C 3173

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Second Semester

Electronics and Communication Engineering

EC 1151 — CIRCUIT ANALYSIS

(Common to B.E. (Part-Time) First Semester – Regulation 2005)

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define current and voltage.

2. What is the equivalent resistance across A and B in Figure 2 when the source is (a) voltage (b) current?

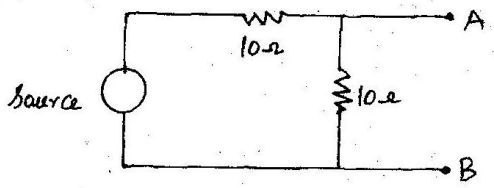

Figure 2

3. Define linear and bilateral network.

4. All the resistors in delta are equal and converted into star network. Which network has the larger resistance?

5. What is the relation between voltage and current in (a) inductor (b) capacitor?

6. Define power factor. What is its relation on different power?

7. What is transient?

8. What is resonance?

9. Define Duality.

10. What is meant by coefficient of coupling? When do you get maximum mutual inductance?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Find the equivalent resistance across A and B in Figure. 11 (a) (i). (8)

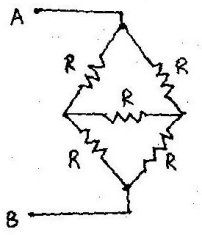

Figure. 11 (a) (i)

(ii) Find the current i in 5Ω resistor in Figure. 11 (a) (ii). (8)

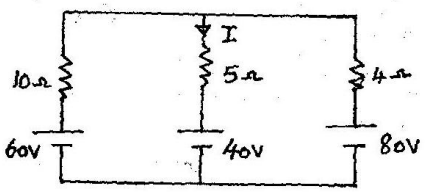

Figure. 11 (a) (ii)

Or

(b) (i) Find the equivalent resistance across A and B in Figure 11 (b) (i). (6)

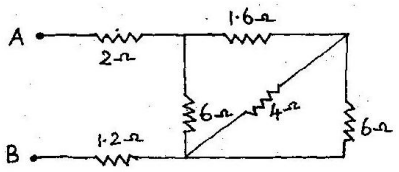

Figure 11 (b) (i)

(ii) Find the voltage V in figure 11 (b) (ii) such that the current in 8.4 V is zero. (10)

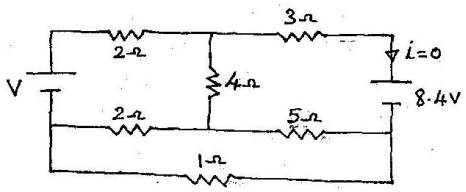

Figure 11 (b) (ii)

12. (a) Find the current i in the circuit shown in Figure 12 (a) using superposition.

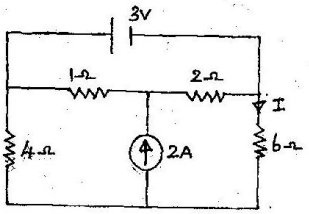

Figure 12 (a)

Or

(b) Find the load resistance for maximum power across it as shown in Figure 12 (b). What is the maximum power?

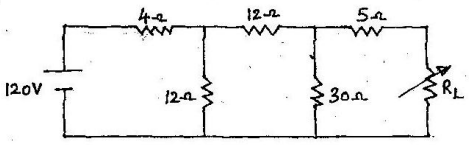

Figure 12 (b)

13. (a) Find the current i in the circuit shown in Figure 13 (a).

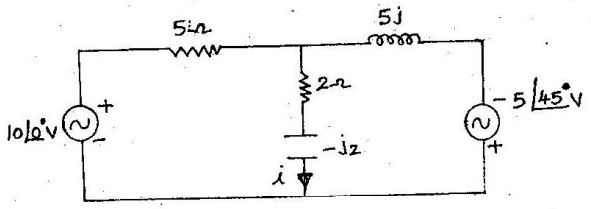

Figure 13 (a)

Or

(b) Find the power factor, average power, apparent power and reactive power in the circuit shown in Figure 13 (b).

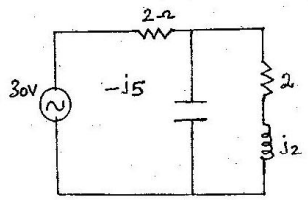

Figure 13 (b)

Figure 13 (b)

14. (a) Find the current $i(t)$ for $t > 0$ when the switch is closed when $t = 0$ in hte circuit shown in Figure 14 (a).

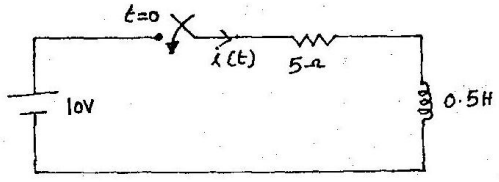

Figure 14 (a)

Or

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(b) (i) Derive the resonant frequency of a parallel R, L, C circuit. (6)

(ii) Find the quality factor, bandwidth and half-power frequencies of a series RLC circuit with $R = 16\ \Omega$, $L = 5$ mH and $C = 2\ \mu$F. (10)

15. (a) (i) Find the dual network for the figure shown in Figure 15 (a) (i). (6)

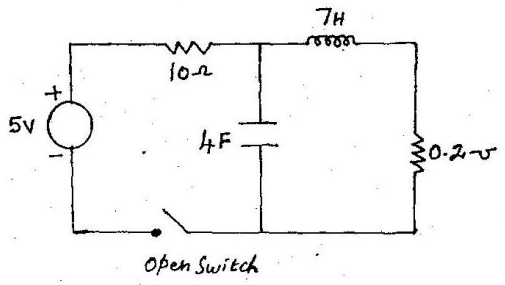

Figure 15 (a)-(i)

(ii) Find the secondary current i_s in the coupled circuit shown in Figure 15 (a) (ii). (10)

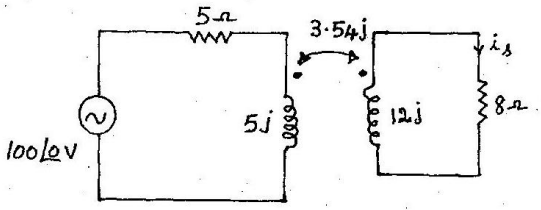

Figure 15 (a) (ii)

Or

(b) (i) Find all possible trees for the circuit shown in Figure 15 (b) (i). (10)

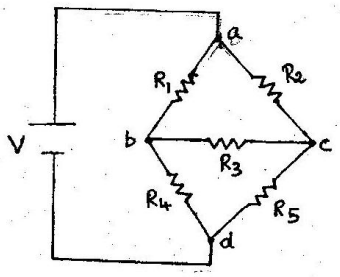

Figure 15 (b) (i)

(ii) How do you get the loop equation from the tie-set matrix? Use Figure 15 (b) (i) for your example? (6)

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