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B.E / B.Tech (Full Time) DEGREE ARREAR SEMESTER EXAMINATIONS, APRIL / MAY 2014

ELECTRICAL AND ELECTRONICS ENGINEERING

Second Semester

EE 181/EE 9151-Electric Circuit Analysis

(Regulations 2004/2008)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Define lumped network.
2. Transform a voltage source of 20V with an internal resistance of 5Ω to a current source.
3. Draw the current response of RL series circuit excited from DC source.
4. Given V(s)=(s+2)/s(s+1),determine the initial and final values of v(t).
5. Two sinusoidal currents are given by i_1= 10 sin (ωt +π/3) and i_2 = 15 sin (ωt +π/4). Calculate the phase difference show in phasor diagram.
6. Calculate the bandwidth between the half power points of circuit which resonant at 1MHz and has a Quality factor of 100.
7. Determine the maximum power transfer to the load is connected in series with (15 +j20) Ω and 50 Volts supply.
8. Mention the necessity of mesh impedance matrix with it application.
9. Find out the self-inductance of coil has 500 turns is linked with 50 mWb, when carrying a current of 125 A.
10. Give the relationship between line and phase voltages for star connected load with phasor diagram.

Part – B (5 x 16 = 80 marks)

11. (i) Determine the equivalent resistance between A and B in Fig.1a **(8)**

    (ii) Find the current through 1Ω resistor using Kirchoff's laws in Fig.1b. **(8)**

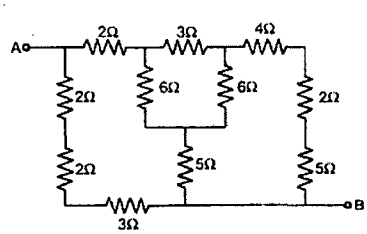

Fig.1a

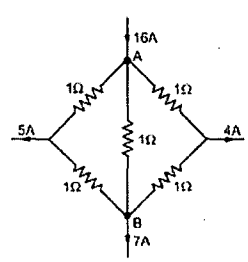

Fig.1b

12. a) A series RL circuit has R=50 Ω and L=0.2 H connected with v(t) = 150 sin (500t + φ) volts is applied at t=0 when φ=0. Find an expression for the value of current.

(OR)

b) A series RLC circuit fed by a d.c. voltage of 50 V with R= 3000 Ω, L=10 H and C= 200μF applied at t=0. Derive the expression for the current and its maximum value Assume initial conditions to be zero.

13. a) A series RLC circuit with R =100 Ω, L=0.5 H and C=40μF. Determine the resonance frequency, lower and upper half power frequencies, Band width, quality factor, damping ratio and voltage across each element is 200V.

(OR)

b) A series RL branch is connected in parallel with a pure capacitor C. Find the resonance frequency of combination if R=250Ω and L=100mH and C=0.005μF.what is the value of dynamic resistance? If R, L and C are connected is series, calculate the new resonant frequency.

14. a) (i). Find the current through 3Ω using Superposition theorem Fig.2a **(8)**
(ii) Find the current I in Fig.2b using Nodal analysis. **(8)**

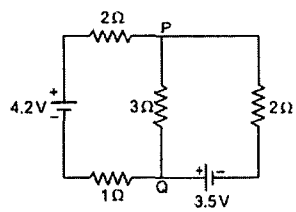

Fig. 2a.

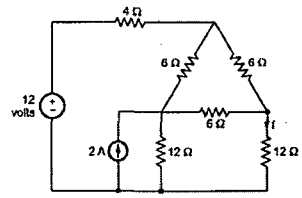

Fig. 2b.

(OR)

b) (i). Find the current through 16 Ω using Thevennin's theorem in Fig.2c **(8)**
(ii) Determine the current through 3Ω using Mesh analysis shown in Fig. 2d **(8)**

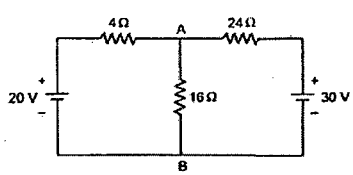

Fig. 2c.

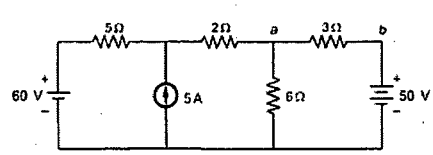

Fig. 2d

15. a) Two identical coils in series give an effective inductance of 800 mH and when one of the coils is reversed then the effective inductance of 400 mH. Determine self-inductances, mutual inductances between coils and the coefficient of coupling.

(OR)

b) (i) The number of turns in two coupled coils are 600 and 1200 respectively. When a current of 4 A flows in coil 1, the total flux in coil 1 is 0.5 mWb and the flux linking coil 2 is 0.4 mWb. Determine the self-inductances of the coils and mutual inductance between them. Also calculate coefficient of coupling. **(10)**

(ii) Two wattmeters are connected to measure the input of a 15 HP,50 Hz,3φ at full load. The full load efficiency and p.f are 0.9 and 0.8 lagging respectively. Find the reading of the two wattmeters **(6)**