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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

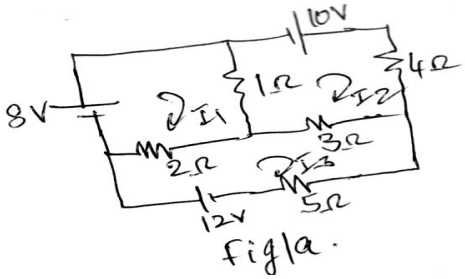
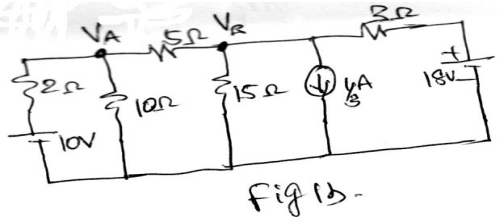
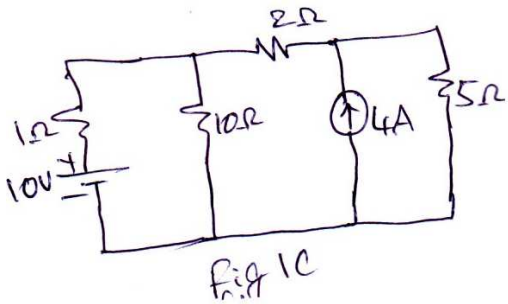
Third Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; Dec. - 2019

Network Analysis

Time: 3 hrs *Max. Marks: 100*

Note: I) **PART - A** is compulsory. One question for 2 marks from each unit.
II) **PART - B**: Answer any **two** sub questions (from a, b, c) for Maximum of 18 marks from each unit.

Q. No.		Questions	Marks
		I : PART - A	**10**
I	a.	State superposition theorem.	2
	b.	What are the conditions for series resonance?	2
	c.	Define tree and co-tree.	2
	d.	What is gate function?	2
	e.	Obtain the pole zero plot for the following function: $F(S)=\frac{(S-1)(S)}{(S+2)(S+4)}$	2
		II : PART - B	**90**
		UNIT - I	**18**
1	a.	For the network shown in Fig. 1(a) determine the current through the 5 Ω resistor.  fig 1a.	9
	b.	Find VA and VB for the network shown in Fig. 1(b).  Fig 1b.	9
	c.	Determine the current in the 10Ω resistor for the network shown in Fig.1(c).  Fig 1c	9

Cont…2

UNIT - II **18**

2 a. Define;

i) Incidence matrix ii) Tie set matrix 9

iii) Cut set matrix iv) The number of a possible trees of a graph

b. For the network shown in Fig.2 (b). Write down the tie set matrix and obtain the network equilibrium equation in the matrix form using KVL .calculate the loop currents I, II, III, IV, V and VI are branches and choose 4, 5, 6 as twigs. 9

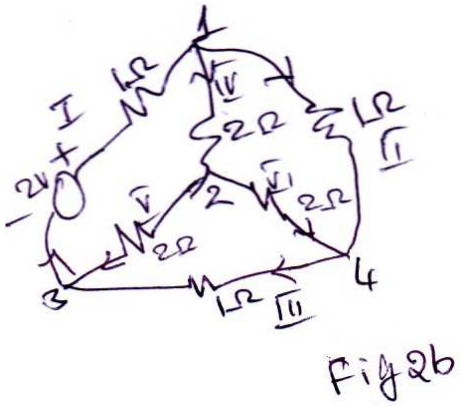


Fig 2b

c. What are the Dirichlet conditions? Explain the wave symmetry with examples. 9

UNIT - III **18**

3 a. For the network shown in Fig.3(a) the switch is closed at t = 0 with zero current in the inductor find $i, \frac{di}{dt}$ *and* $\frac{d^2i}{dt^2}$ *at* $t = 0^+$ 9

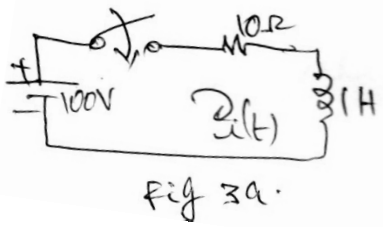


Fig 3a.

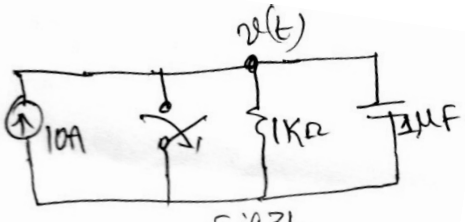


fig3b.

b. In the given network of Fig.3(b) the switch is opened at $t = 0$. *Solve for* $v, \frac{dv}{dt}$ *and* $\frac{d^2v}{dt^2}$ *at* $t = 0^+$ 9

c. I) State and prove time shifting theorem and show that for the periodic signals, 6

$$F(S) = \frac{F_1(S)}{(1 - e^{-TS})}.$$

II) Sketch the wave forms for, i) t ii) $tu(t)$ iii) $tu(t-T)$ 3

Contd...3

UNIT - IV

4 a. At t = 0 unit phase voltage of unit width is applied to a series RL circuit as shown in Fig. 4(a). Obtain an expression for *i(t)*. 9

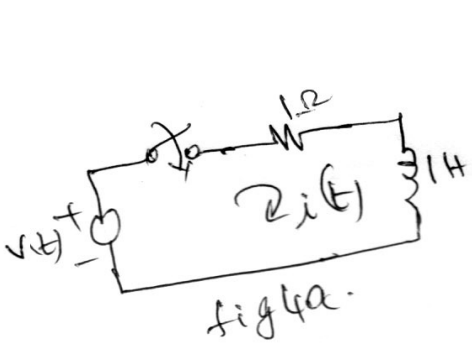


fig 4a.

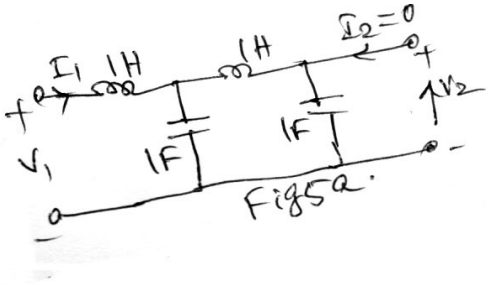


Fig 5a.

b. Write the transformed impedance and the transformed network for the, 9

i) R ii) L iii) C elements with their corresponding equation (both KVL and KCL)

c. State and prove convolution theorem and Borell's theorem. 9

UNIT - V **18**

5 a. Find the network functions $\frac{V_1}{I_1}, \frac{V_2}{V_1}$ *and* $\frac{V_2}{I_1}$ for the network shown in Fig.5(a) 9

b. Determine the Z-parameters for the network shown in Fig. 5(b).

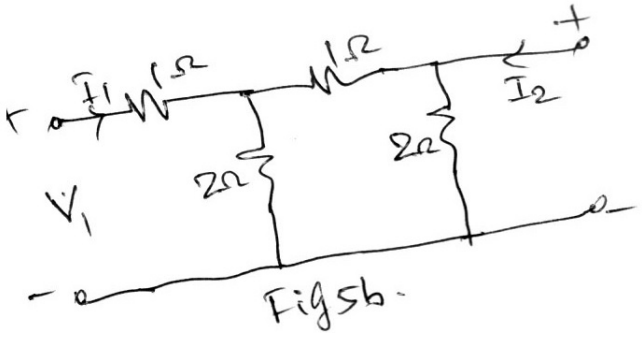


Fig 5b.

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c. A balanced star connected load having an impedance of $Z_{ph} = 10\angle 30\,\Omega$. is connected in star across a balanced 3ϕ, 4 wire supply of 200 V. determine the line current , power absorbed and also draw the vector diagram. Phase reference is RYB. 9

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