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PES University, Bengaluru

(Established under Karnataka Act No. 16 of 2013)

UE16EC201

DECEMBER 2017: END SEMESTER ASSESSMENT (ESA) B.TECH III SEMESTER

UE16EC201 - Network Analysis and Synthesis

Time: 3 Hours | Answer All Questions | Max Marks: 100

1	a.	Find the total resistance between terminals AB of the network shown in figure 1a	04

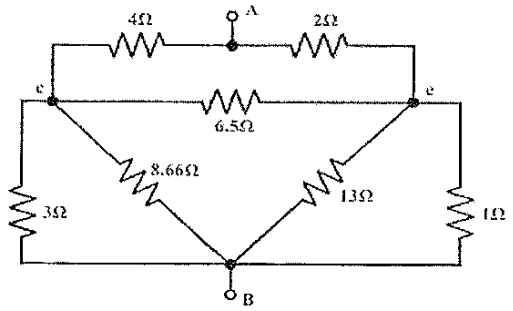

Figure 1a

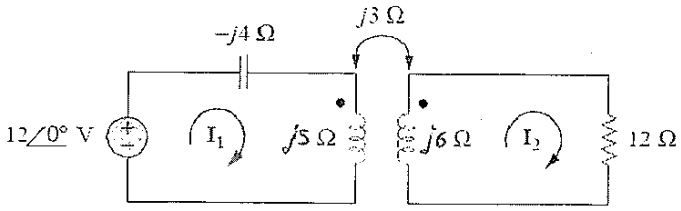

Figure 1b

	b.	Calculate the currents I_1 and I_2 in the magnetically coupled circuit shown in figure 1b	06
	c.	Write the dual of the circuit shown in figure 1c and write the elementary values of all the circuit elements.	04

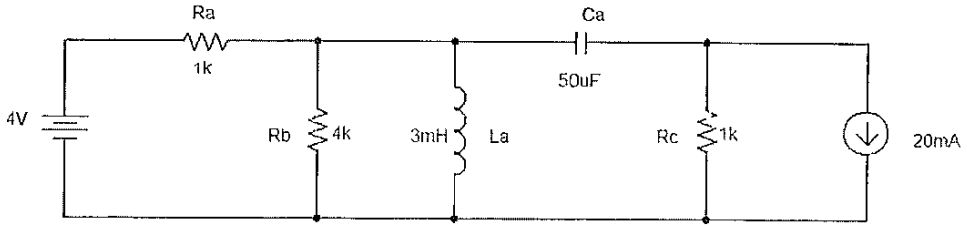

Figure 1c

	d.	Apply nodal analysis to find branch current i_x in the circuit of figure 1d	06

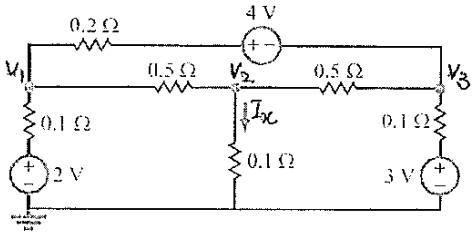

Figure 1d

2	a.	Using law of superposition, find V_{ab} in the circuit of figure 2a	05

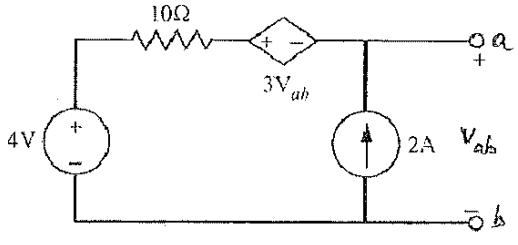

Figure 2a

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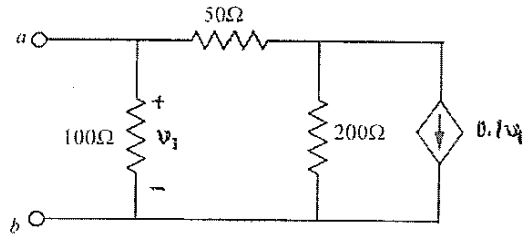
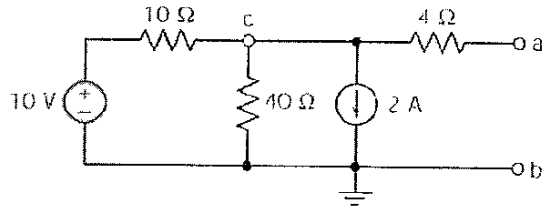
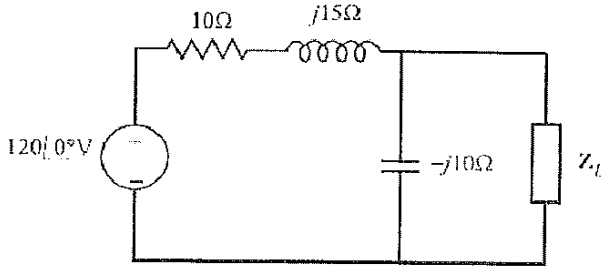
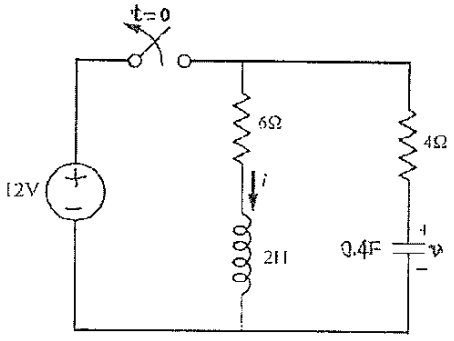
	b.	Find Norton's equivalent across terminals ab in the network shown in figure 2b.  **Figure 2b**	05
	c.	Find Thevinin's equivalent circuit for the network shown in figure 2c across the open circuited terminal.  **Figure 2c**	04
	d.	What is the value of load impedance Z_L that will absorb the maximum average power? What is the value maximum power absorbed?  **Figure 2d**	06
3	a.	A series RL circuit is connected in series with a battery of 12V and switch 'k'. Switch k is closed at $t = 0$. Assuming zero initial current in the inductor, find the values $i(0+), \frac{di}{dt}(0+)$ and $\frac{d^2i}{dt^2}(0+)$. Value of R= 8Ω and L=0.2H.	05
	b.	Referring to the circuit shown in figure 3b, the switch was closed for long time before it was open at $t = 0$. Find the following, i. $i(0+)$ and $v(0+)$ ii. $\frac{di}{dt}(0+)$ and $\frac{dv}{dt}(0+)$ iii. $i(\infty)$ and $v(\infty)$  **Figure 3b**	09
	c.	Find time domain solution for V_o applicable for $t \geq 0$ in the circuit of figure 3c	06

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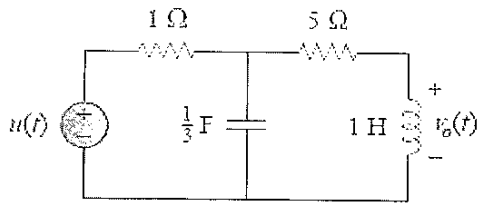
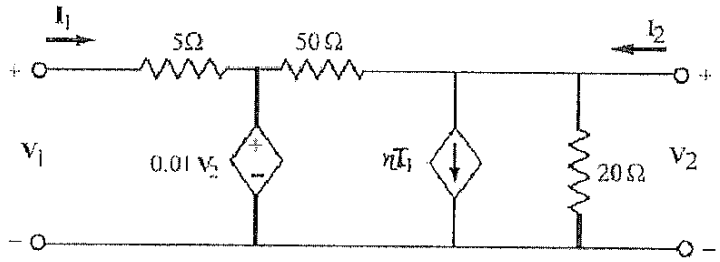
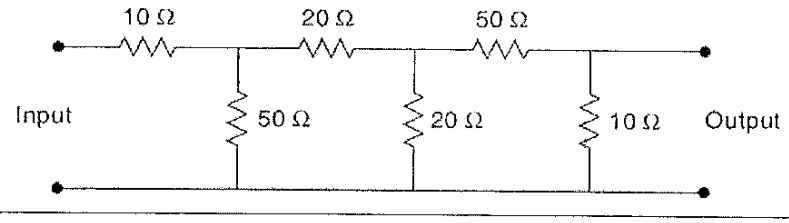


Figure 3c

4	a.	Find Y_{12} and Y_{21} for the circuit shown below for n = 10. What is the value of n for circuit to be reciprocal?  Figure 4a	06
	b.	Using the concept of interconnection of two port networks, find T-parameters of the network shown in figure 4b.  Figure 4b	08
	c.	The h-parameters of the two-port network are given. Find the y – parameters for the network. $\begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix} = \begin{bmatrix} 5 & 2 \\ 3 & 6 \end{bmatrix}$	06
5	a.	Find whether the following functions are realizable and give reason for your answer. $i)\ Z(s) = s^2 + 1$ $ii)\ Z(s) = \frac{s^2+1}{s^3}$	04
	b.	Synthesize the Foster I form and Foster II form for the network function $Z(s) = \frac{s(s^2+2)}{(s^2+1)(s^2+3)}$	10
	c.	List out the properties of LC immittance function and then realize the network having the driving point impedance function $Z(s) = \frac{2s^5+12s^3+16s}{s^4+4s^2+3}$ using cauer I form.	06

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