

D 2339

(Pages : 5)

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THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION  
DECEMBER 2009

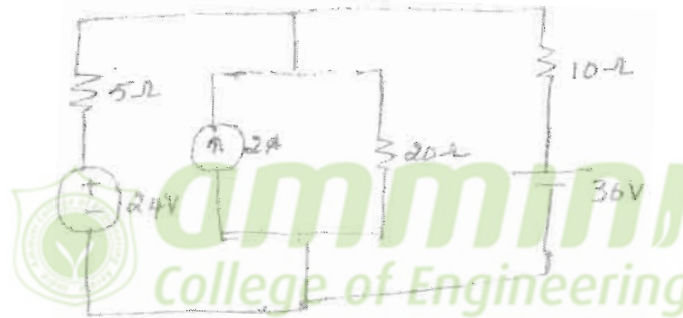
CS-04-306--ELECTRIC CIRCUITS AND SYSTEMS

(2004 admissions)

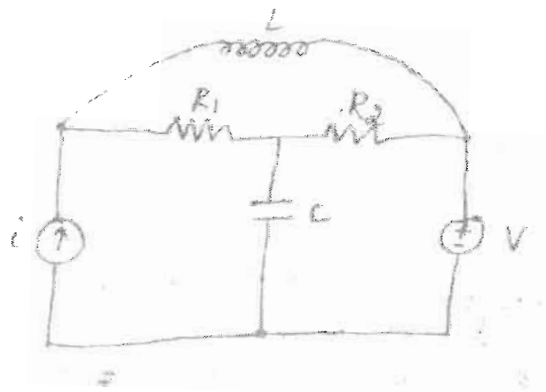
Time : Three Hours

Maximum : 100 Marks

1. (a) For the circuit shown in Fig. use node analysis to find the current delivered by the 24 V source



- (b) For the circuit shown in Fig. (i) Draw the oriented graph ; (ii) Find the tie-set schedule.

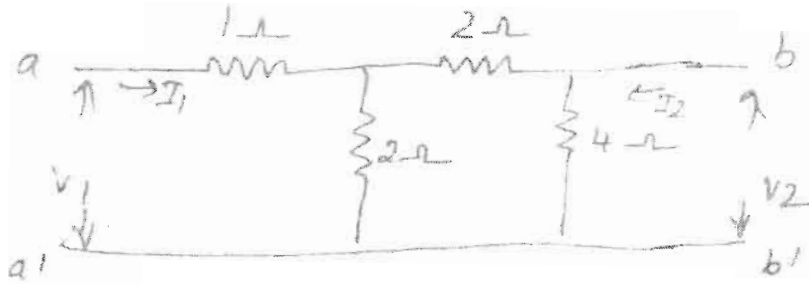


- (c) Short note on "Frequency response".  
(d) State and explain the Thevenin's Theorem

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2(a) Find the Z parameters of the network shown in Fig



(ii) Explain the principle of Admittance bridge with diagram

(iii) Reduce the block diagram representation of the following to canonical form

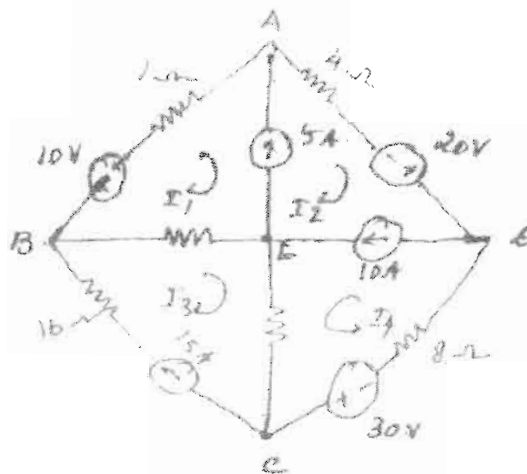


(iii) The open loop transfer function of a system is given by  $G(s)H(s) = \frac{30}{s(1+5s)(1+0.08s)}$

Determine the gain Margin

(8 × 5 = 40 marks)

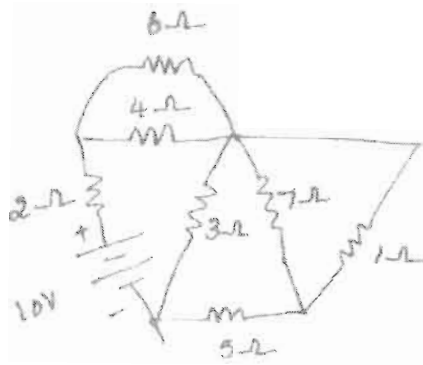
2 (a) Determine the loop currents for the circuit shown in Fig. by using mesh analysis.



(8 marks)

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(d) Write the incidence matrix for the network shown in Fig



Or

(c) Explain Node Analysis for writing equilibrium equations.

(2 marks)

(d) Explain briefly cut set schedule.

(1 marks)

(e) Explain the following term in network topology :

1. Tree.
2. Branch.
3. Oriented graph.
4. Incident Matrix.

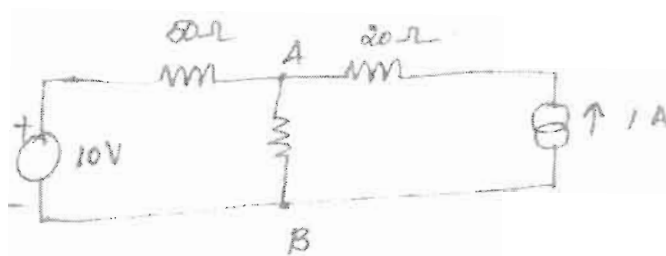


(3 marks)

(f) Short note on "coupled circuits".

(1 marks)

3. (a) Determine the voltage across 200 Ω resistor in circuit by Norton's theorem



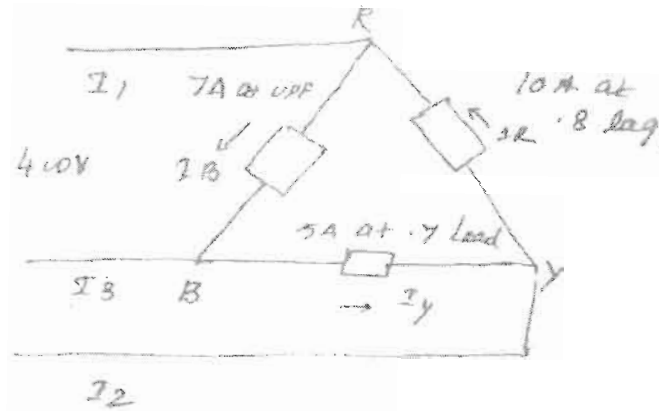
(b) A symmetrical 3-phase 440 V system supplies balanced delta-connected load. The branch current is 10 A at a phase angle of  $30^\circ$  lagging find (i) the line current ; (ii) the total active power and (iii) the total reactive power

Or

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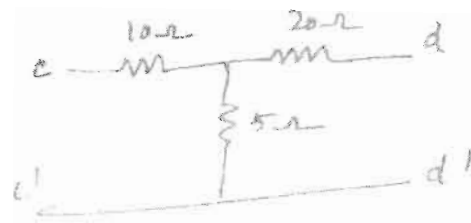
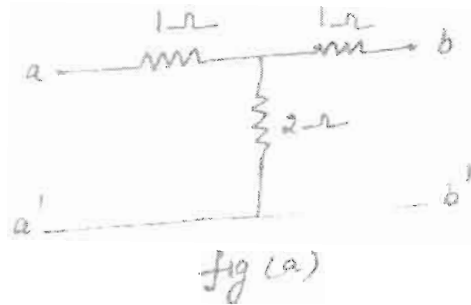
(c). Find the line currents and the total Power Consumed by the unbalanced delta-connected load shown in Fig.



- (d) State and explain the minimum power transfer theorem.
4. (a) Derive the expression of Z-parameters in terms of Y parameters.  
 (b) Explain the principle of Maxwell's bridge with diagram.



- (c) Explain different types of connections of two port networks. (8 marks)
- (d) Two networks shown in Fig. (a) and (b) are connected in series. Obtain the Z parameters of the combination. Also verify by direct calculation.

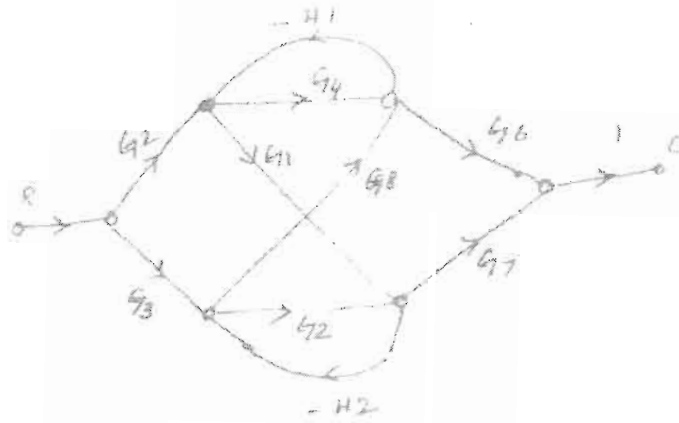


(8 marks)

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- (a) Write any six rules in block diagram reduction algebra.  
 (b) Find C/R for the system shown in Fig

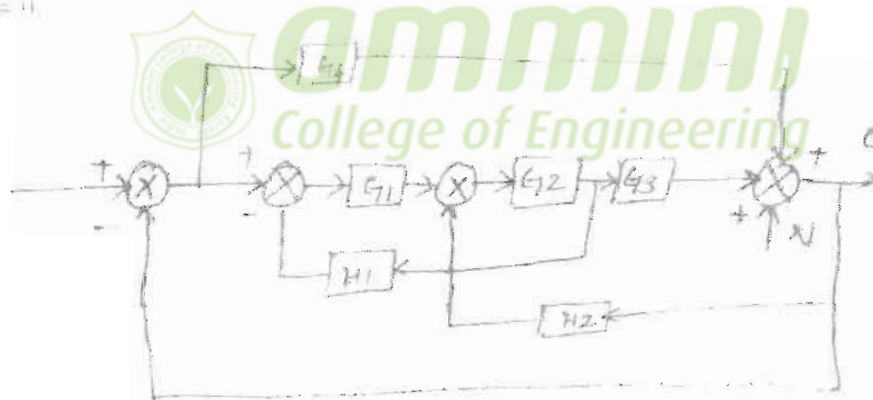
(6 marks)



(6 marks)

Or

- (c) Find the transfer function for the system shown in Fig. Use Mason's gain formula. Assume  $N=0$ .



- (d) Draw the Bode diagram for the following transfer function.

$$G(j\omega) = \frac{10(j\omega + 3)}{(j\omega)(j\omega + 2)[(j\omega)^2 + (j\omega + 2)]}$$

(5 marks)

[4 × 15 = 60 marks]