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B.E Degree Examination, Anna University,Apr/May 2013

EC9029 ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY

Electronics and Communication Engineering

Time:3 Hours Max Marks:100

Answer All Questions

Part A(10x2=20 Marks)

1. What are the Primary mechanisms by which Electromagnetic interference moves from source to receptor?
2. How does Transients affect Electronic equipments?
3. Differentiate: common mode and differential mode coupling
4. Specify the important measures to avoid cable to cable coupling
5. What are the factors that influence the choice of shielding materials for i)E field ii)H field
6. Specify the advantages of Zoning in PCBs
7. What is meant by Class A and Class B classification in EMC
8. Specify the Electromagnetic compatibility Requirements for household Appliances,
9. Give the features and applications of GTEM cell
10. Define Antenna factor and specify its significance

Part B(5x16=80 Marks)

11.Discuss in detail the FCC and CISPR 22 conducted emission limits

12a)Explain in detail about the effects of intentional and unintentional Electromagnetic emissions from various Electrical, Electronic and Electromechanical apparatus

(OR)

12.(a)(i) Using source transformation and wye-delta transformation for the circuit given in Fig.Q.12(a)(i), calculate the current through 9 Ω. **(12)**

(ii) Draw the dual circuit for the circuit given in Fig.Q.12(a)(ii) **(4)**

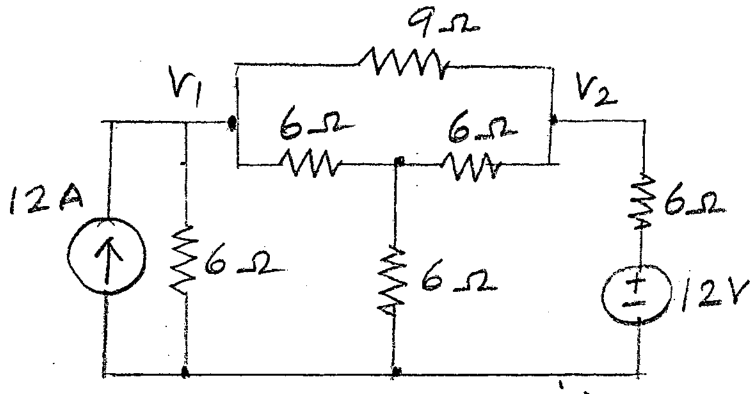

Fig Q.12 a(i)

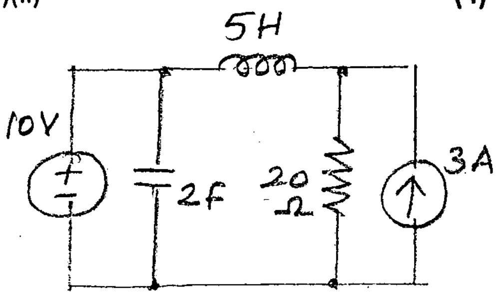

Fig.Q.12a(ii)

OR

12.(b) Find the Thevenin and Norton equivalent circuits at terminals a-b of the circuit shown in Fig.Q.12(b). For what value of R is the power dissipated in R maximum?. Calculate that power.

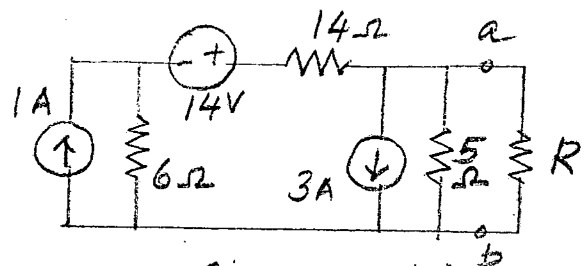

Fig.Q.12(b)

13.(a)(i) Determine the input admittance Y_{in} of the given circuit. (Fig.Q.13(a)(i)) **(8)**

(ii) For the circuit shown in Fig.(Q.13(a)(ii)) if R = 8 Ω, X_L = 12 Ω and Xc = 6 Ω and **I** = 10 $\angle 0^0$ A, find $\mathbf{V_R}$, $\mathbf{V_L}$, $\mathbf{V_C}$ and **V** in rectangular and polar forms. **(8)**

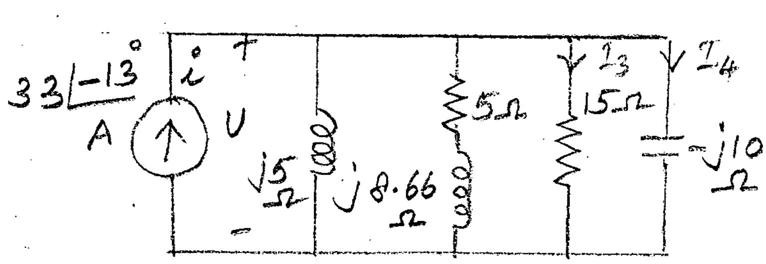

Fig Q 13 a(i)

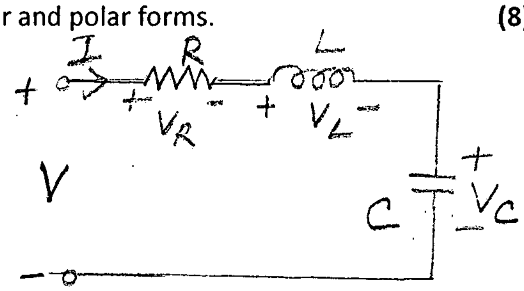

Fig. Q.13 a(ii)

OR

13.(b) Determine the current through 1 Ω resistor of the given circuit (Fig.Q.13.(b)) by Thevenin's theorem. What should be the load Z_L to be connected across terminals a-b for maximum power transfer and hence find the maximum average power delivered to the load.

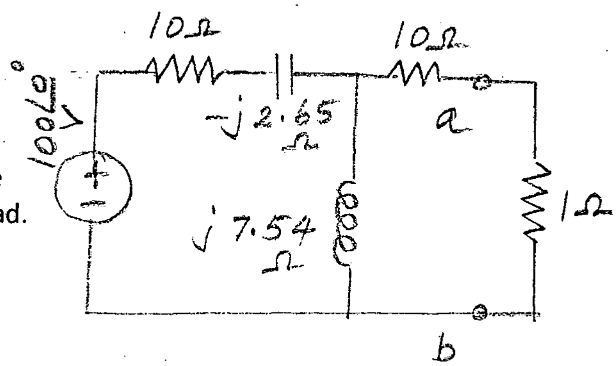

Fig Q 13(b)

14.(a)(i) Give the relevant mathematical expressions with which the DC transient responses (step response) of RL and RC circuits i(t) and v(t) respectively are evaluated using their initial and final values. **(4)**

(ii) The switch in the circuit (Fig.Q.14(a)(ii)) has been closed for a long time. At t = 0, the switch is opened. Calculate i(t) for t>0. **(12)**

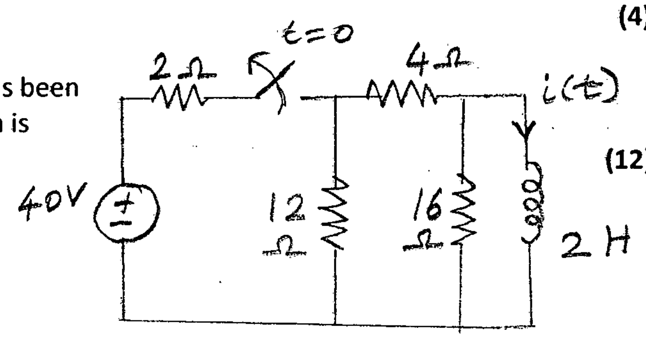

Fig. Q.14a(ii)

OR

14.(b)(i) Obtain the expression for the half power frequencies f_1 and f_2 of a series RLC resonant circuit and hence the bandwidth. **(8)**

(ii) For the tank circuit given in Fig.Q.14.(b)(ii), determine the capacitance required to make the circuit resonate at 1.65 MHz. Find the quality factor Q of the coil at resonance. **(8)**

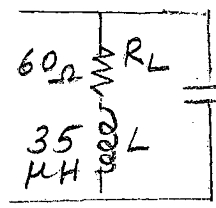

Fig. Q.14.b(ii)

15.(a) Obtain a conductively coupled equivalent circuit for the mutually coupled circuit Shown in Fig.Q.15.(a) and find the voltage across 5 Ω resistor.

OR

15.(b) Obtain the branch currents and voltages for the circuit shown in Fig.Q.15.(b) using tie-set approach.

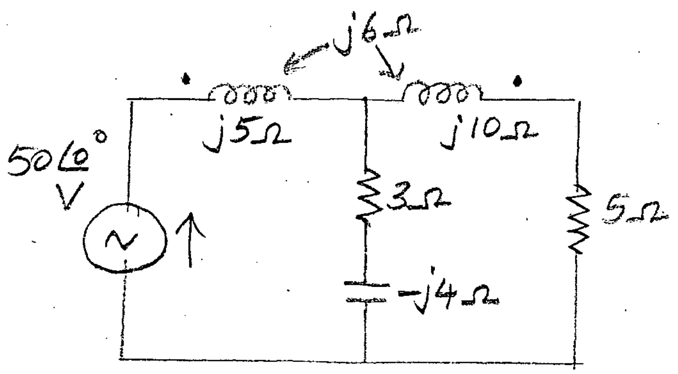

Fig. Q.15(a)

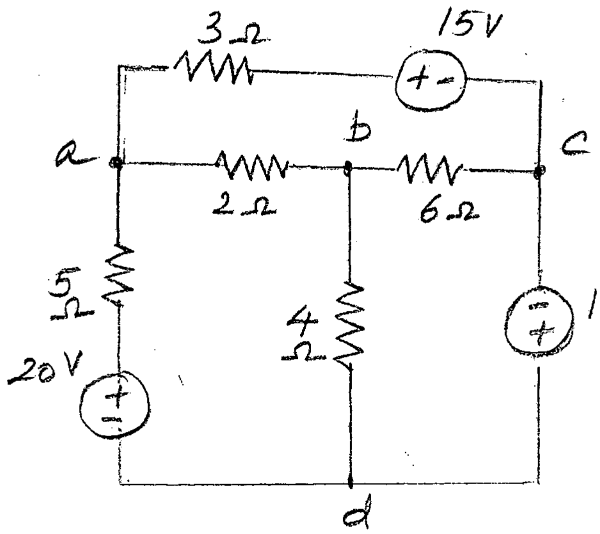

Fig. Q.15(b)

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