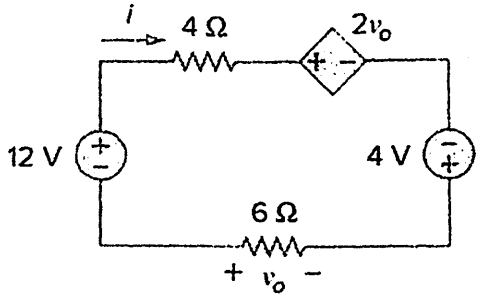
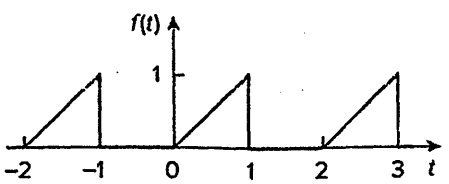
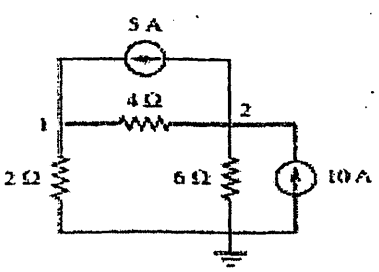
Jamia Hamdard
Department of Computer Science & Engineering
School of Engineering Sciences & Technology
New Delhi-110062
Odd Semester Examination – 2024
BACKLOG

Paper Name: Network Theory **Paper code: BTECE 304**
Time: 3 Hours **Maximum Marks: 75**

Section A

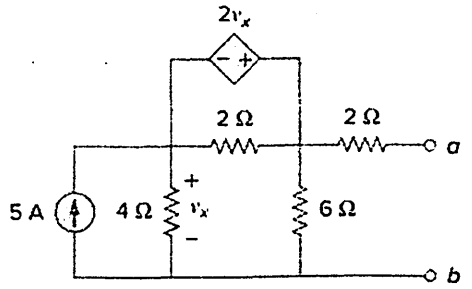
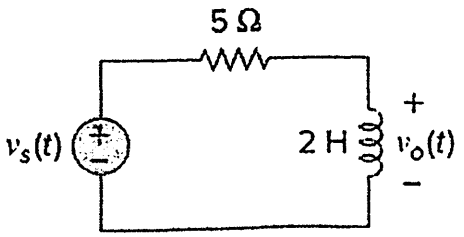
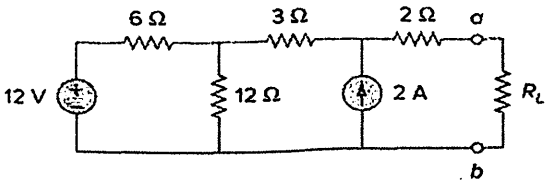
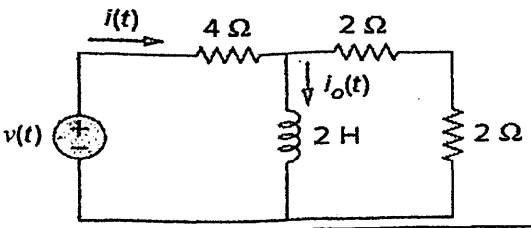
Note: All questions are compulsory in this section **(7 X 5 = 35)**

Q.no	Questions	CO	BL
1.	Explain KVL and KCL? Find current i and v_o 	CO1	L2
2.	Obtain the Fourier series for the periodic function in Figure below and find the amplitude and phase spectra. 	CO2	L4
3.	For a circuit diagram shown below, find the node voltage at node 1 and node 2 as shown in the figure. 	CO1	L3
4.	In a passive filter, what is the significance of -3dB frequency? Explain with the help of a frequency response curve for a low pass filter.	CO5	L2
5.	What are poles and zeros. Explain driving points and transfer function.	CO4	L3
6.	What are the necessary conditions based on which a periodic signal can be expressed using Fourier series expansion? Explain with the help of suitable waveforms.	CO3	L3
7.	Explain linearity property of Laplace transform. Obtain the Laplace transform of $f(t) = \delta(t) + 2u(t) - 3e^{-2t}\,u(t)$.	CO3	L2

Section B

Note: Attempt any four questions from this section **(4 X 10 = 40)**

Q.no	Questions	CO	BL
1.	Consider any linear circuit, and explain how a network can be solved with the help of Norton's and Thevenin's Theorem? Explain with the help of suitable steps and circuit	CO1	L3

	diagram. For the circuit diagram given below, find the Thevenin equivalent of the circuit below at terminals a-b? 		
2.	Also find the Fourier transform of the following functions a) $\delta(t - t_0)$ b) $\text{Sin}\,\omega_0 t$ c) $e^{j\omega_0 t}$	CO2	L2
3.	Write short notes on: a) Low Pass Filter b) High Pass Filter c) Band Stop Filter	CO5	L2
4.	Let the function f(t) be the voltage source $v_s(t)$ in the circuit of Figure below. Find the response $v_o(t)$ of the circuit. $$f(t) = \frac{1}{2} + \frac{2}{\pi}\sum_{k=1}^{\infty}\frac{1}{n}\sin n\pi t, \qquad n = 2k - 1$$ 	CO4	L5
5.	Explain Maximum power transfer theorem. Find the value of R_L for maximum power transfer in the circuit below. Find the maximum power. 	CO1	L1
6.	Find the response $i_o(t)$ of the circuit of Fig. 17.23 if the input voltage v(t) has the Fourier series expansion $$v(t) = 1 + \sum_{n=1}^{\infty}\frac{2(-1)^n}{1+n^2}(\cos nt - n\sin nt)$$ 	CO3	L5

BL – Bloom's Taxonomy Levels (1- Remembering, 2- Understanding, 3- Applying, 4- Analyzing, 5- Evaluating, 6- Creating)

Moderated