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

(An Autonomous Institution affiliated to VTU, Belagavi)

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

Semester End Examination; Dec. - 2019

Network Analysis and Synthesis

Time: 3 hrs *Max. Marks: 100*

Note: i) PART - A is compulsory. **Two** marks for each question.

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 Thevenin theorem.	2
b.	Define bandwidth and selectivity of a series RLC circuit.	2
c.	Find the Laplace transform of damped hyperbolic sine function $e^{-at}\sin(wt)$.	2
d.	Define the following: i) link ii) sub-graph	2
e.	Determine whether the polynomial $P(s) = s^3 + 3s^2 + 2s + 1$ is Hurwitz or not.	2
	II : PART - B	**90**
	UNIT - I	**18**
1 a.	Find the nodal voltage in the circuit.	9

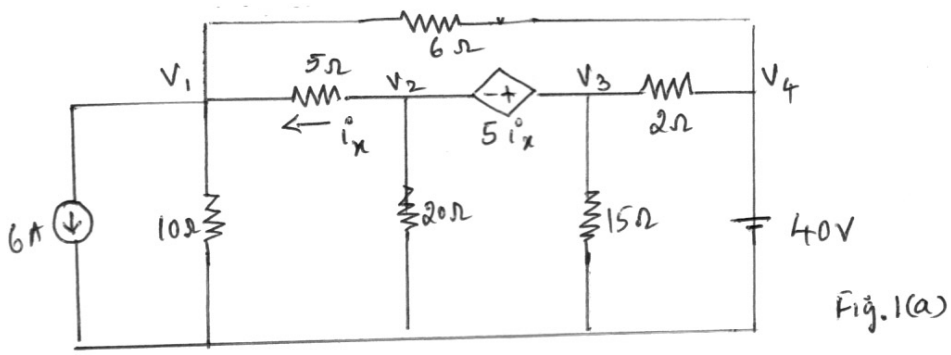

Fig. 1(a)

b. Find equivalent resistance at terminal AB in Fig.1(b) 9

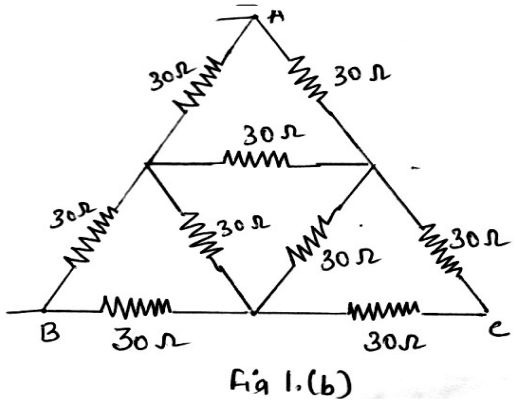

Fig 1.(b)

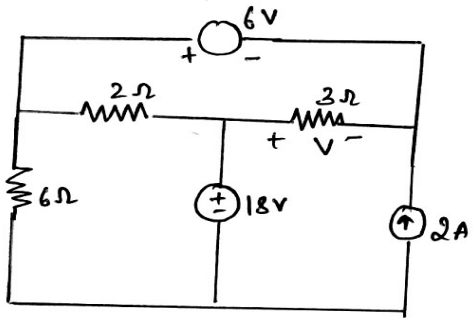

Fig 1.(c)

Contd....2

c. Find the voltage 'V' across 3 Ω resistor using super position theorem for the circuit given in Fig.1(c). 9

UNIT - II **18**

2 a. What is resonance? Show that resonant frequency of series resonance circuit is equal to geometric mean of two half power frequencies. 9

b. A parallel resonant circuit has a coil of 150 μH with Q factor of 100 and is resonated at 1 M Hz;

i) Specify the required value of capacitance

ii) What is resistance of coil? 9

iii) What is resistance of circuit at parallel resonance?

iv) What is absolute band width of resonant circuit?

c. Determine $v, \frac{dv}{dt}, \frac{d^2v}{dt^2}$ *at* $t = 0^+$ when the switch *k* is opened at *t* = 0 for the Fig. 2(c). 9

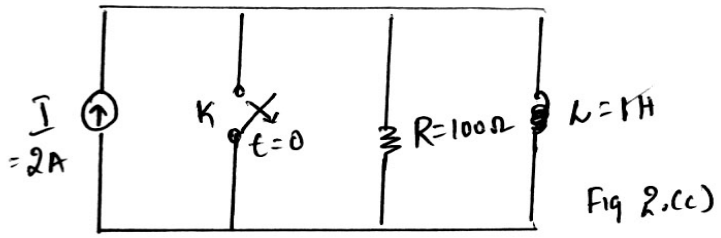

Fig 2.(c)

UNIT - III **18**

3 a. Use initial and final value theorem to find *f (0)* and *f (∞)* for the following :

$i) F(s) = \frac{s^3 + 7s^2 + 5}{s(s^3 + 3s^2 + 4s + 2)}$ $ii) F(s) = \frac{e^{2S}/(s+2)}{s^2 + 5}$

$iii) F(s) = \frac{s(s+4)(s+8)}{(s+1)(s+6)}$ 9

b. Find the inverse Laplace transform of $f(s) = \frac{2s+4}{(s^2 + 4s + 13)}$. 9

c. In the series RL circuit shown in Fig.3(c) the source voltage is *V(t) = 50 sin 250t V*. Determine the resulting current, if the switch is closed at *t* = 0. 9

UNIT - IV **18**

4 a. Define Z parameters for the network shown in Fig. 4(a). 9

b. Determine the transmission parameters for the network shown in the Fig.4 (b). 9

c. In the network shown in Fig.4(c) consider branches 1, 3, 4 forming a tree. Write a tie set schedule and hence write equilibrium equation on loop current basis and find values of loop currents consider that the branch number indicates value of resistance in that branch. 9

Contd....3

UNIT - V **18**

5 a. Test whether $F(s)=\dfrac{2s^3+2s^2+3s+2}{s^2+1}$ is positive real function. 9

b. Realize foster form–II for the following LC impedance function $Z(s)=\dfrac{(s^2+1)(s^3+3)}{s(s^2+2)(s^2+4)}$. 9

c. Realize caver foster–I forms for the following RC impedance function $Z(s)=\dfrac{s+4}{(s+2)(s+6)}$. 9

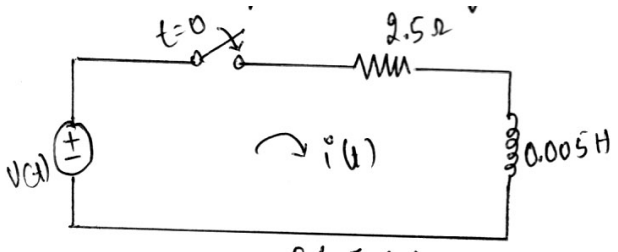

Fig 3.(c)

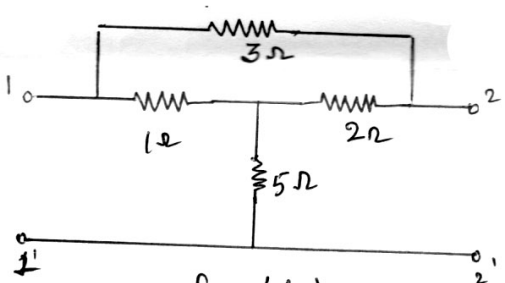

Fig. 4(a)

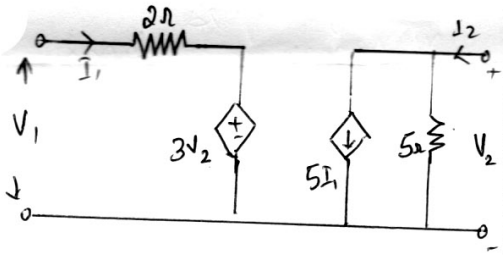

Fig 4(b)

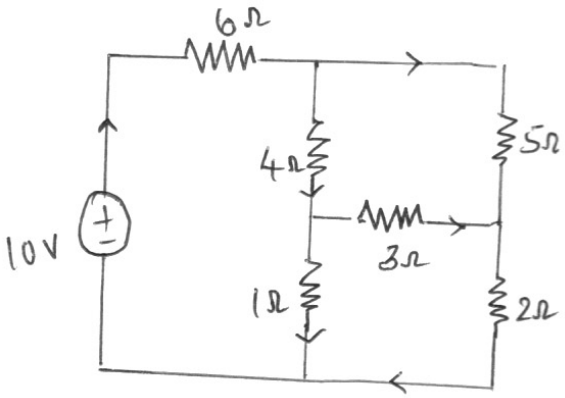

Fig 4(c)

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