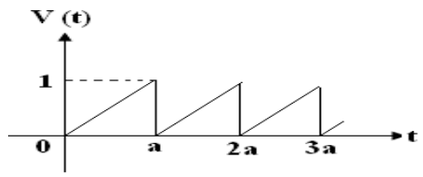
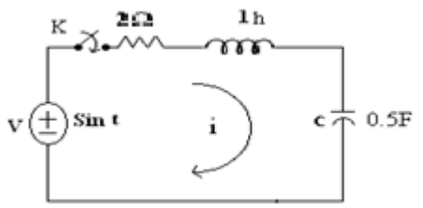
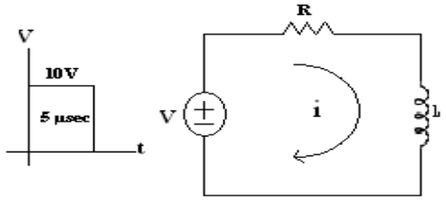
Q.5 i. Find the transform of the given waveform. **3**



ii. In the series RLC circuit shown, the applied voltage is v (t) = sin t for t>0. For the element values specified, find i(t) if the switch K is closed at t=0 using LT method. **7**

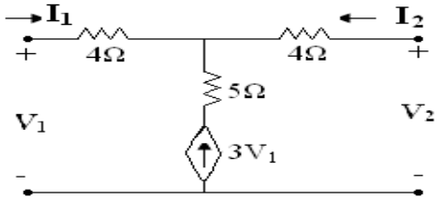


OR iii. A pulse of voltage of 10 V magnitude and 5 μsec duration is applied to the RL circuit. If R = 2Ω and L = 10 μH, find i(t). **7**

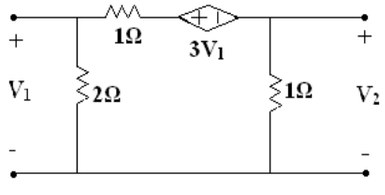


Q.6 i. Write the conditions of reciprocity and symmetry in two-port for Z, Y and T parameters. **3**

ii. Find Z and Y parameters for the figure shown below. **7**



OR iii. Find hybrid and ABCD parameters for the figure shown below. **7**



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Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2022

EE3CO28 Network Analysis

Programme: B.Tech. Branch/Specialisation: EE

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. The Kirchhoff's law fails in- **1**

(a) Linear circuits (b) Non-linear circuits
(c) Lumped parameter circuits (d) Distributed parameter circuits

ii. A graph which does not have a cut-set is called- **1**

(a) Complement graph (b) Unilateral graph
(c) Bipolar graph (d) Hinged graph

iii. A network is said to be nonlinear if it does not satisfy- **1**

(a) Superposition condition (b) Homogeneity condition
(c) Both (a) and (b) (d) Associative condition

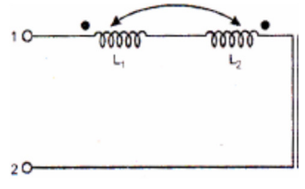
iv. Super positions theorem is not applicable in the network when it is varying- **1**

(a) Linear (b) Non-linear
(c) Time varying (d) Time invariant

v. Transient current in a circuit result from- **1**

(a) Voltage applied to the circuit
(b) Impedance of the circuit
(c) Changes in the stored energy in inductors and capacitors
(d) Resistance of the circuit.

vi. The equivalent inductance measured between the terminals 1 and 2 for the circuit shown in figure is: **1**



(a) $L_1 + L_2 + M$ (b) $L_1 + L_2 - M$
(c) $L_1 + L_2 + 2M$ (d) $L_1 + L_2 - 2M$

vii. Laplace transform of ramp function is- **1**
(a) $1/s^2$ (b) 1/s (c) s (d) s^2

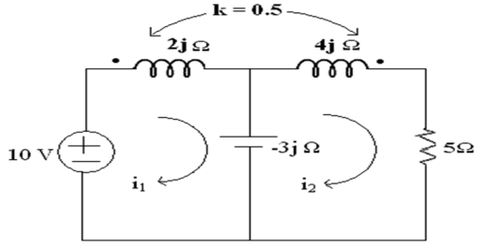
viii. Convolution theorem is used to find inverse Laplace transform of- **1**
(a) Product of two transform (b) Quotient
(c) Addition (d) None of these

ix. Example of two port network is- **1**
(a) Transformer (b) Transmission line
(c) Bridge circuit and transistor circuit (d) All of these

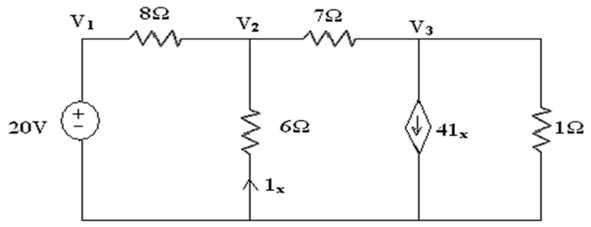
x. Two port networks are connected in cascade, the combination is to be represented as a single two port network, the parameters of the network are obtained by multiplying the individuals in- **1**
(a) Z parameter matrix (b) H parameter matrix
(c) Y parameter matrix (d) T parameter matrix

Q.2 i. Define Tree, Incidence matrix, Tie Set matrix, Cut Set matrix, oriented graph, Links, Twigs. **3**

ii. Determine the voltage drop across 5Ω resistance of the coupled circuits shown below. **7**

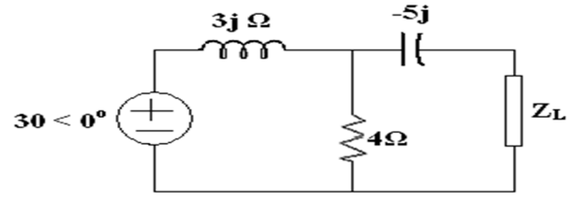


OR iii. In the network of the figure shown below, find V_1, V_2 and V_3 using nodal analysis. **7**

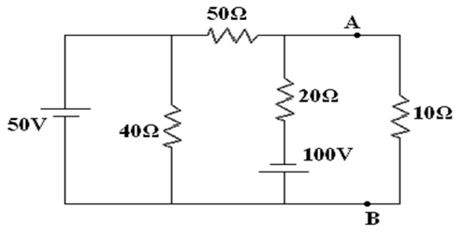


Q.3 i. State and explain Thevenin's theorem. **3**

ii. Determine the value of load, for which source will transfer the maximum power. Also determine the value of maximum power that can be transferred. **7**

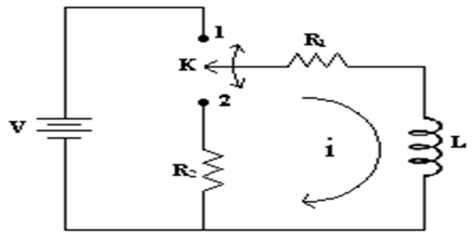


OR iii. Apply Milliman's theorem to find current through 10Ω resistor. **7**

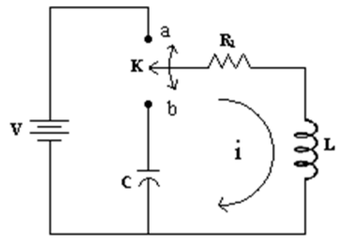


Q.4 i. Explain the concept of impedance and admittance for steady state analysis of any network. **3**

ii. In the network of the figure, the switch k is moved from position 1 to position 2 at t = 0, a steady state current having previously been established in the RL circuit. Find the particular solution for the current i(t). **7**



OR iii. In the network of fig., K is changed from position a to b at t=0. Solve for i, di/dt, and di^2/dt^2 at t=0+ if R=1000Ω, L=1H, C=0.1μF, and V=100V. **7**



Marking Scheme

EE3CO28 Network Analysis

Q.1	i)	c) Lumped parameter circuits	**1**
	ii)	d) Hinged graph	**1**
	iii)	c) both superposition and homogeneity conditions	**1**
	iv)	b) Non-linear	**1**
	v)	c) changes in the stored energy in inductors and capacitors	**1**
	vi)	d) $L_1 + L_2 - 2M$	**1**
	vii)	a) $1/s^2$	**1**
	viii)	a) product of two transform	**1**
	ix)	d) All of these	**1**
	x)	d) T parameter matrix	**1**
Q.2	i.	Define Tree, Incidence matrix, Tie Set matrix, Cut Set matrix, oriented graph, Links, Twigs.	**0.5*6=3**
	ii.	Finding the value of mutual inductance	**1**
		Writing the two equations	**3**
		Solving till final value	**3**
OR	iii.	Writing the two nodal equations	**2**
		Finding V_1, V_2 and V_3 values	**5**
Q.3	i.	State and explain Thevenin's theorem.	**1,2**
	ii.	Value of voltage	**3**
		Value of load	**2**
		value of maximum power that can be transferred.	**2**
OR	iii.	Formula used	**2**
		Applying Milliman's theorem to find current through 10Ω.	**5**
Q.4	i.	Explain the concept of impedance and admittance for steady state analysis of a any network.	**1.5*2=3**
	ii.	Different values at $t = 0^-$ condition	**2**
		Writing equations	**1**
		Solving it to final value	**4**
OR	iii.	Different values at $t = 0^-$ condition	**2**
		Solving for i, di/dt, and di^2/dt^2 at t=0+	**1,2,2**
Q.5	i.	Transform of the given waveform	**3**
	ii.	Writing equation	**1**
		Solving partial fraction	**3**
		Solving inverse Laplace transform to get i(t)	**3**
OR	iii.	Writing equation	**1**
		Solving partial fraction	**3**
		Solving inverse Laplace transform to get i(t)	**3**
Q.6	i.	Write the conditions of reciprocity and symmetry in two-port for Z, Y and T parameters.	**0.5*6=3**
	ii.	Find Z and Y parameters	**3.5*2=7**
OR	iii.	Find hybrid and ABCD parameters	**3.5*2=7**

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