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B.E / B.Tech (Part Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

Electronics and Communication Engineering

First Semester

PTEC9152 Circuit Analysis / PTEC182 Circuit Analysis / PTEC142 Circuit Analysis

(Regulation 2009, 2005 & 2002)

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

PART-A (10 x 2 = 20 Marks)

1. Consider three resistors of 500 Ω, 1000Ω and 2000Ω are connected in series and the combination is powered by a 3V DC source. Then calculated the current and power derived from the source.
2. Complete the blanks in the following statements. The algebraic sum of voltages across the elements present in a closed loop is _____. It is called as_____.
3. Draw the dual of voltage source.
4. State superposition theorem with an example.
5. Draw the phasor diagram of a RL circuit.
6. Across a 1Ω resistor, a voltage source $v(t) = 2 \sin(100\pi t)$ is connected. Then calculate the instantaneous power and average power delivered by the source.
7. Define time constant of RC network.
8. Draw the circuit of series RLC circuit and write equation used to compute the resonance frequency of the circuit.
9. What is ideal transformer? And what is its power efficiency?
10. What is tree in a network topology? And illustrate with an example.

Part – B (5 x 16 = 80 marks)

11. Consider the circuit shown in Figure Q.11. (i) Apply the mesh analysis to circuit to estimate the power dissipated by 12 Ω resistor and (ii) verify the same using nodal analysis.

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12. a) Use superposition on the circuit shown in Figure Q.12a to find the estimate the power dissipated by the 30Ω resistor.

(OR)

b) In the circuit shown in Figure Q.12b, find the value of RL to derive maximum power from the network. Also calculate the maximum power dissipated by R_L.

13. a) Find the Thevnin's equivalent circuit for the circuit shown in Figure Q.13a. Calculate the voltage across load connected between 'a' and 'b' while the load is (i) 100Ω, (ii) j100Ω and (iii) -j100Ω.

(OR)

b) Determine the average power supplied by the dependent source in the circuit shown in Figure Q.13b

14. a) After being open for a long time, the switch in the circuit of Figure Q.14a is closed at time t=0. For t>0, find $v_c(t)$ and $i_{sw}(t)$

(OR)

b) Consider the circuit shown in the Figure Q.14b. (i) Plot the frequency behavior of $|Z_{in}(\omega)|$, (ii) derive the expression to estimate the resonance frequency and (iii) calculate the value of $Z_{in}(\omega)$ at resonance frequency. (8 + 6 + 2)

15. a) Consider the circuit shown in Figure Q.15a. Find (i) $I_L(j\omega)/V_s(j\omega)$, (ii) $i_L(t)$ while $v_s(t) = 100\ u(t)$.

(OR)

b) Find $H(j\omega)=Vo(j\omega)/Vs(j\omega)$ for the circuit shown in Figure Q.15b

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Figures:

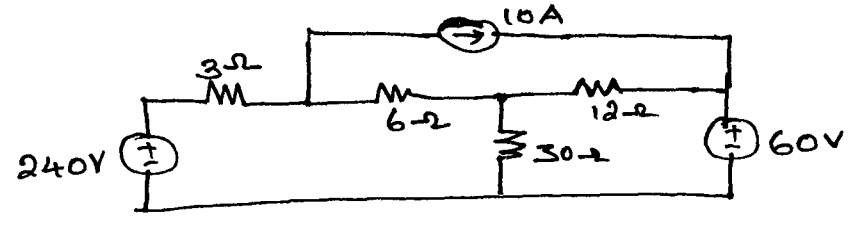

Figure Q.11

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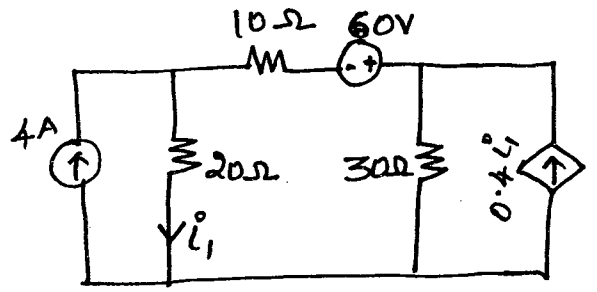

Figure Q.12a

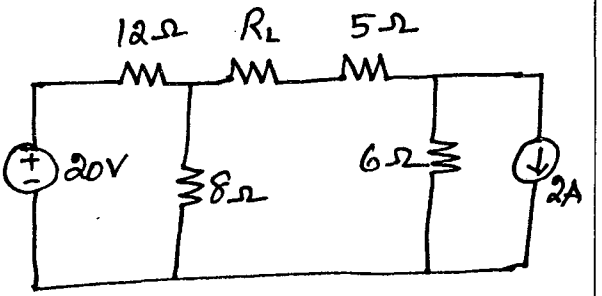

Figure Q.12b

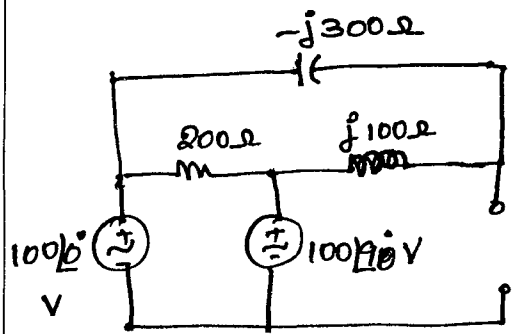

Figure Q.13a

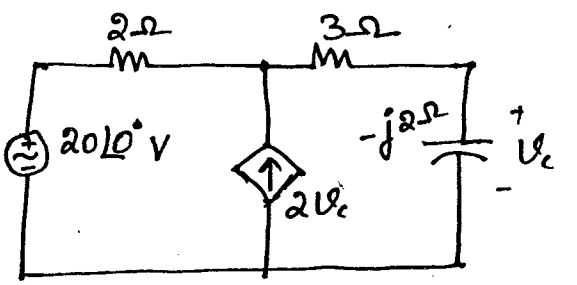

Figure Q.13b

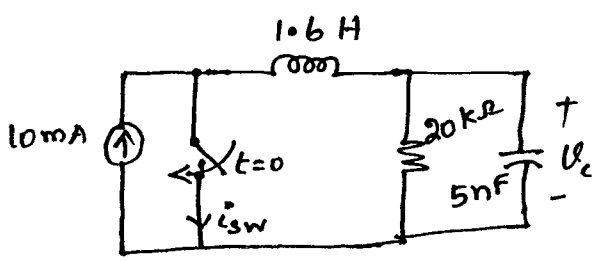

Figure Q.14a

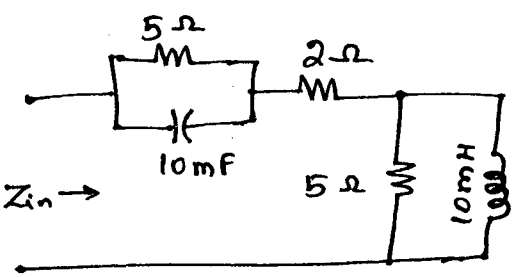

Figure Q.14b

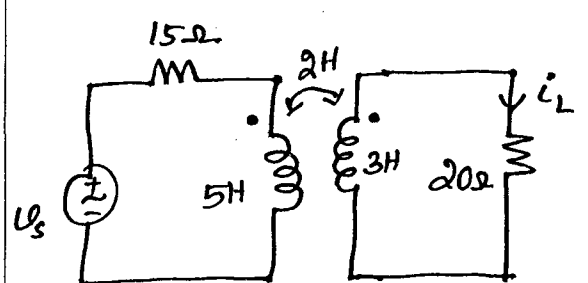

Figure Q.15a

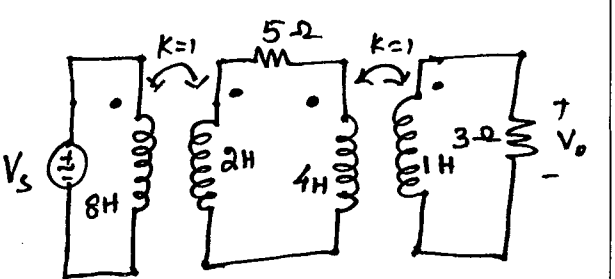

Figure Q.15b