(ii) In a series RLC circuit R = 10Ω. L = 10 mH, C = 1μF has an applied voltage of 200 V at resonance frequency. Calculate the resonance frequency. current in the circuit, voltage across each element at resonance. Find also the quality factor and band width. (8)

Or

(b) In a series RLC circuit R = 300Ω, L = 1 H and C = 100μF has a constant voltage of 50 V applied at t = 0. Find maximum current value. Assume zero initial conditions. (16)

15. (a) (i) A symmetrical three phase, three wire 440 V supply is connected to a star connected load. The impedances in each branch are $Z_R = (2 + j3)\Omega, Z_Y = (1 - j2)\Omega$ and $Z_B = (2 + j4)\Omega$. Find its equivalent delta connected load. The phase sequence is RYB. (8)

(ii) A three phase balanced delta connected load of $(4 + j8)\Omega$ is connected across a 400 V, three phase balanced supply. Determine the phase currents and line currents. Assume the phase sequence to be RYB. Also calculate the power drawn by the load. (8)

Or

(b) Show that the total power in a three phase. three wire system using the two wattmeter method of measurement is given by the sum of the wattmeter readings. Draw a connection diagram and phasor diagram for the two-wattmeter method for a balanced load. Also derive the expression for the power factor of a three phase system using only the wattmeter readings. (16)

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

Question Paper Code : 52944

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Second Semester

Electrical and Electronics Engineering

EE 6201 — CIRCUIT THEORY

(Common to Biomedical Engineering, Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Instrumentation and Control Engineering, Medical Electronics)

(Regulation 2013)

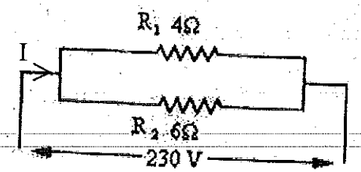
(Also common to PTEE 6201 — Circuit Theory for B.E. (Part-Time) for First Semester /Second Semester for Electrical and Electronics Engineering, Electronics and Communication Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

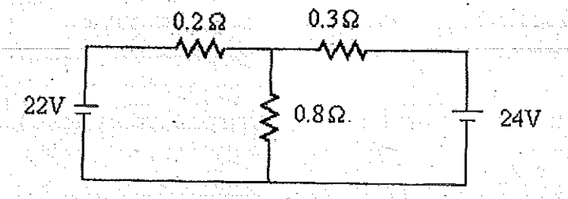
1. State Kirchoff's current law.
2. Find the current flowing through the circuit shown below.



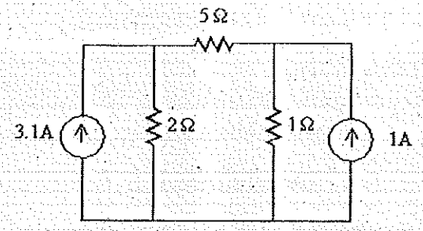
3. What is linear and non-linear element?
4. State Superposition theorem.
5. What you mean by coefficient of coupling in coupled circuit?
6. Define quality factor.
7. What you mean by driving point impedance?
8. Define time constant in series RL circuit.
9. Mention the relationship between line and phase voltage in star and delta connected networks.
10. Compare balanced system with unbalanced system.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Calculate the branch currents and also calculate voltage across 0.8Ω. Use Kirchofis law. (8)

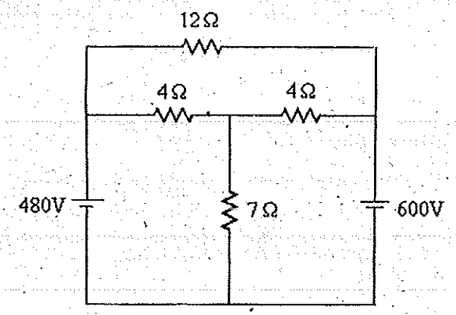


(ii) Determine the node voltage for the given circuit. (8)

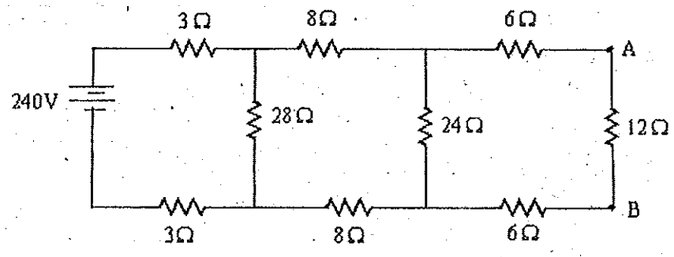


Or

(b) Write the mesh equations for the circuit shown in figure and solve for the current in 12Ω resistor. (16)

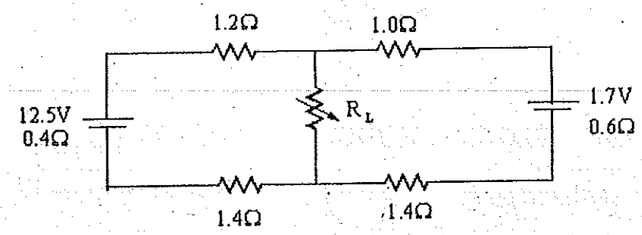


12. (a) Determine the current in 12Ω resistor using Thevenin's theorem. Also draw the Thevenin's equivalent circuit. (16)



Or

(b) For the circuit, find the value R_L for maximum power delivered to it. Calculate also the maximum load power. (16)



13. (a) (i) A series RLC circuit has R = 5Ω, L = 40 mH, C = 1μF. Calculate

(1) Q of the circuit,

(2) separation between $(f_2 - f_1)$,

(3) resonance frequency,

(4) its half power frequency f_1 and f_2. (8)

(ii) A coil of resistance 40Ω, inductance 0.75H forms part of the series circuit, for which the resonance frequency is 55 cycles per sec, If the supply is 250V, 50 cycles per see, find

(1) the line current,

(2) power factor,

(3) voltage across the coil. (8)

Or

(b) (i) Two Coupled coils with L_1 = 0.02 H, L_2 = 0.01 H and K = 0.5 are connected in four different ways, series aiding, series opposing and parallel with both arrangements of the winding cells. What are the four equivalent Inductances? (8)

(ii) A coil of 20Ω resistance has an inductance of 0.2H, and is connected in parallel with a Condenser of 100μF. Calculate the frequency at which the circuit will act as a non-inductive resistance of RΩ. Find also the value of R. (8)

14. (a) (i) A series RL circuit with R = 100Ω and L = 20 H has a DC voltage of 200 volts applied through a switch at t = 0. Find

(1) The equation for the current and voltage across different elements.

(2) The current at t = 0.5 Sec.

(3) The current at 1 sec.

(4) The time at which voltage across resistor and inductor is equal. (8)