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

Question Paper Code: 32307

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Second Semester

Electrical and Electronics Engineering

01UEE207- ELECTRIC CIRCUITS

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

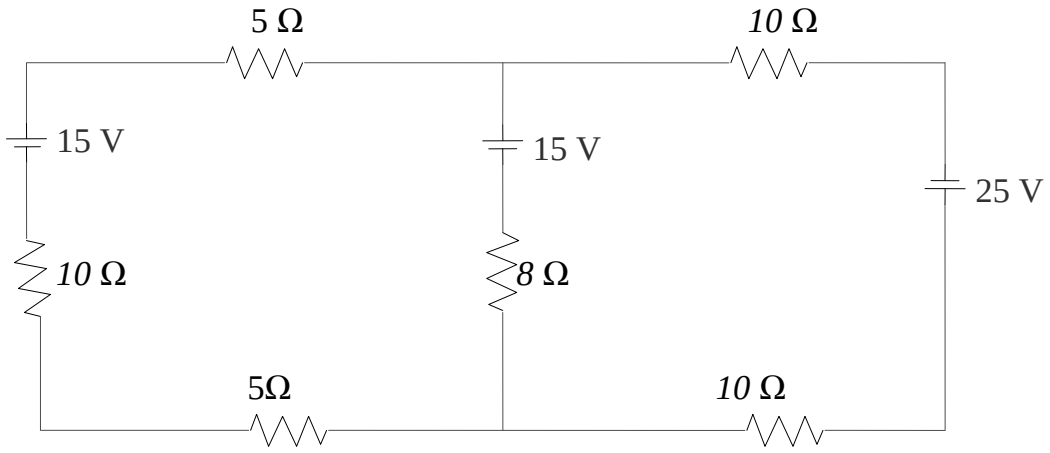
Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Define Kirchhoff's law.
2. What is an ideal source?
3. State maximum power transfer theorem.
4. Write some applications of maximum power transfer theorem.
5. Define Q-factor of a coil.
6. Sketch the frequency response of a single tuned circuit.
7. Write the purpose of Laplace transformation in the circuit analysis.
8. A RL series circuit with R=10 Ω is excited by a dc voltage source of 30 V by closing the switch at t = 0. Determine the current in the circuit at $t = 2\tau$.
9. A star connected load has impedance of (6 + j8) Ω in each phase. Determine the line current when it is connected to 400*V*, 3 phase, 50 *Hz* supply.
10. In three phase power measurement using two wattmeters, what is the power factor if one wattmeter reads zero?

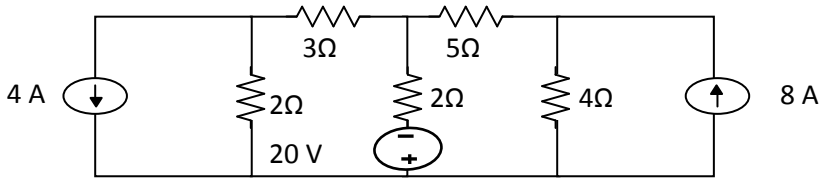
PART - B (5 x 16 = 80 Marks)

11. (a) Use mesh analysis to determine the current in 8Ω resistor as shown in the circuit diagram. (16)



Or

(b) Using nodal analysis, calculate the current through the 5 Ω resistor in the circuit shown in figure 2. (16)



12. (a) Find i_o in the network shown in figure 3 using Superposition theorem. (16)

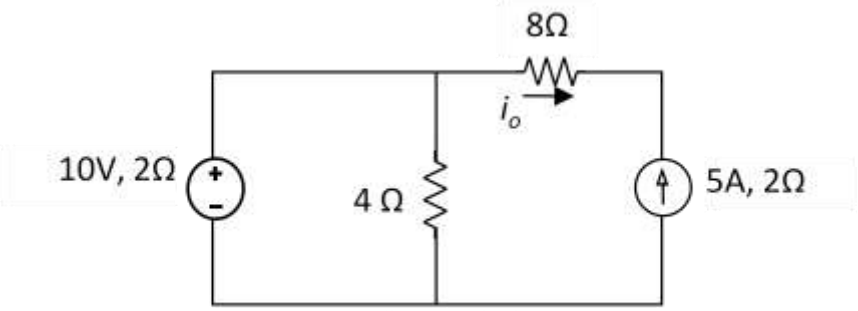


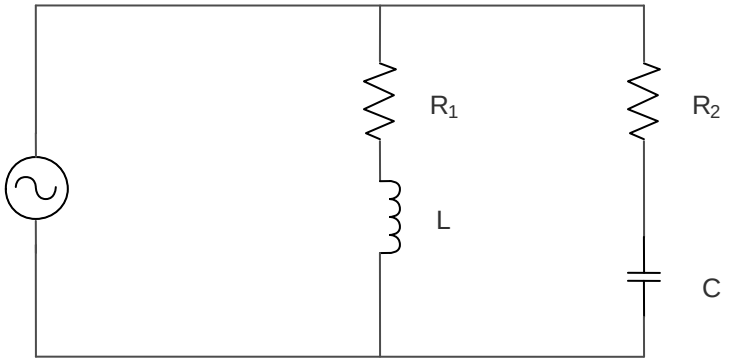
Figure 3

Or

(b) (i) Explain how three resistances connected in delta can be converted into equivalent star. Derive the relationship. (8)

(ii) An AC power source 100*V*, 50*Hz* has an internal impedance of 2 + j5 Ω. What will be the maximum power that can be delivered by this source to load? (8)

13. (a) For the parallel circuit shown in figure, find the Resonance frequency *f*. (16)



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 is closed on position 1 at t = 0 and moved to position 2 after one time constant (τ). Obtain the current for $0 < t < \tau$ and $t > \tau$.

. (16)

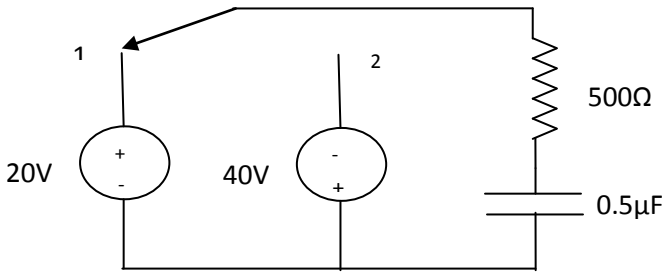


Figure.

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 $20 \angle 45\ \Omega$. Obtain the line currents, power and power factor. Also draw the phasor diagram. (16)

Or

(b) Power is measured in a 3 phase, 400V (Line-Line) system by two wattmeters. If the readings are W_1 = 3500W and W_2 = 1500W, determine the line currents, power and power factor if reading of W_2 is obtained after reversing its potential coil. (16)