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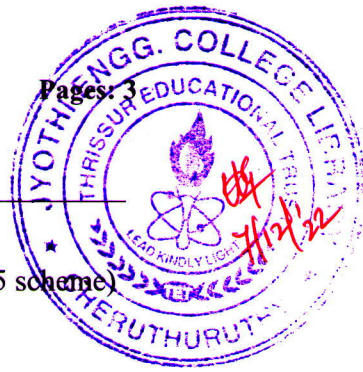
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Reg No.: _____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech Degree (S,FE) Examination December 2022 (2015 scheme)



Course Code: EC201

Course Name: NETWORK THEORY

Max. Marks: 100

Duration: 3 Hours

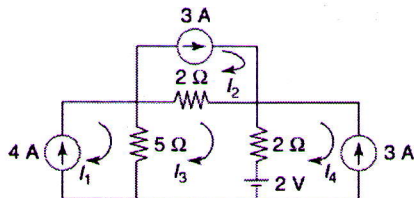
PART A

Answer any two full questions, each carries 15 marks.

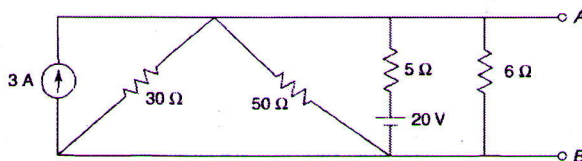
Marks

- 1 a) Find the current through the $5\ \Omega$ resistor in the network of Fig

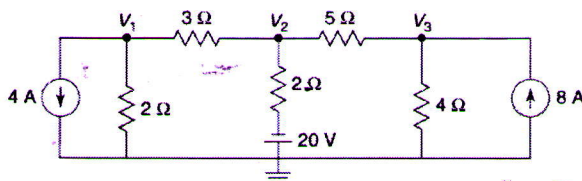
(8)



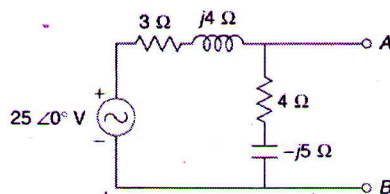
- b) Replace the circuit between A and B in Fig. with a voltage source in series with a single resistor. (7)



- 2 a) Calculate the current through the $5\ \Omega$ resistor for the network shown in Fig. using node analysis (10)

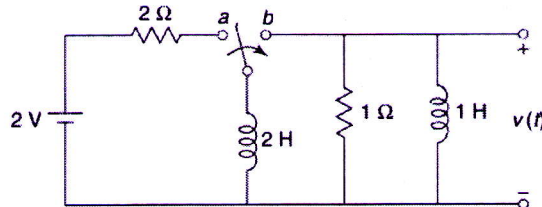


- b) Classify independent and dependent sources mentioning the different types of dependent sources. (5)
- 3 a) State and prove initial value and final value theorem (7)
- b) Obtain Norton's equivalent network between terminals A and B as shown in Fig. (8)

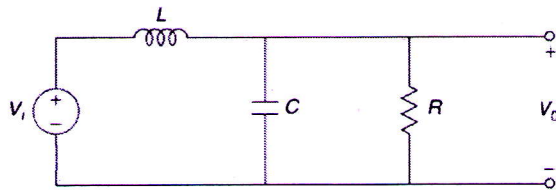


PART B*Answer any two full questions, each carries 15 marks.*

- 4 a) Find the inverse Laplace transform of $\frac{3s+1}{(s+1)(s^2+2)}$ (5)
- b) The network of fig was initially in the steady state with the switch in the position a. At $t = 0$, the switch goes from a to b. Find an expression for voltage $v(t)$ for $t > 0$. (10)



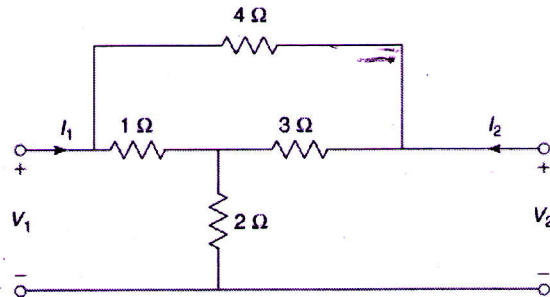
- 5 a) Find the response of a series RL circuit for unit step input signal (7)
- b) List any 4 properties of transfer function and driving point function (8)
- 6 a) For the transfer function $H(s) = \frac{V_o}{V_i} = \frac{10}{s^2+3s+10}$, realise the function using the network shown in Fig. Find L and C when $R = 5\Omega$. (8)



- b) Find the time domain response of the network function $F(s) = \frac{4s}{s^2+5s+4}$ from the pole-zero plot. (7)

PART C*Answer any two full questions, each carries 20 marks.*

- 7 a) Find the open-circuit impedance parameters for the network shown in Fig. Determine whether the network is symmetrical and reciprocal. (12)



- b) Write short note on characteristic impedance and image parameter (8)
- 8 a) Currents I_1 and I_2 entering at Port 1 and Port 2 respectively of a two-port network are given by the following equations: (12)

$$I_1 = 0.5V_1 - 0.2V_2$$

$$I_2 = -0.2V_1 + V_2$$

Find Y, Z and ABCD parameters for the network

- b) A series RLC circuit has the following parameter values: $R = 10 \Omega$, $L = 0.01 \text{ H}$, $C = 100 \text{ mF}$. Compute the resonant frequency, bandwidth, and lower and upper frequencies of the band-width. (8)
- 9 a) Compare series and parallel resonant circuit parameters (5)
- b) Two coils having self-inductances of 4 mH and 7 mH respectively are connected in parallel. If the mutual inductance between them is 5 mH, find the equivalent inductance. (5)
- c) Write mesh equations for the network shown in Fig (10)

