figure 2, determine current through various resistors using Nodal Method. (8)

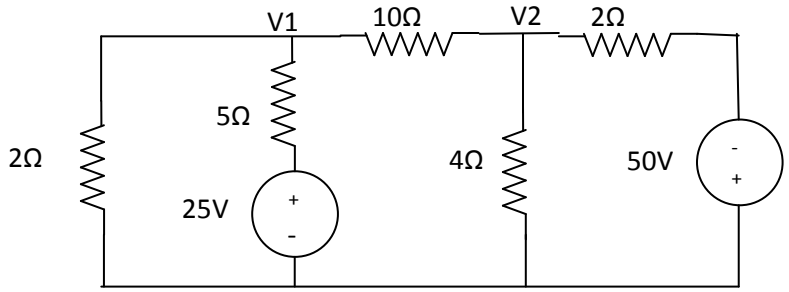

Figure 2

12. (a) (i) In the circuit shown in figure 3, obtain the current in each resistor using Network reduction method. (8)

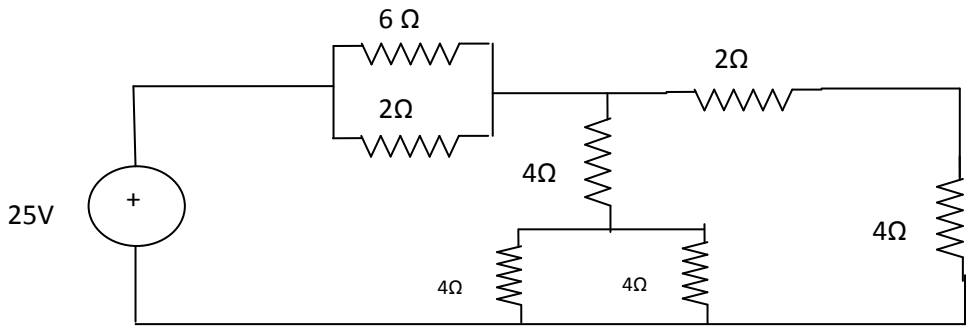

Figure 3

(ii) Using Superposition theorem, find current *I* in figure 4. (8)

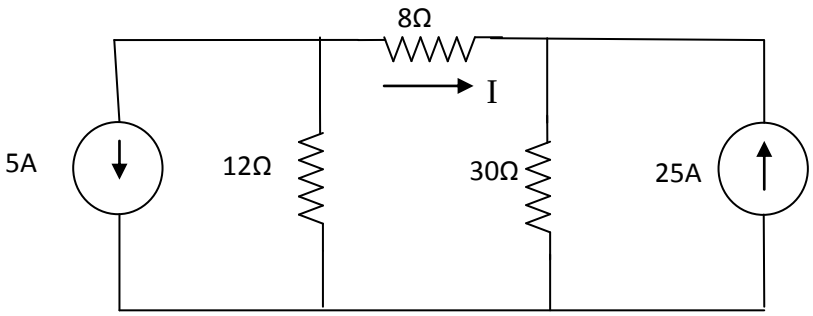

Figure 4

Or

(b) Find the equivalent resistance between *A* and *B*, in the network shown in figure5. (16)

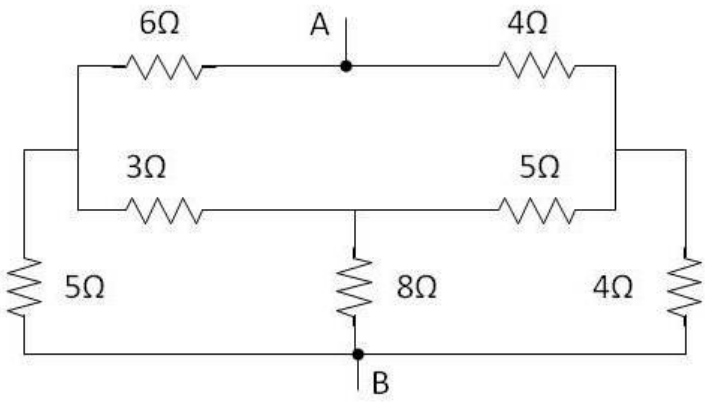

Figure 5

13. (a) (i) Derive the relationship between resonant frequency and Quality factor of an RLC series circuit. (8)

(ii) Compute the Quality factor of an *RLC* series circuit with R=20Ω, L = 50mH and C = 1μF. (8)

Or

(b) Two coils connected in series have an equivalent inductance of 0.8 H when connected in aiding and an equivalent inductance of 0.4 H when connected in opposing. Determine the mutual inductance. Calculate the self-inductance of the coils, by taking k = 0.55. (16)

14. (a) The switch in the circuit shown in figure 6. is closed on position 1 at t = 0 and moved to position 2 after one time constant (τ). Obtain the current for 0 < t < τ and t > τ. (16)

.

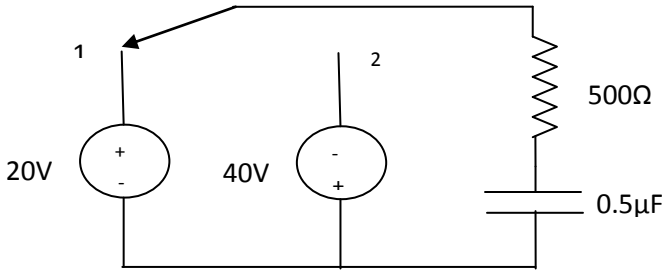

Figure. 6

Or

(b) A capacitor has an initial charge of Q_o. A resistor R is connected across the capacitor at t = 0, to discharge the charge. The power transient of the capacitor $p_c(t) = 800e^{-4000t}$ W. Find the value of R and Q_o. Take C = 10 μF. (16)

15. (a) A three phase balanced supply of 400V (line to line) 50Hz is given to a three phase delta connected load with impedance 20 $\angle$45 Ω. Obtain the line currents, power and power factor. Also draw the phasor diagram. (16)

Or

(b) A 500 V, three phase motor has an output of 3.73 kW and operates at a power factor of 0.85, with an efficiency of 90%. Calculate the reading of each of the two watt meter connected to measure the input. (16)