Channel Name: Engg-Course-Made-Easy

Dear students,

Network theory (18EC32) (17EC35) (for 3rd sem ECE Branch)

Electric Circuit Analysis (18EE32) (17EE32) (for 3rd sem E&E Branch)

Network Analysis (18EI/BM/ML36) (for 3rd sem EI, Biomedical and ML Branches)

All above three are same subject with different titles. The syllabus is almost same.

In this PDF you can find solution of previous year question papers

of

18EC32, 17EC35 and 18EE32/17EE32

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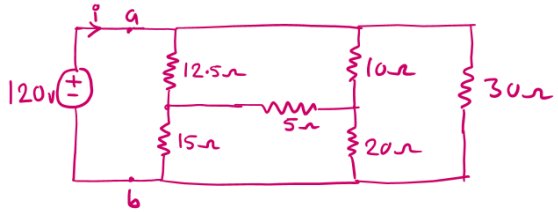
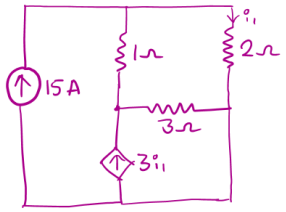
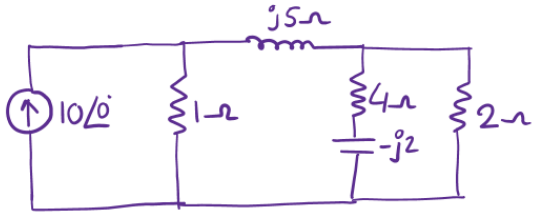
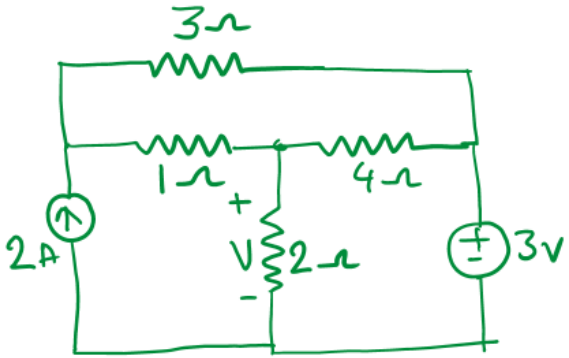
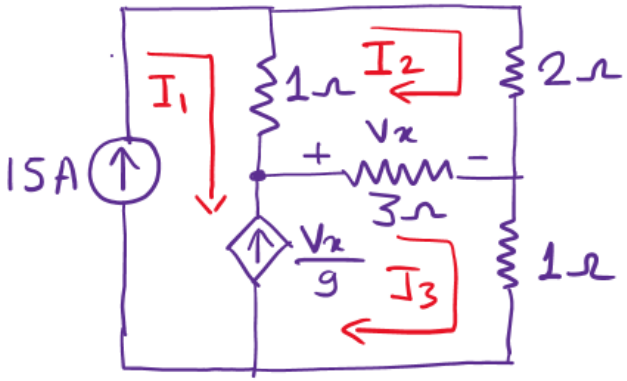
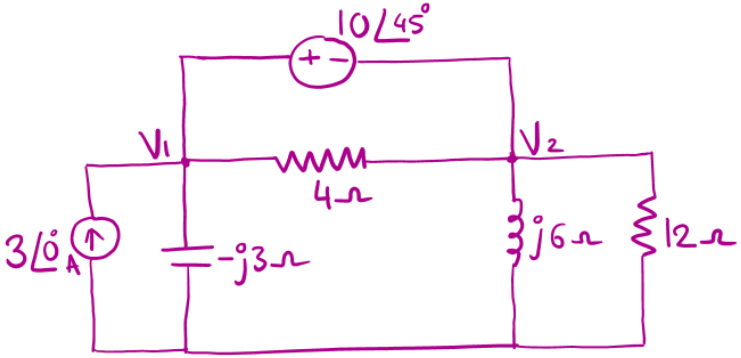
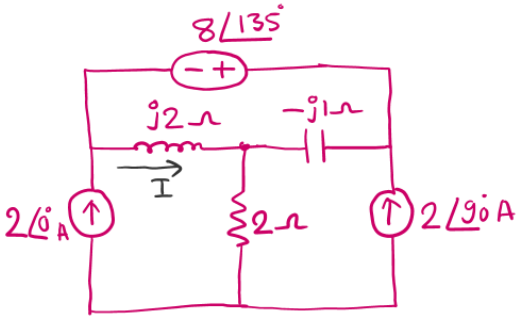
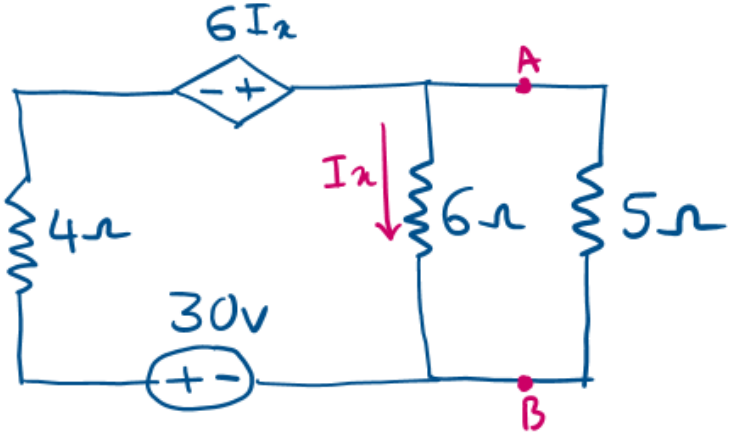
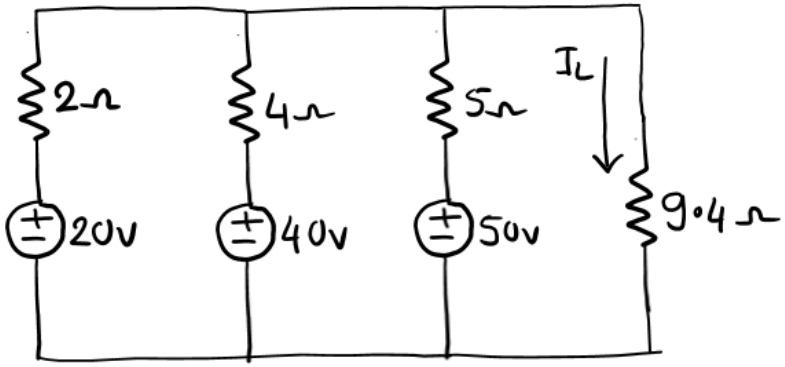
Subject: Network Theory (18EC32)

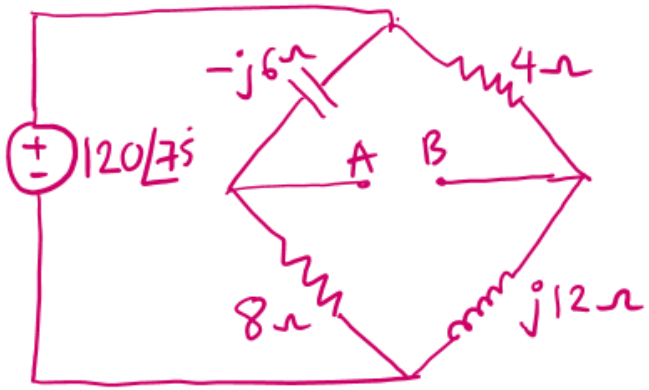
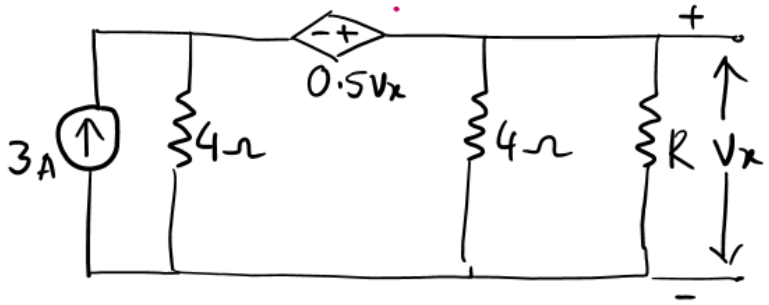
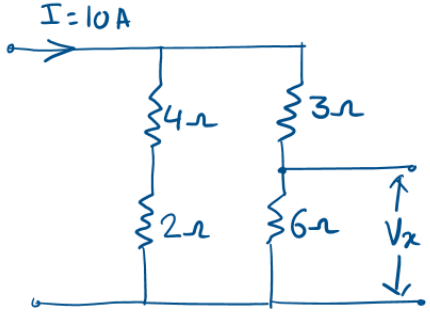
Solution for August 2021 Question paper

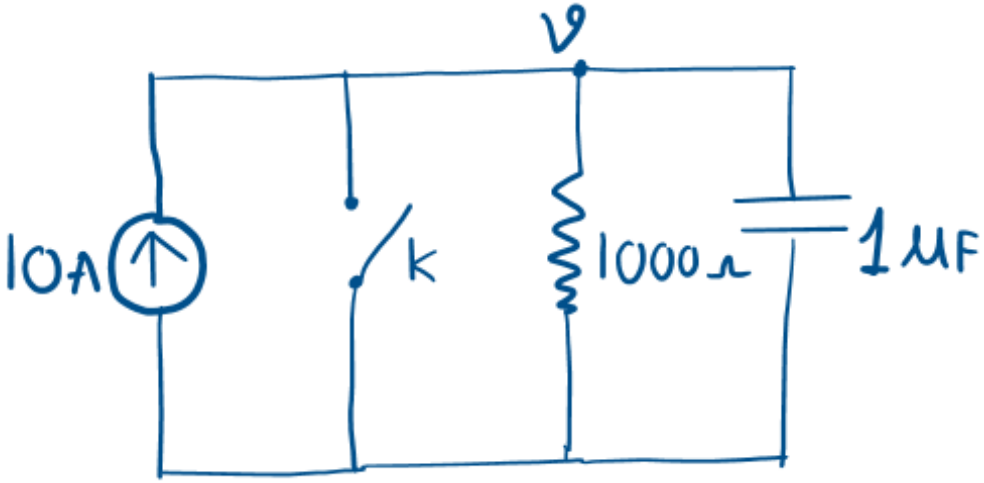
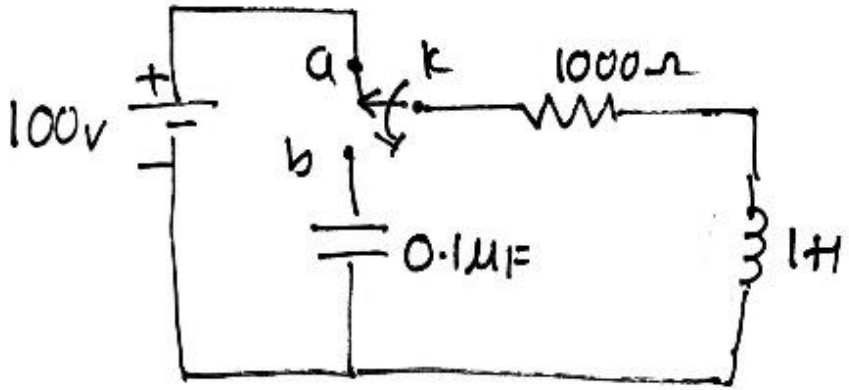
Click on Youtube video link to for the solution.

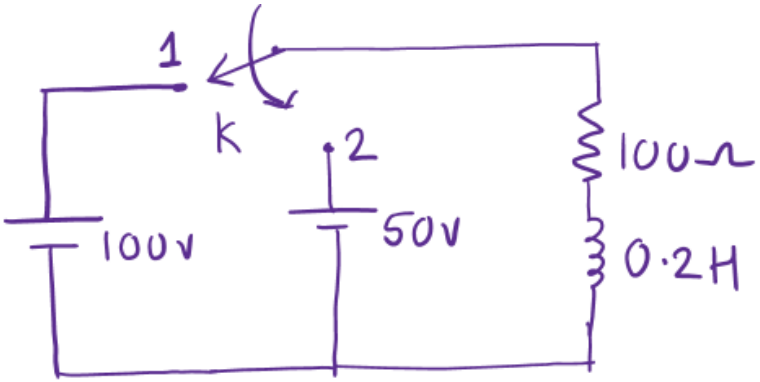
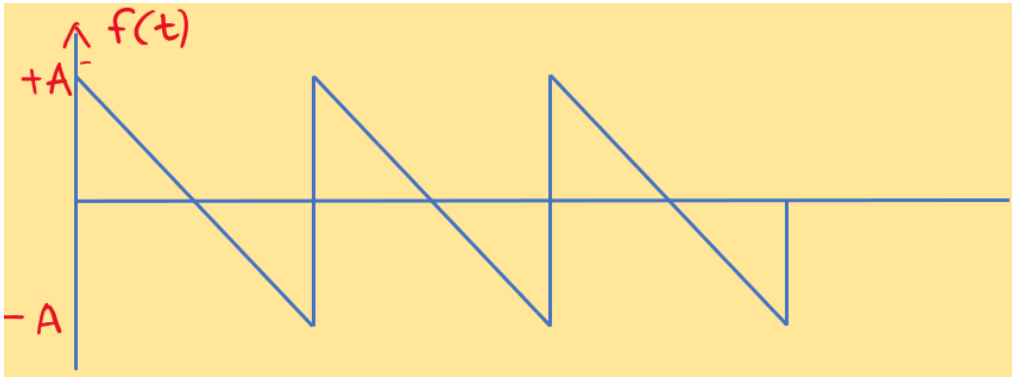
	Problem	You-Tube Link for solution
1a)	Find the equivalent resistance Rab for the circuit shown below and use it to find i. 	https://youtu.be/fi_vzCYzIZM
1b)	Determine the power supplied by the dependent source for the circuit shown below, use nodal analysis. 	https://youtu.be/0i3HZPZoXVc
1c)	Determine current through 2Ω resistor using mesh analysis 	https://youtu.be/ZGCiuUIRiL0

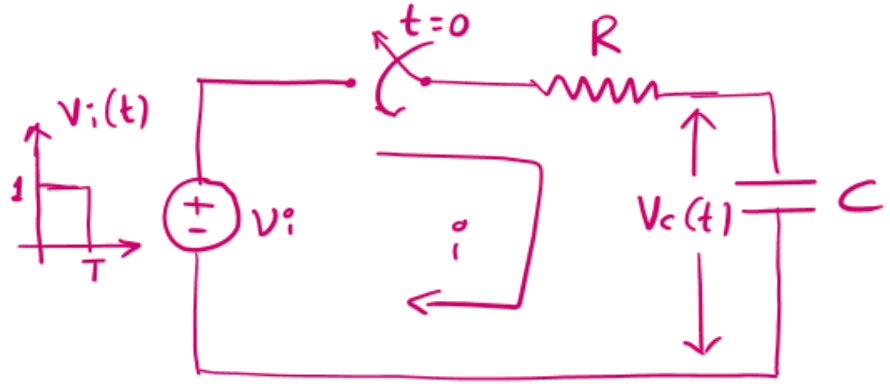
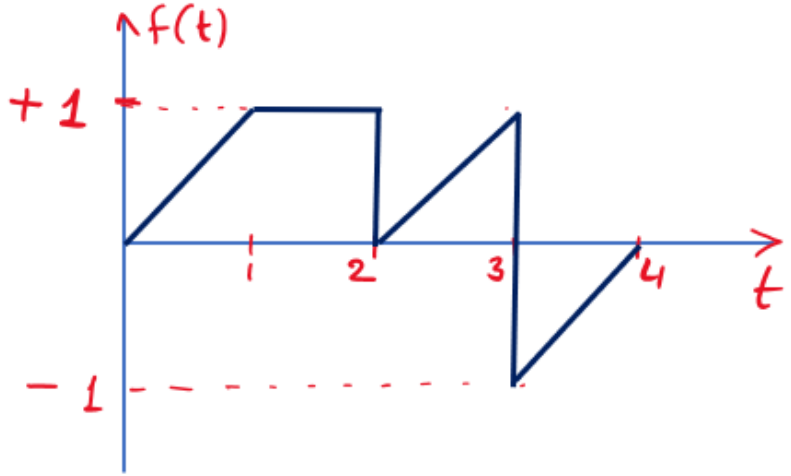
2a)	Using source transformation and source shifting find current through 2Ω resistor. 	**https://youtu.be/-IR91CwVmN4**
2b)	Find I1, I2 and I3 using mesh analysis 	**https://youtu.be/d351w3bGfws**
2c)	Compute V1, V2 in the circuit using nodal analysis. 	**https://youtu.be/U6pWVd68qNY**

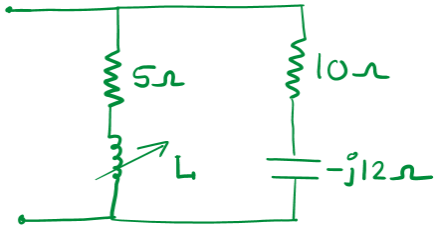
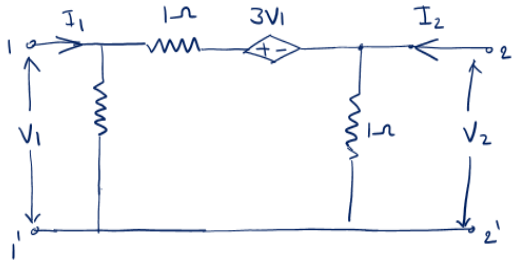
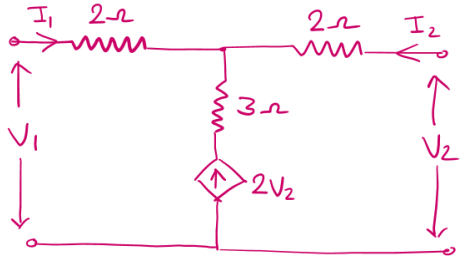
3a)	For the circuit shown below, use superposition theorem to find I. 	https://youtu.be/VHHavIM7PjU
3b)	Use Norton's theorem to find current through 5Ω resistor. 	https://youtu.be/FY4SuLMgICs
3 c)	State millman's theorem. Using Millman's theorem find IL. 	https://youtu.be/-w5EjIFXA_Y

4 a)	Find Thevenin's equivalent at terminals AB.  	**https://youtu.be/ObGlQ2Y_W6g**
4 b)	Compute the value of R that results in maximum power to it in figure shown below. Find the maximum power.  	**https://youtu.be/HSX1Cbi8dJg**
4 c)	State Reciprocity theorem. Find Vx and verify reciprocity theorem for the circuit shown below.  	**https://youtu.be/QzD6GLs1yQw** (reciprocity thm) **https://youtu.be/-w5EjIFXA_Y**

5 a)	In the network shown below, the switch k is opened at $t = 0$. At $t = 0^+$ solve for v, $\frac{dv}{dt}$, $\frac{d^2v}{dt^2}$. 	https://youtu.be/YG6yX1KOKfc
5 b)	In the network shown below, the switch is changed position from 1 to 2 at $t = 0$, the steady state is reached before switching. Calculate i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$.	https://youtu.be/2jDIYHIU0VM
6 a)	In the network shown below, the switch k is changed position from a to b at $t = 0$. Solve for i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$. The steady state having reached before switching. 	https://youtu.be/GQWYGQ_ggg0

6 b)	In the network shown below, the switch k is closed at t=0, with zero capacitor voltage and zero inductor current. Solve for a) V1 and V2 at t=0⁺, b) V1 and V2 at t=∞ c) $\frac{dv1}{dt}, \frac{dv2}{dt}$ at t=0⁺ $\frac{d^2v2}{dt^2}$ at t=0⁺	https://youtu.be/m11iom05SXc
7 a)	In the circuit shown below, switch is closed on position 1 at t=0 and t=500µs, switch is moved to position 2. Obtain equation of current in both intervals. Use Laplace transforms. 	https://youtu.be/KX9Q4m869go
7 b)	Determine the Laplace transform of periodic saw tooth waveform as shown in fig. below 	https://youtu.be/VlzpPoT-gms

8 a)	A voltage of unit height and width T is applied to the circuit shown below at t=0. Determine Voltage across capacitance C as a function of time. 	https://youtu.be/PgNK_MrEbPQ
8 b)	Determine the Laplace transform of the waveform shown below. 	https://youtu.be/yLmveB0zRPs
9 a)	With respect to series resonant circuit show that resonant frequency is the geometric mean of two half power frequencies	https://youtu.be/E6Gd9JDngnw
9 b)	A series resonant circuit includes 1µF capacitor, resistance of 16Ω and an inductance of L henry. If the bandwidth is 500rad/sec, determine i) ωr ii) Q iii) L	https://youtu.be/S411KAr7b3w

9 c)	Find the value of L for which the circuit resonates at frequency of 1000rad/sec for the circuit shown below. 	https://youtu.be/73NhM9p_03o
10 a)	Derive Z parameters in terms of H parameters.	https://youtu.be/pZ4O_mxW8EM
10 b)	Determine Z parameters of the network shown below. 	https://youtu.be/D4YXr5QiQgw
10c)	For the network shown below, find Y parameters. 	https://youtu.be/-TpT-LVpeSI

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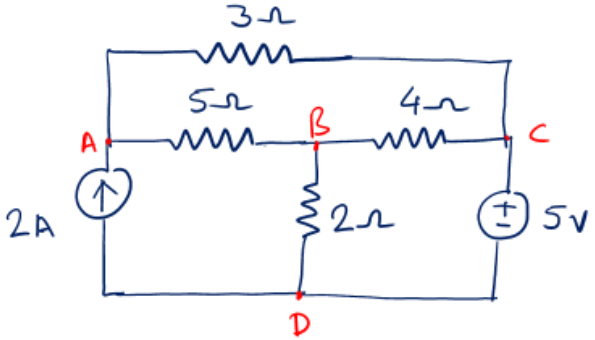
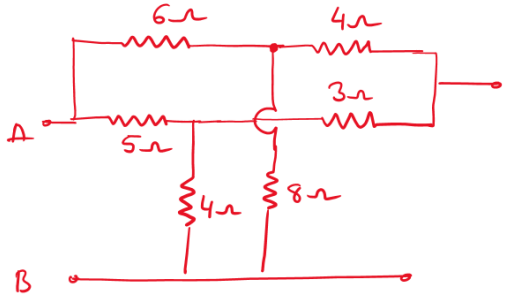
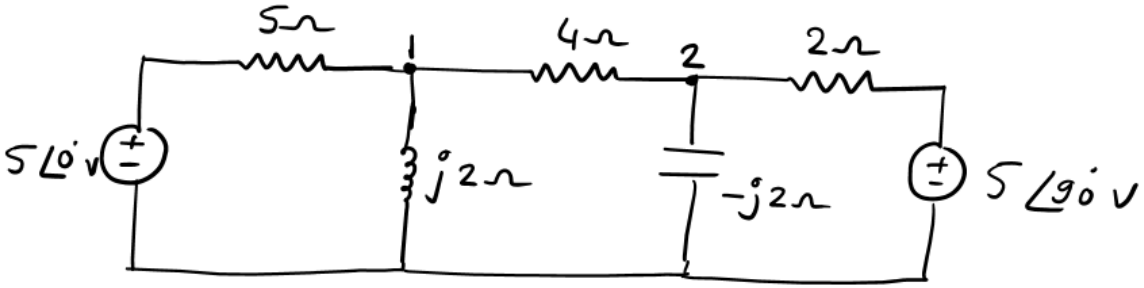
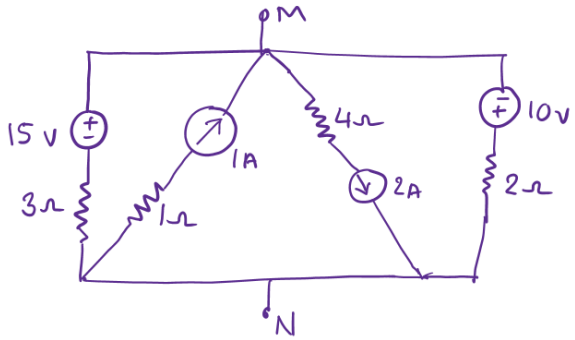
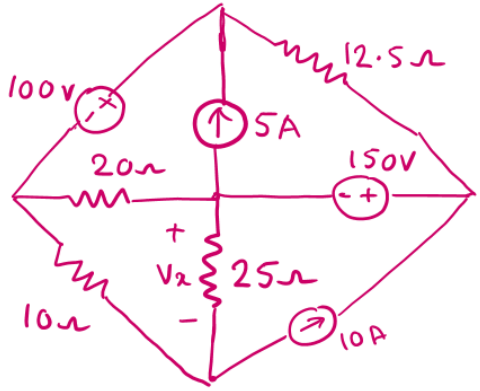
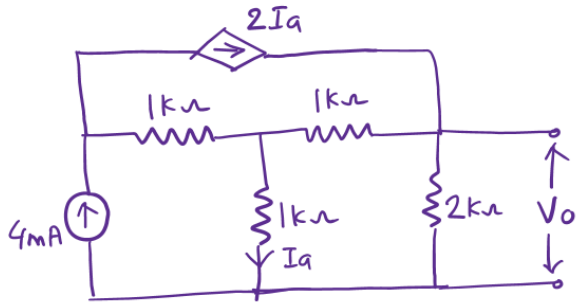
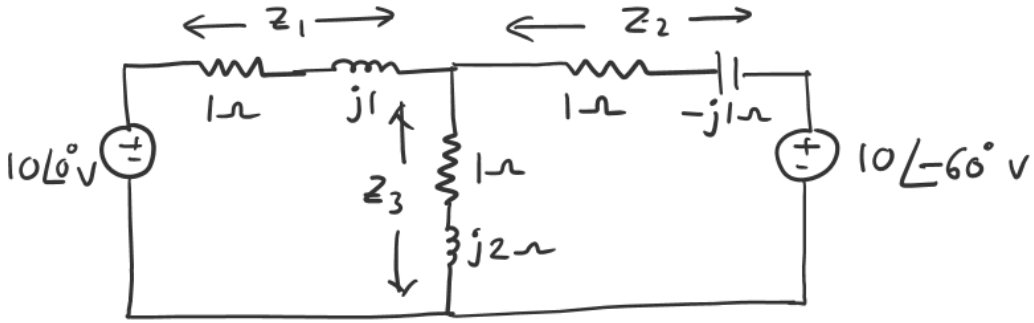
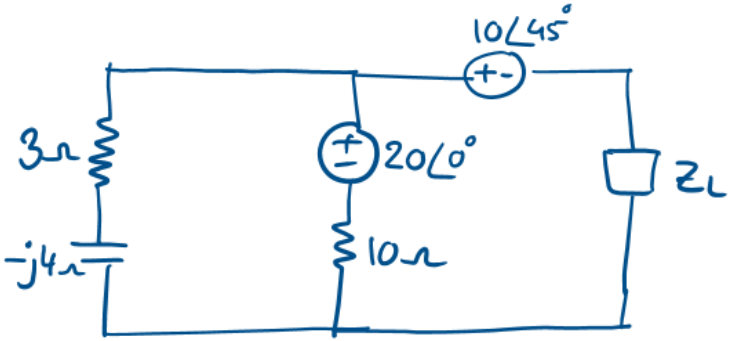
Subject: Network Theory (18EC32)

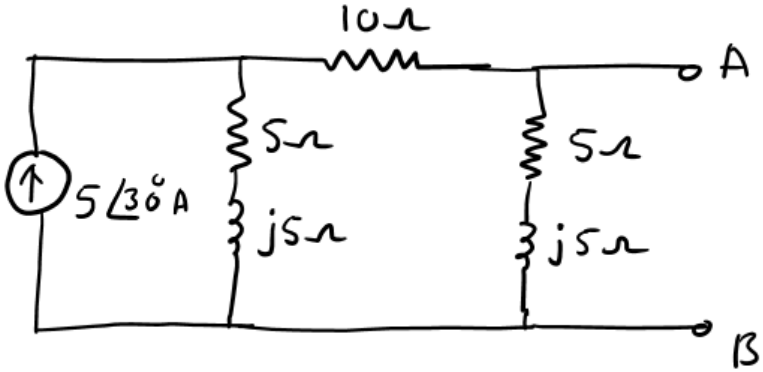
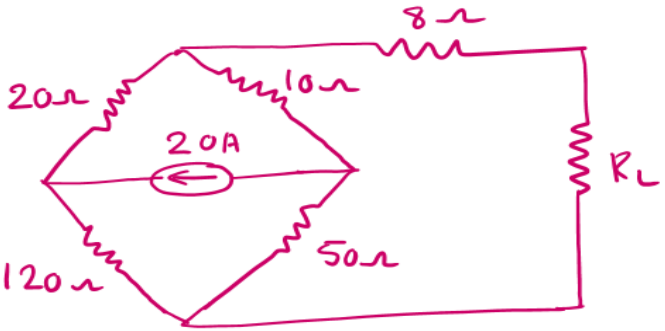
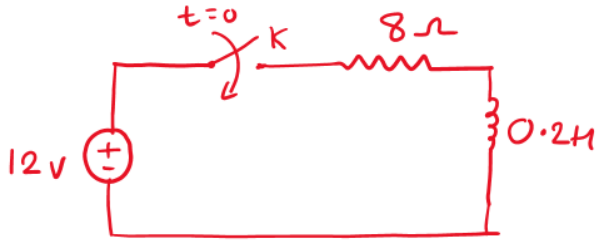
Solution for Jan./Feb.2021 Question paper

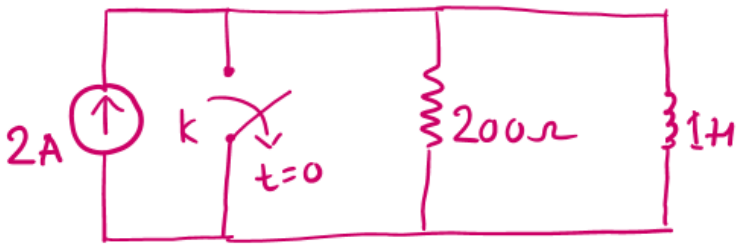
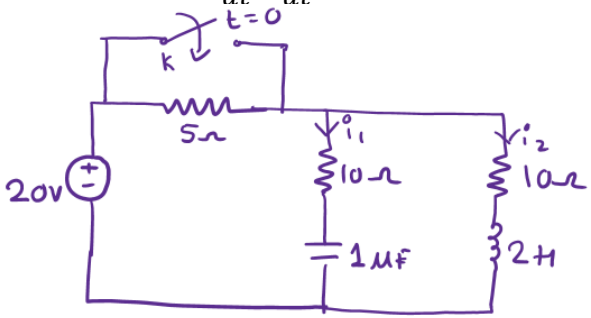
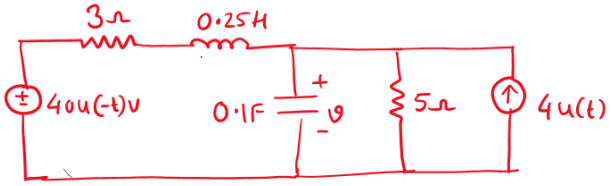
Click on Youtube video link to for the solution.

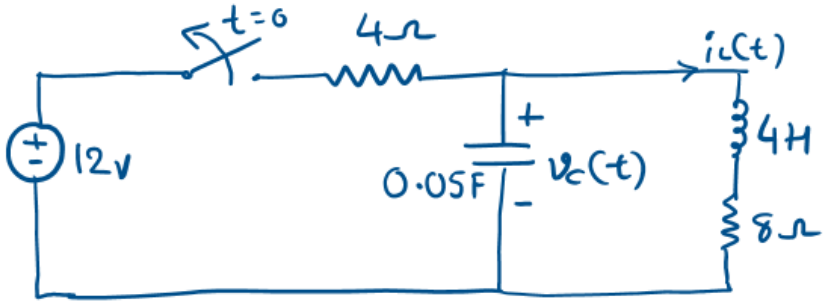
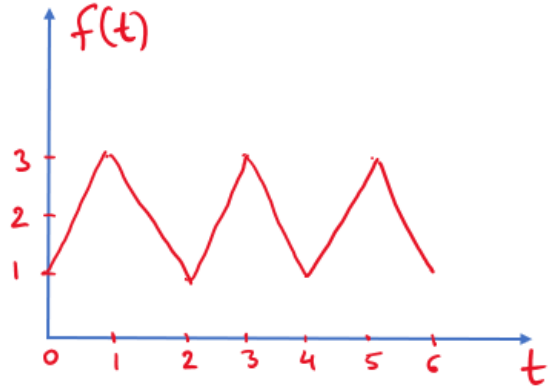
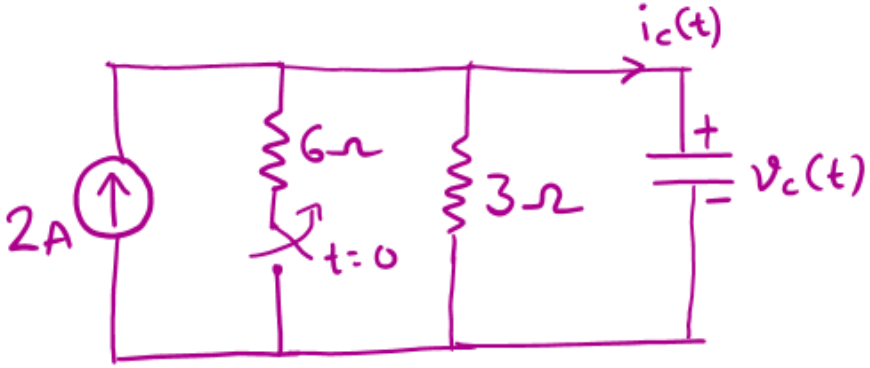
	Problem	You-Tube Link for solution
1 a)	Using Source transformation and source shifting techniques find voltage across 2Ω resistor for the given circuit. 	https://youtu.be/9L47CrS6aq0
1 b)	Find equivalent resistance between A and B using star delta transformation 	https://youtu.be/UoMMy60juIs

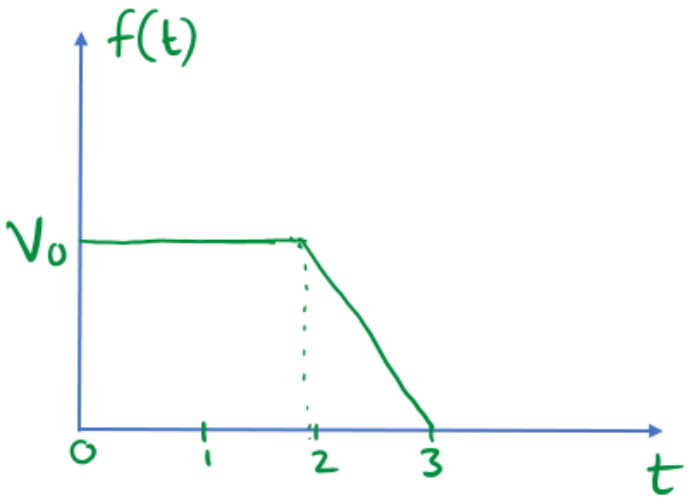
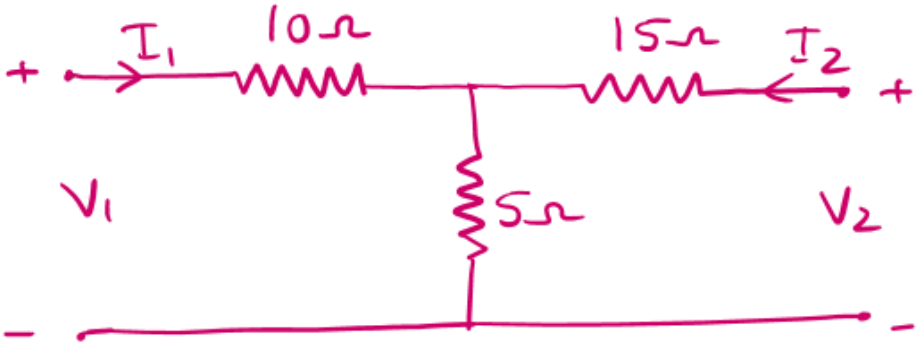
1 c)	Determine the Node voltages V1 and V2 by nodal analysis for the network shown below. 	https://youtu.be/diuuoUBBU4k
2 a)	Find the potential difference between M and N using source transformation for the circuit shown below. 	https://youtu.be/SRgdUKmOL04
2 b)	Find V_x using nodal analysis 	https://youtu.be/Hj3CZNqyW1g

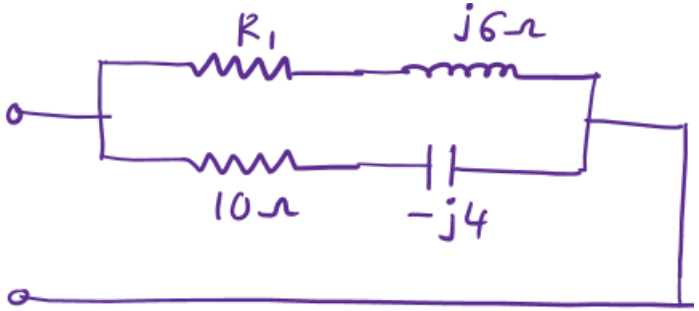
2 c)	Determine Vo using mesh analysis for the network shown below. 	https://youtu.be/x9p6VRlsP0s
3 a)	State and prove millman's theorem.	https://youtu.be/_a5HT5WRCMY
3 b)	Find current through Z3 using superposition theorem 	https://youtu.be/EV3DcATjzE0
3 c)	Find the value of ZL for which maximum power transfer occurs in the network shown below. 	https://youtu.be/aiBstMqbPC8

4 a)	Find Thevenin's and Norton's equivalent for the circuit Shown below hence find current through 10 Ω resistor across AB. 	https://youtu.be/AJmT4OIZiyI
4 b)	Find the value of RL for which maximum power is delivered. Also find the maximum power that is delivered to the load. 	https://youtu.be/Mztn6NNp2eo
5 a)	In the network shown below switch k is closed at t=0 with zero current in the inductor. Find i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$ 	https://youtu.be/hMpWw0SUQW0

5 b)	In the network shown below, the switch is changed position from 1 to 2 at $t = 0$, the steady state is reached before switching. Calculate i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$.	https://youtu.be/s_dSHq1xdPE
5 c)	In the network shown below, the switch k is opened at $t = 0$. At $t = 0^+$ solve for v, $\frac{dv}{dt}$, $\frac{d^2v}{dt^2}$, 	https://youtu.be/aqgFJA4bVfU
6 a)	For the circuit shown below, steady state is reached with switch k open. The switch is closed at t=0. Find $i_1, i_2, \frac{di_1}{dt}, \frac{di_2}{dt}$ at $t = 0^+$ 	https://youtu.be/2q2HLhDn_9E
6 b)	For the circuit shown below, i) $v(0^+)$ *and* $i(0^+)$ ii) $\frac{d\,v(0^+)}{dt}$, *and* $\frac{d\,i(0^+)}{dt}$ iii) $v(\infty)$ *and* $i(\infty)$ 	https://youtu.be/IMB8nqiIpdk

7 a)	Determine current $i(t)$ for t ≥0 for the circuit shown below. 	https://youtu.be/RwLyhIkZgbw
7 b)	Find the Laplace transform of the function f(t) shown below. 	https://youtu.be/x4UFLg8Tif8
8 a)	Determine $v_c(t) and\ the\ current\ i_c(t)$ for t ≥0 for the circuit shown below. 	https://youtu.be/sqyQ6dC_4Fw

8 b)	Find Laplace transform of f(t) shown below. 	https://youtu.be/qlQAt3_BG0I
9 a)	Express Y parameters in terms of H parameters	https://youtu.be/_DiEXO4-o-Q
9 b)	Find Z parameters for the network shown below. 	https://youtu.be/ayKFyQnB7XE
9 c)	The Z parameters of two port network are $Z_{11} = 20\Omega,\ Z_{22} = 30\Omega,\ Z_{12} = Z_{21} = 10\Omega$. Find Y and ABCD parameters.	https://youtu.be/Yf-blZ8dbT8
10 a)	Prove that resonant frequency is the geometric mean of two half power frequencies.	https://youtu.be/E6Gd9JDngnw

10 b)	A series RLC circuit has a resistance of 10Ω, L= 0.01H and C=0.01μF and is connected across 10mv supply. Calculate i) fo ii) Qo iii) Bandwidth iv) f1 and f2 v) Io	https://youtu.be/7aIcR23Uh3c
10c)	Find the value of RL such that the circuit shown below is resonant. 	https://youtu.be/sqp1rzi-0HU

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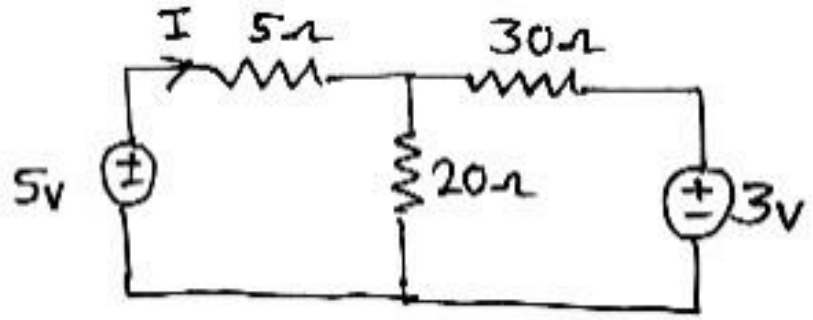
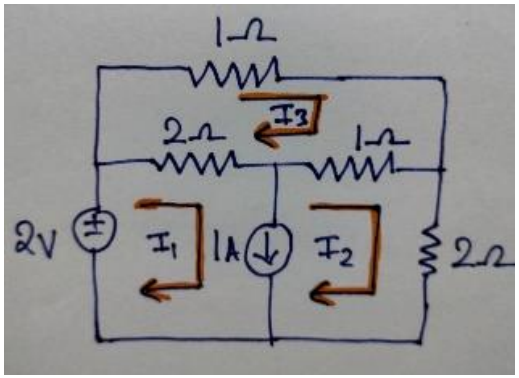
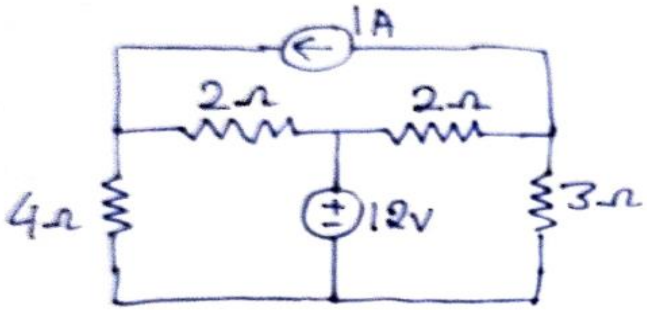
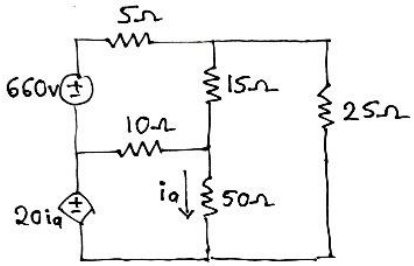
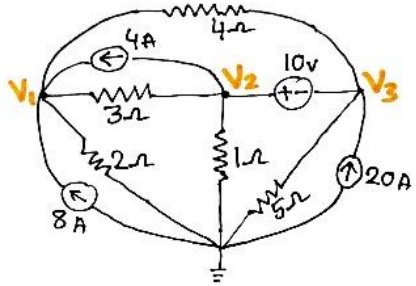
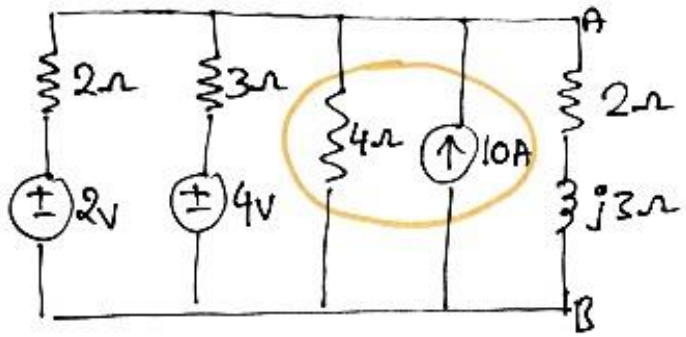
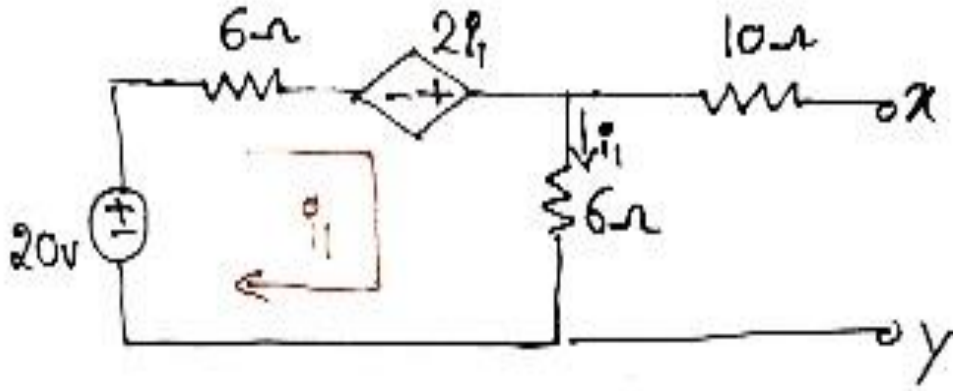
Subject: Network Theory (18EC32)

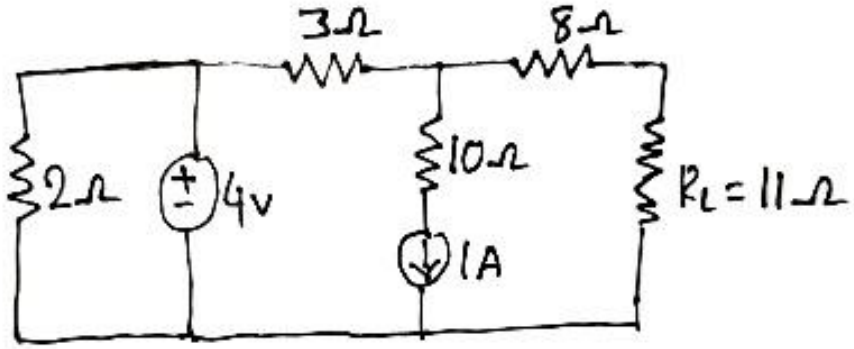
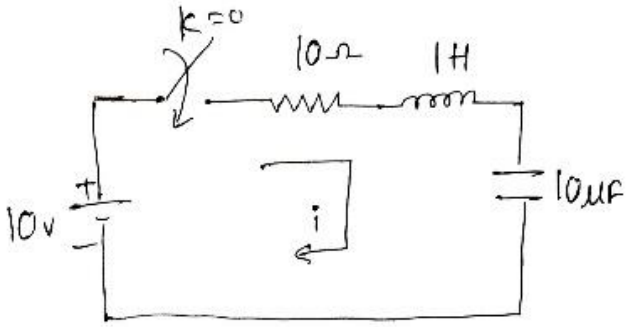
Solution for Dec.2019/Jan.2020 Question paper

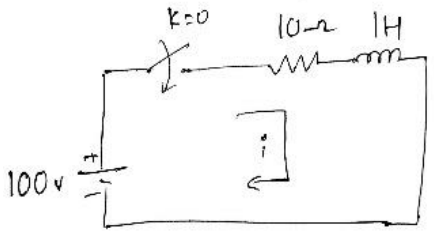
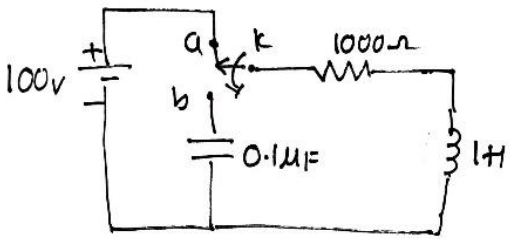
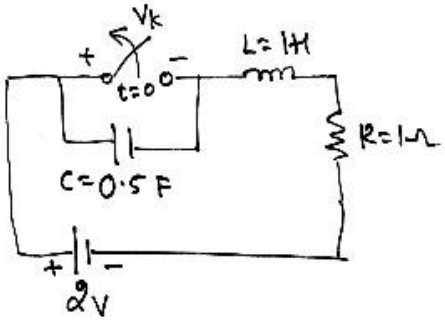
Click on Youtube video link to for the solution.

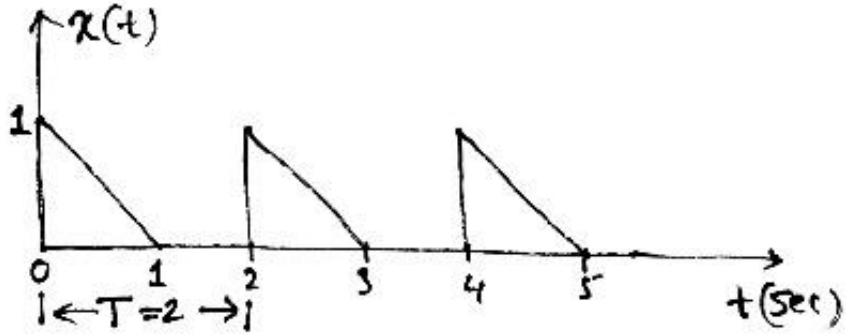
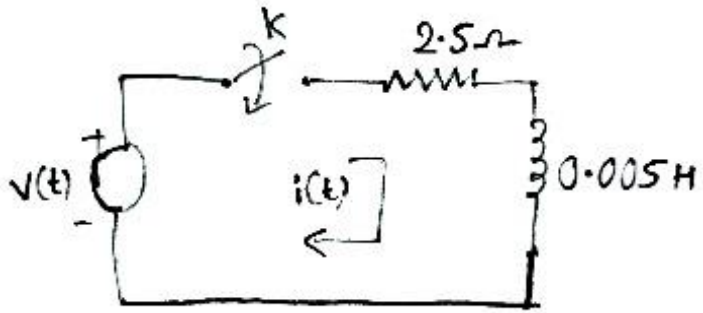
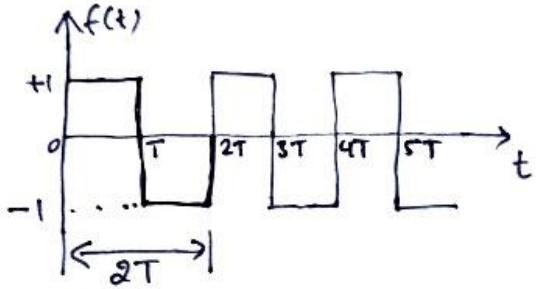
1 a)	Using Source transformation technique find the current through 5Ω resistor for the given circuit. 	https://youtu.be/lKXEtbcMsdA
1 b)	Use Mesh Analysis to Determine current i1, i2, i3 	https://youtu.be/bDsgn6DDJ9I

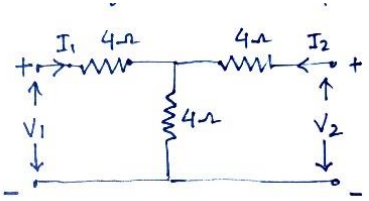
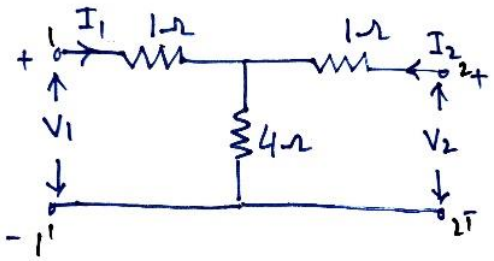
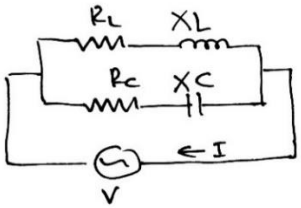
1 c)	Find the power delivered by 1A current source using Nodal analysis for the circuit shown below 	https://youtu.be/vMqq8H1tIUc
2 a)	Three impedances are connected in delta, obtain the star equivalent of the network.	https://youtu.be/e-dh529iJAU
2 b)	Use Mesh Analysis to Find power delivered by the dependent voltage source in the circuit shown below 	https://youtu.be/VKvfgwNiDQw
2 c)	Determine all the Node voltages for the circuit shown below, using nodal analysis. 	https://youtu.be/y46CjpRU4s4

3 a)	State and explain superposition theorem.	https://youtu.be/QEH8LObMlCE
3 b)	Use Millman's theorem to find the current flowing through (2+j3)Ω impedance for the circuit shown below. 	https://youtu.be/QTEpFBHl6eU
3 c)	State and prove Nortan's theorem	https://youtu.be/Y3HbrL04RXM
4 a)	Find Thevenin's equivalent for the circuit Shown below with respect to terminals X-Y 	https://youtu.be/MQCjhE0Lsp0
4b)	Find condition for maximum power transfer in AC circuit, where both RL and XL are varying.	https://youtu.be/i8269fBfNXY

4 c)	Determine the current through the load resistance using Norton's theorem 	https://youtu.be/_1IfyGAKfqQ
5a)	Explain the behavior of RLC elements at the time of switching at t=0, at t=0+ at t=infinity	
5 b)	Find i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$. Assume that capacitor is initially uncharged. 	https://youtu.be/EgSvdYZ9-LY

5 c)	Find i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$. The switch is closed at $t = 0$ with zero current in the inductor. 	https://youtu.be/UtTK_Vc2eV8
6 a)	In the network shown below, the switch k is changed position from a to b at $t = 0$, the steady state is reached at position a. Find i, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t = 0^+$. Assume that the capacitor is initially uncharged. 	https://youtu.be/GQWYGQ_gqg0
6 b)	For the network shown below, the network is steady state with switch k closed. At $t = 0$, switch is opened. Determine voltage across switch Vk, $\frac{dVk}{dt}$, at $t = 0^+$. 	https://youtu.be/vnHiwGEJSVA

7 b)	Find Laplace Transform of the periodic signal x(t), shown below. 	https://youtu.be/hxG44NC0HTY
8 a)	In the series RL circuit shown, the source voltage is V(t)=50sin250t V. Using Laplace Transform the current when switch k is closed at t=0. 	https://youtu.be/nAmrV_drQz8
8 b)	Find Laplace Transform of the non-sinusoidal periodic waveform. 	https://youtu.be/OcjdYov6204

9a)	Define Z parameters. Determine Z parameters in terms of Y parameters	https://youtu.be/ro55flsznd8
9 b)	Determine h Parameters of the given circuit. 	**https://youtu.be/253teZ4LvDw**
9 c)	Find Transmission (T) Parameters 	**https://youtu.be/5FDmyR1x8lU**
10a)	Define Q factor, Selectivity and Bandwidth	
10b)	A series RLC circuit has a resistance of 10Ω, an inductance of 0.3H and a capacitance of 100μF. The applied voltage is 230V. Find Resonance frequency, Lower & upper cutoff frequencies current at resonance, current at f1 & f2, Voltage across inductance at resonance.	**https://youtu.be/qCivWKXpuRQ**
10c)	Derive the expression for the resonant frequency of the circuit shown below. Also show that the circuit will resonate at all frequencies if $RL = Rc = \sqrt{\frac{L}{C}}$ 	**https://youtu.be/mY9Zvi2x2mk**

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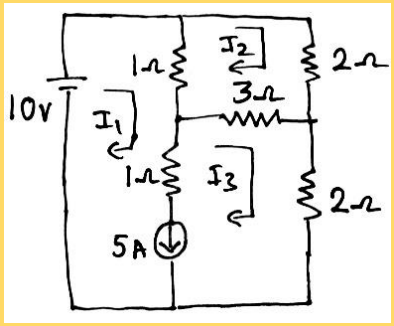
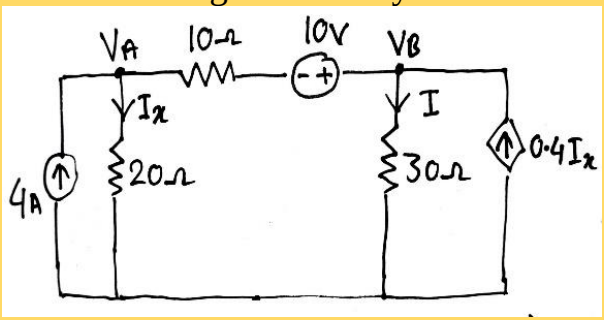
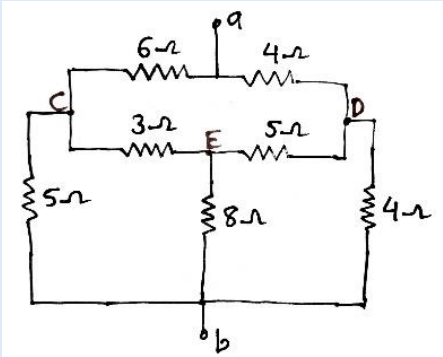
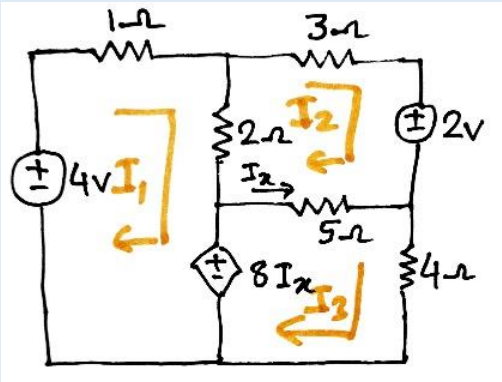
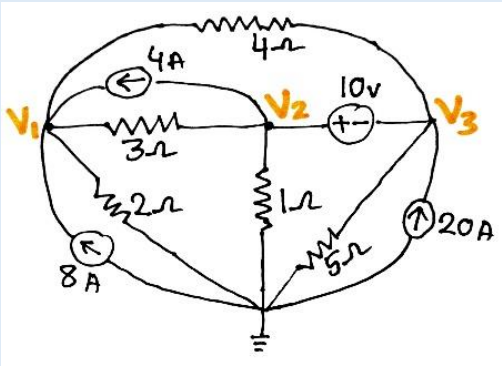
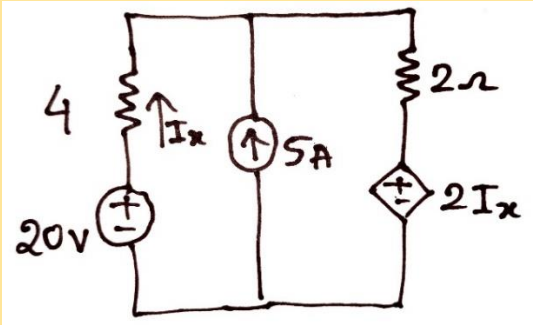
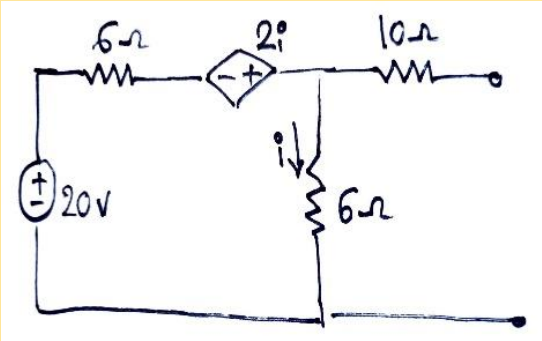
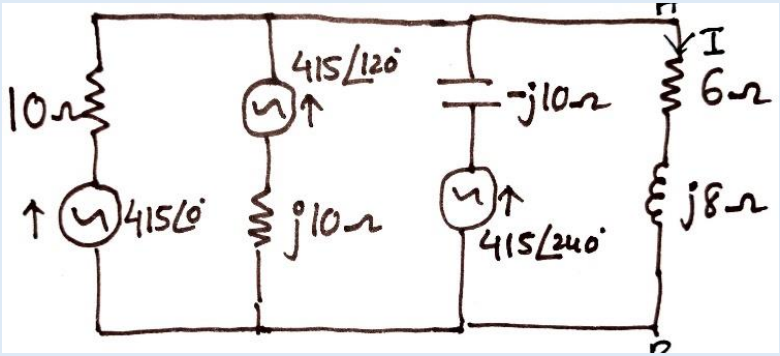
Subject: Network Theory (Network Analysis) (17EC35)

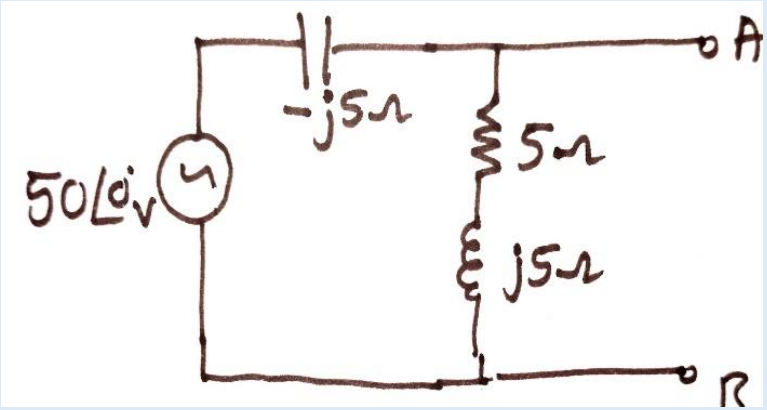
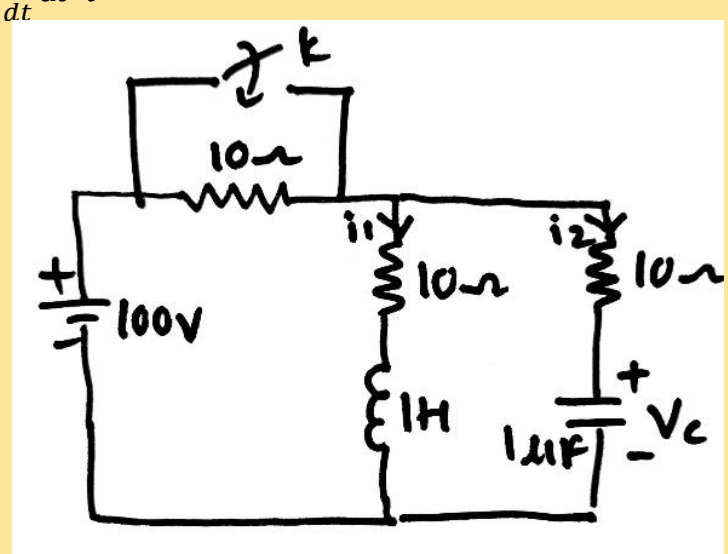
Solution for Dec.2018/Jan.2019 Question paper

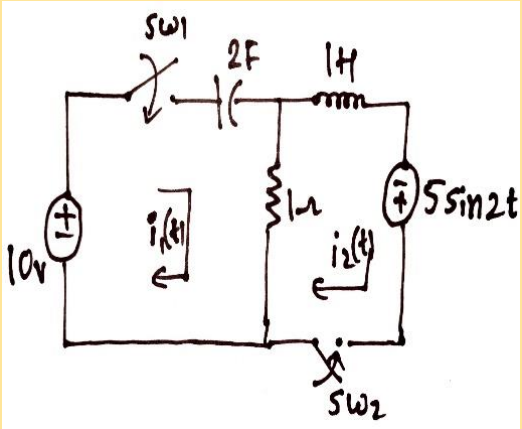
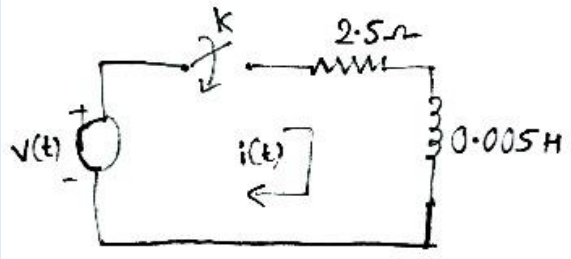
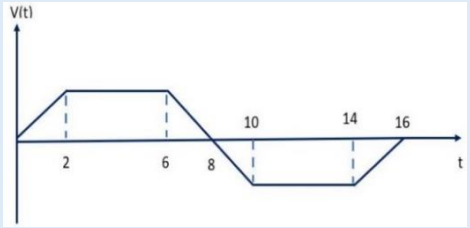
Click on corresponding You-tube video link to for the solution.

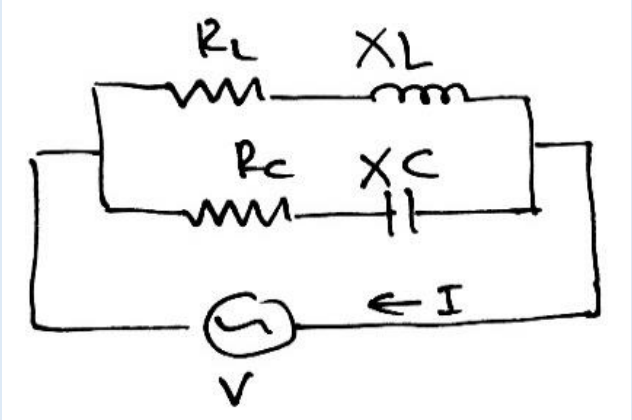
	Problem	You-Tube Link for solution
1 a)	Reduce the Network shown below to a single voltage source in series with a resistance using source shift and source transformation.	https://youtu.be/oCVh8GcEKGg
1 b)	Use mesh analysis to determine the three mesh currents 	https://youtu.be/zyFZbYw8_dM
1 c)	Find current in 30 Ω resistor using nodal analysis for the circuit shown below 	https://youtu.be/jlkWyCkjNks

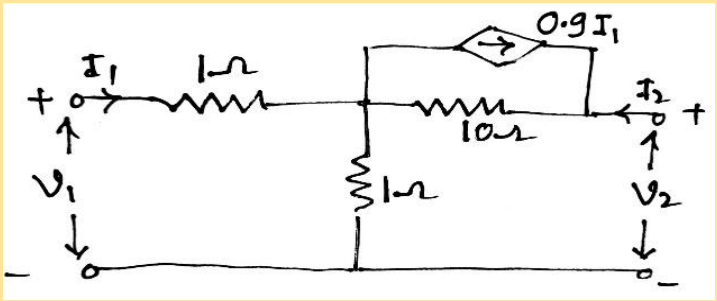
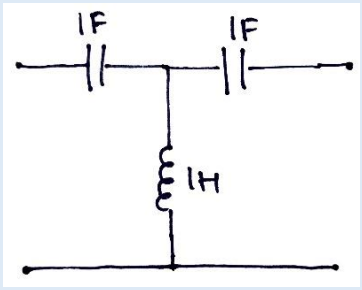
2 a)	Find the equivalent resistance between a and b using star delta transformation 	https://youtu.be/vOLM2ekc28w
2 b)	For the circuit shown below, determine lx, and other loop currents 	https://youtu.be/eL5Njc6pS14
2 c)	For the circuit shown below, determine all node voltages. 	https://youtu.be/y46CjpRU4s4

3 a)	For the circuit shown in below, find the current Ix, using super position theorem 	https://youtu.be/IcASlZ_cnDQ
3 c)	Obtain the Thevenin's equivalent of the circuit shown below 	https://youtu.be/WJZhyf0439Q
4 a)	For the circuit shown below, find the current in (6 +j8) Ω impedance using Millman's theorem. 	https://youtu.be/G-cP-BGLyhM

4 b)	For the Network shown below, determine Norton's equivalent across A and B. Find the current thorough the impedance (6 -j8) Ω connected to the terminals A and B 	https://youtu.be/Vg0iwVmqZkM
4 c)	State and prove maximum power transfer theorem for AC circuit, where both RL and XL are varying.	https://youtu.be/i8269fBfNXY
5 a)	In the network shown below, a steady state is reached with the switch K open. At t = 0, the switch K is closed. Obtain the initial values of Find i1, i2, Vc, $\frac{di1}{dt}$, $\frac{di2}{dt}$ and $\frac{di1}{dt}$at $t = \infty$ 	https://youtu.be/2jDIYHIU0VM

5 b)	For the given circuit, find the value of the loop currents, their first derivatives and their 2nd derivatives, all evaluated at t = 0+, given that Vc(0-) = 1 volts, i2(0-) = 0 amp. At t= 0, sw1, and sw2 are closed. 	https://youtu.be/2swnQfKZu0Y
6 a)	In the circuit shown below, the source voltage is V(t)=50sin250t V. Using Laplace Transform determine current when switch k is closed at t=0. 	https://youtu.be/nAmrV_drQz8
6 b)	Synthesize the periodic waveform shown below, find its Laplace transform and prove any formula used. 	https://youtu.be/mCWLY5VmvkU
	Proof for the formula used	https://youtu.be/0aAZlZLThxc

7 a)	Show that resonant frequency of series resonant circuit is equal to the geometric mean of two half power frequencies.	**https://youtu.be/E6Gd9JDngnw**
7 b)	A coil is connected in series with a variable capacitor across V(t) = 10 cos 1000t. The current is maximum when c = 10μF. When C = 12.5μF, the current is 0.707 times the maximum value. Find L, R and Q of the coil.	**https://youtu.be/Rq9kLS9zMTU**
7 c)	A coil has resistance of 400Ω and inductance of 318μH. Find the capacitance of capacitor which when connected in parallel with the coil will produce resonance with a supply frequency of 1MHz. If a second capacitor of capacitance 23.42pF is connected in parallel with the first capacitor, find the frequency at which resonance will occur.	**https://youtu.be/szWi9UrEjgI**
8 a)	Derive the expression for the resonant frequency of the circuit shown below. Also show that the circuit will resonate at all frequencies if $RL = Rc = \sqrt{\frac{L}{C}}$ 	**https://youtu.be/mY9Zvi2x2mk**
8 b)	A coil of 10 resistance 0.2H inductance is connected in parallel with a variable condenser across 220V, 50Hz supply. Determine: (i) Capacitance of condenser so that current drawn may be in phase with the supply voltage (ii) Effective impedance of the circuit ii) Power absorbed at resonance (iv) Current magnification factor.	**https://youtu.be/n47bR1zSlRk**

9 a)	Z-parameters of a network are obtained from an experiment. Explain how Y-parameters parameters can be computed from the experiment data.	https://youtu.be/LTxQBrd4EHo
	Explain how T-parameters parameters can be computed from the experiment data.	https://youtu.be/R9cSwgKcvhM
9 b)	Find Z & Y parameters of the network shown below. 	https://youtu.be/3BkWYHHqkgc
10a)	Find Z and H parameters for the network shown below. 	https://youtu.be/djdUj_s8yG4
10c)	Explain symmetry and reciprocal property of 2 port network	https://youtu.be/UhSkL1nVWzU

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Subject: Network Theory (Network Analysis) (17EC35)

Other some important Question paper problems

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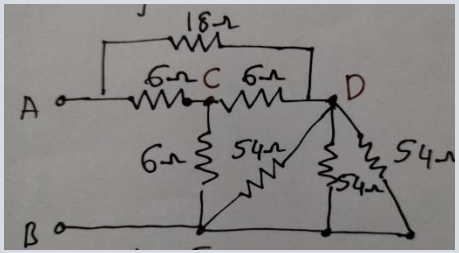
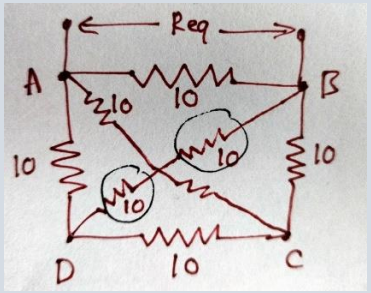
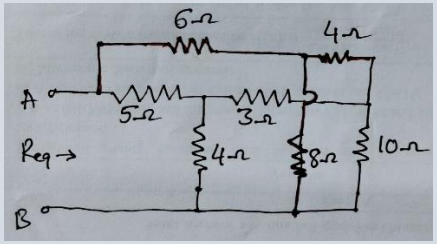
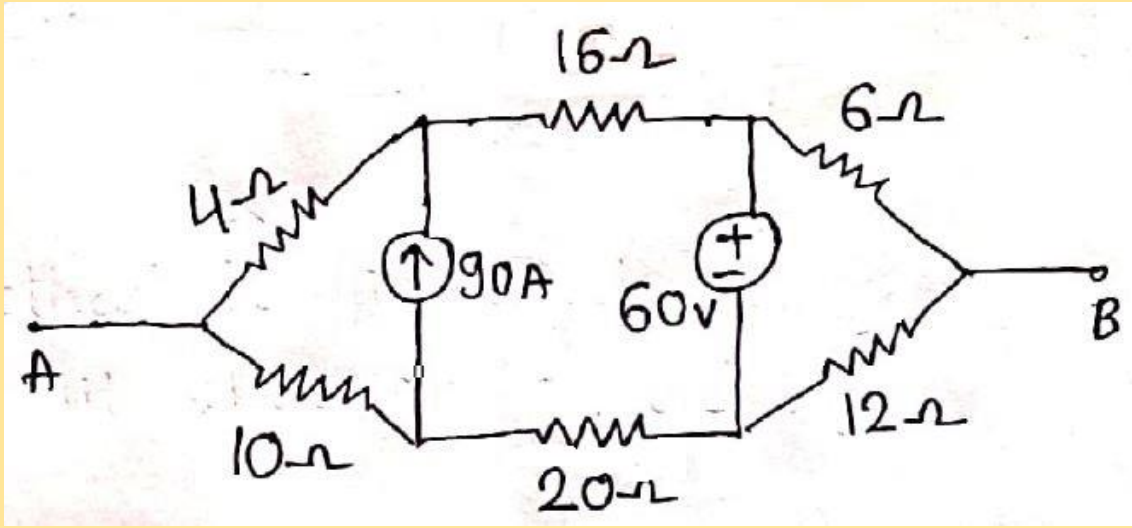
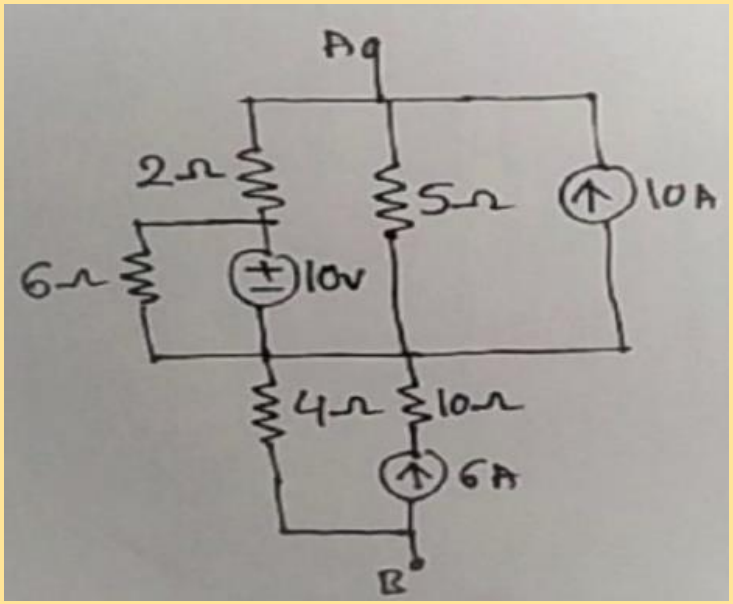
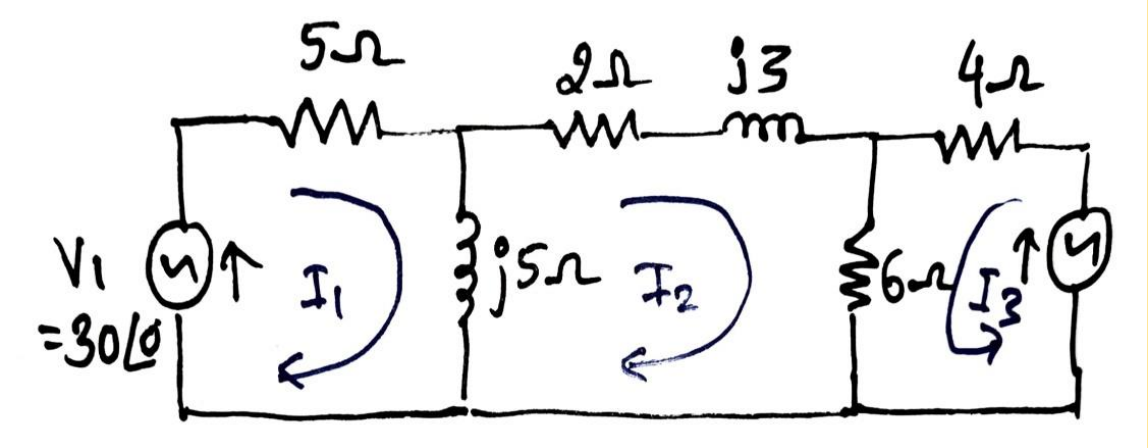
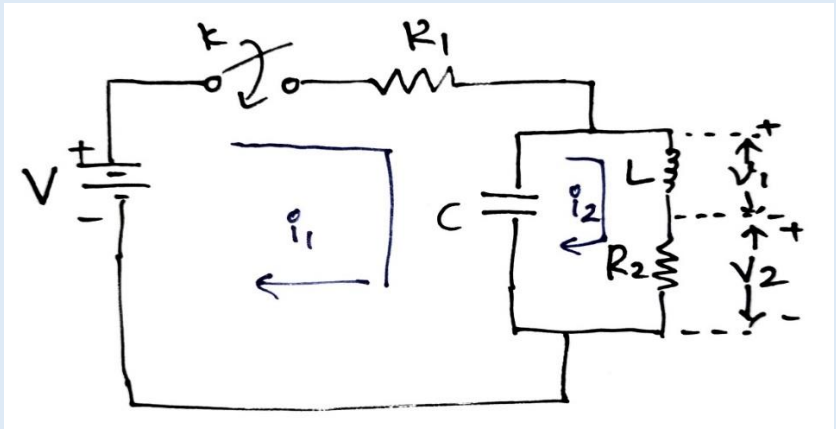
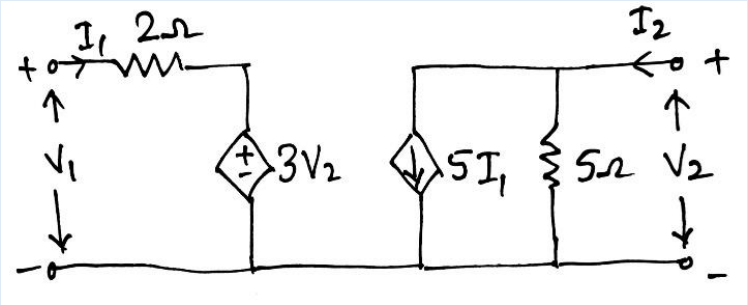
1	Find equivalent resistance between A and B using star delta transformation 	https://youtu.be/SwWkqX6rOSw
2	Find equivalent resistance between A and B using star delta transformation 	https://youtu.be/P2kV2NOXbU0
3	Find equivalent resistance between A and B using star delta transformation 	https://youtu.be/AjKCY48Atlo

4	Reduce the Network shown below to a single voltage source in series with a resistance using source shift and source transformation. 	https://youtu.be/DBsQHdxYpi8
5	Find equivalent resistance between terminal A and B, using source transformation and shifting. 	https://youtu.be/9QUej3-ql1o

6	**In the Network shown below, Find voltage V2 such that the current in the impedance (2+j3) Ω is zero. Use Mesh analysis.** 	https://youtu.be/BqVW0BDvuY0
7	**For the circuit shown below, has zero capacitor voltage and zero inductor current when the switch k is open. At t=0, the switch k is closed. Solve for** **i)** **V1** and V2 at at $t = 0^+$ **ii)** $\frac{dv1}{dt}$, $\frac{d^2v2}{dt^2}$ **at** $t = 0^+$ **iii)** $\frac{dv1}{dt}$, $\frac{d^2v2}{dt^2}$ **at** $t = \infty$ 	https://youtu.be/m11iom05SXc

8	**Determine ABCD or Transmission or General parameters** 	https://youtu.be/MxKvOIMOTGA

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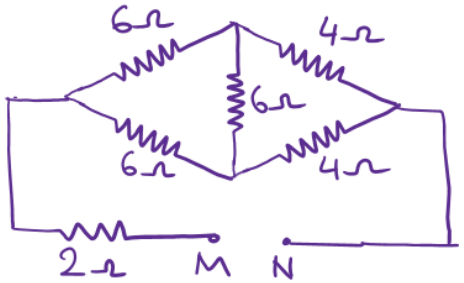
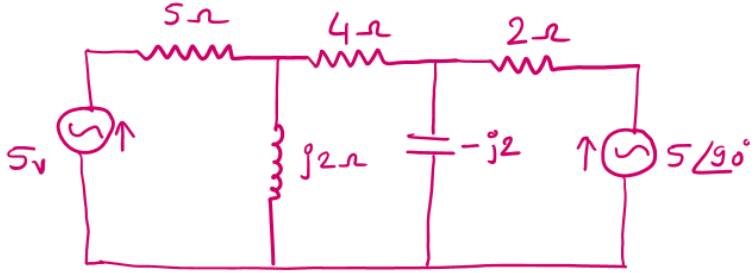
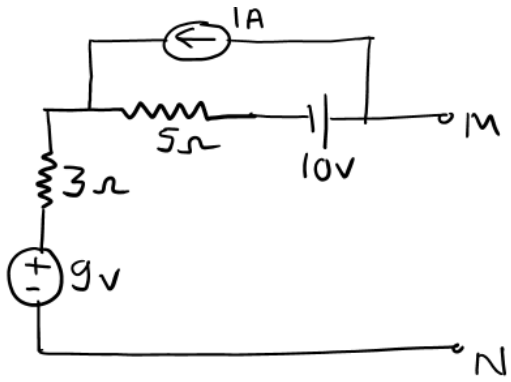
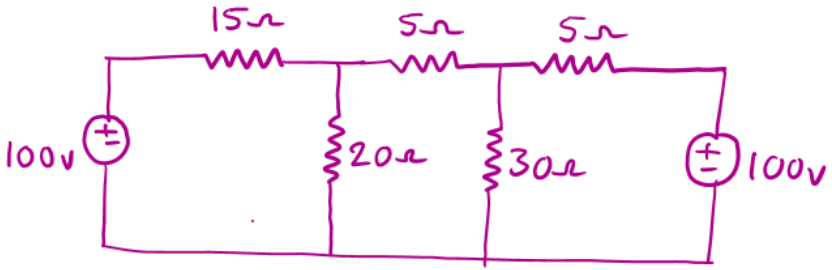
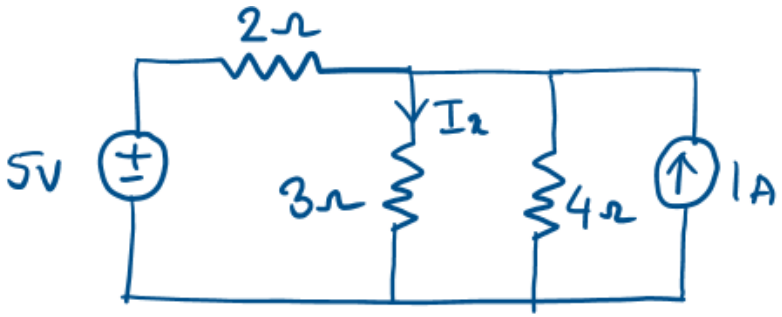
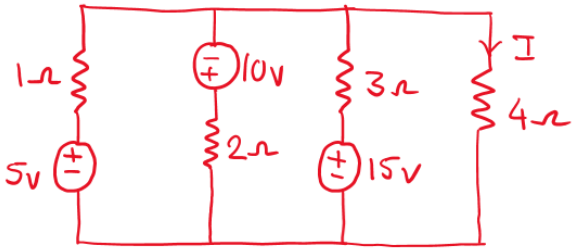
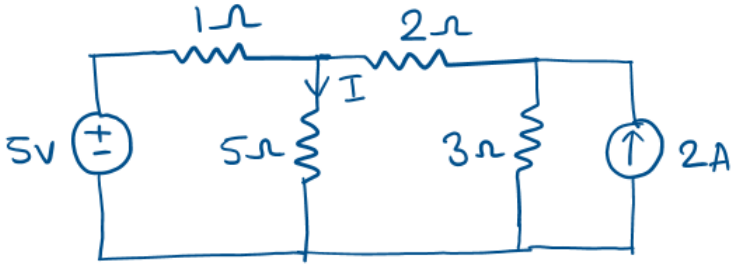
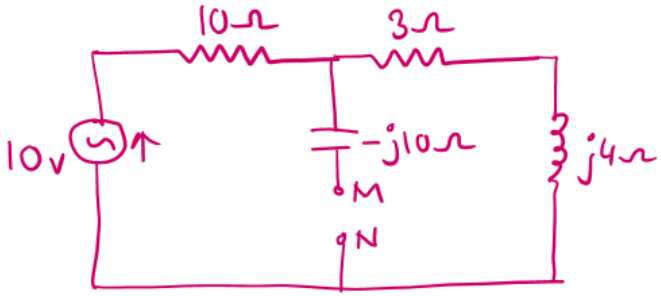
Subject: Electric Circuit Analysis (18EE32)
(Network Theory) (Network Analysis)

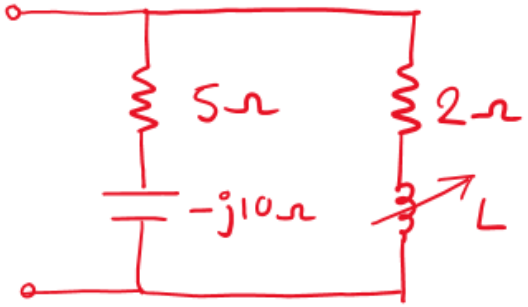
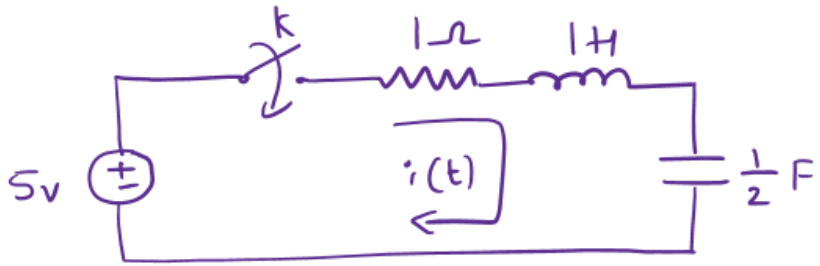
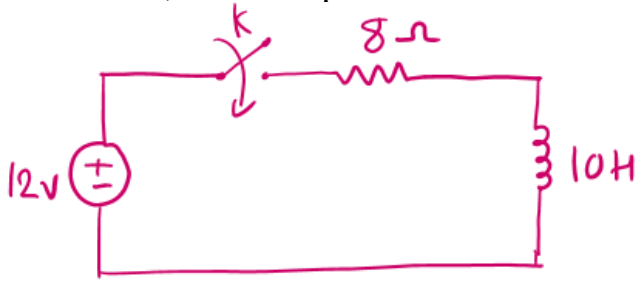
Solution for Jan.2021 Question paper

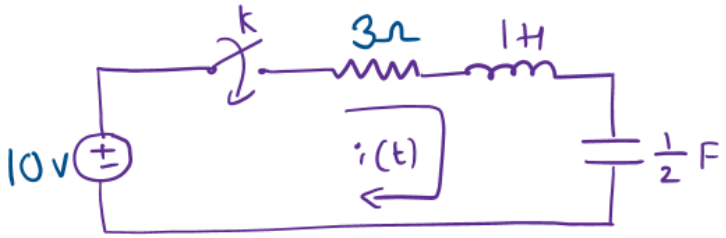
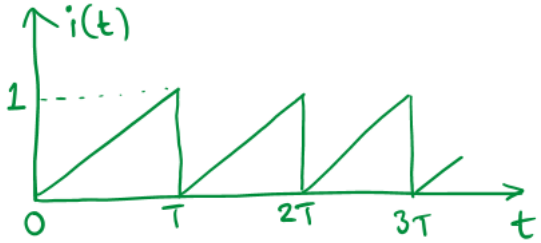
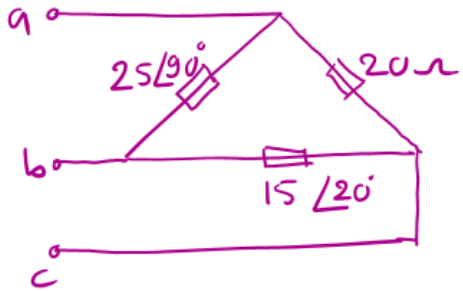
Click on corresponding You-tube video link to for the solution.

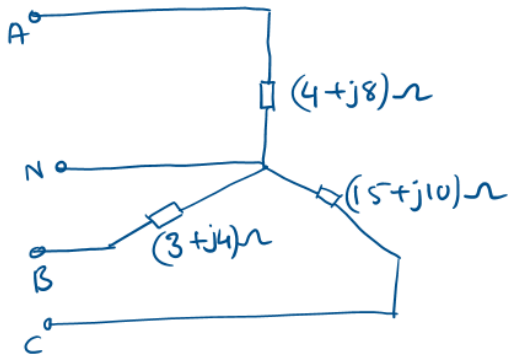
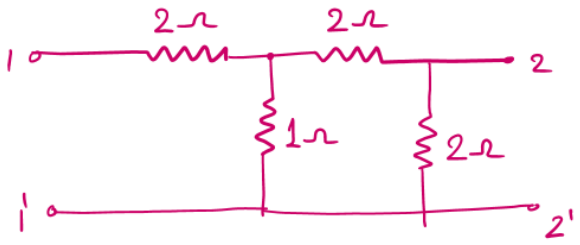
1 b.	For the circuit shown below, determine resistance between M and N using star delta transformation. 	https://youtu.be/D1LwIpQuoN8
1 c.	Use node voltage analysis to find node voltages 	https://youtu.be/mdFpYyo4g3c
2 a.	Derive an expression for converting delta to star	https://youtu.be/e-dh529iJAU

2 b.	Determine potential difference between M and N using source transformation. 	https://youtu.be/ck4RO0EVXGo
2 c.	Use mesh current analysis to find current through 30Ω. 	https://youtu.be/ROKacbmPbB8
3 a.	State and prove reciprocity theorem.	https://youtu.be/QzD6GLs1yQw
3b.	Find Ix using superposition theorem. 	https://youtu.be/GVWmGnkB-5w

3 c.	Use Millman's theorem to find current I in the circuit. 	https://youtu.be/xVdPFveri8w
4 a.	State and obtain condition for maximum power when load impedance is equal to pure variable resistance.	https://youtu.be/i8269fBfNXY
4 b.	Find current I using Norton's theorem. 	https://youtu.be/0DxtAa0fBw4
4 c.	For the network shown below, draw Thevenin's equivalent circuit. 	https://youtu.be/H0-sTqe02XA
5 a.	Show that resonant frequency is the geometric mean of two half power frequencies.	https://youtu.be/E6Gd9JDngnw
5 b.	A series RLC circuit has a resistance of 10Ω, L= 0.5 H and C=0.4μF. Find i) resonant frequency, half power frequencies, bandwidth and quality factor.	https://youtu.be/cRDq8OLscho

5 c.	For the network shown below, find the value of inductance take ω=500r/s. 	https://youtu.be/Ci24Yfx_kVA
6 a.	Explain the behavior of R, L and C for initial condition.	
6 b.	For the network shown below, switch is closed at t=0. Determine the current and its first and second derivative at $t = 0^+$ 	https://youtu.be/nhQRoCYtRnI
6 c.	For R-L circuit shown below, obtain expression for current i(t) for t ≥ 0. 	https://youtu.be/j7osfKpiTT4
7 a.	State and prove initial value theorem.	https://youtu.be/6CYsSUIcvNk
7 b.	Find inverse Laplace transform of $V(s) = \frac{10}{s(s+1)(s+2)}$	https://youtu.be/83yJBE4B84E

7 c.	For the network shown below, draw the transformed circuit and obtain the expression for current i(t) for $t \geq 0$. 	https://youtu.be/OCGLbowbynQ
8 a.	Find LT of: i) Step signal ii) Ramp iii) Impulse signal	https://youtu.be/IfEx_2U28gw
8 b.	For the waveform shown below, obtain the Laplace transform. 	https://youtu.be/gfbpMR78Wcs
8 c.	Find the initial and final values of following functions: i) $V_1(s) = \frac{S^2+3S+2}{S^3+3S^2+3S+1}$ ii) $V_1(s) = \frac{10}{S(S+3)}$	https://youtu.be/mNzfBgMYEa0
9 a.	A 3-phase supply with line voltage of 250V has a unbalanced Delta connected load as shown in Fig. Determine line currents, active and reactive power for phase sequence ABC 	

9 b.	An unbalanced 4 wire star connected load has a balanced supply of 400V. For the phase sequence ABC, calculate the line currents and total power of the circuit shown in figure. 	
10a	Obtain the impedance parameters in terms of Admittance parameters.	https://youtu.be/ro55flsznd8
10b	For the network shown below, determine z-parameters. 	https://youtu.be/FG2hG06Vj_I

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Subject: Electric Circuit Analysis (18EE32)
(Network Theory) (Network Analysis)

Solution for Sept.2020 Question paper

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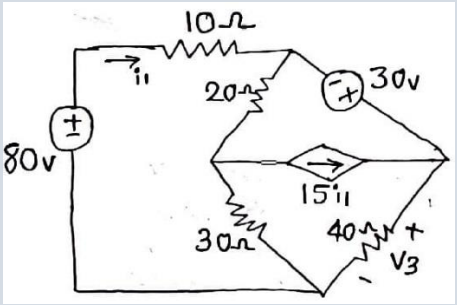
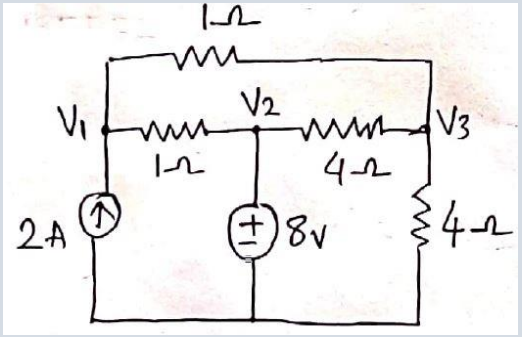
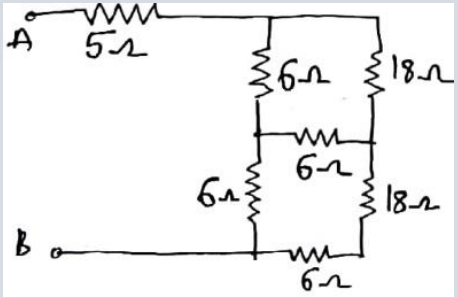
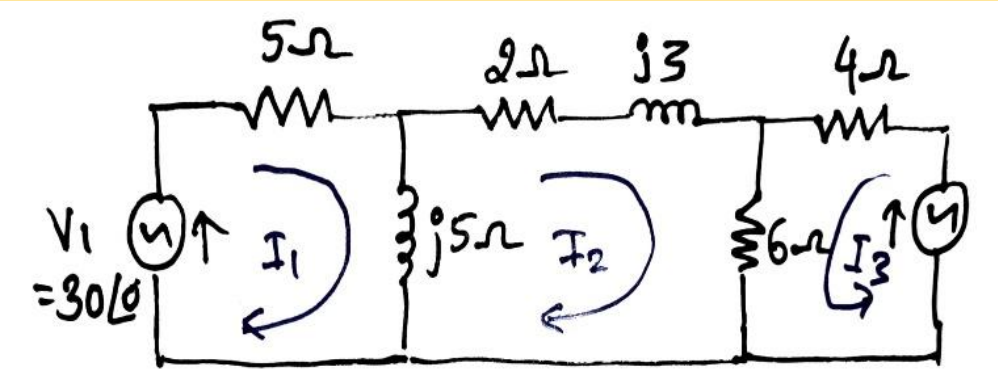
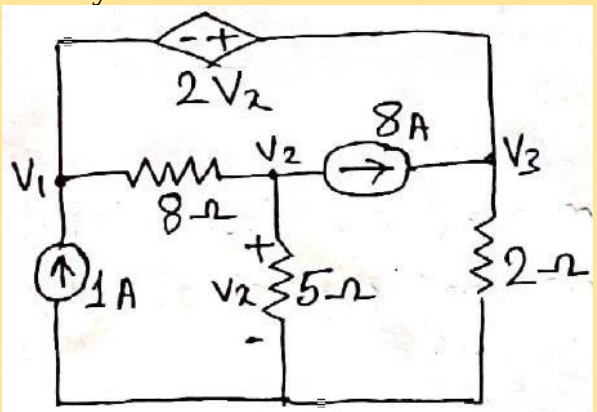
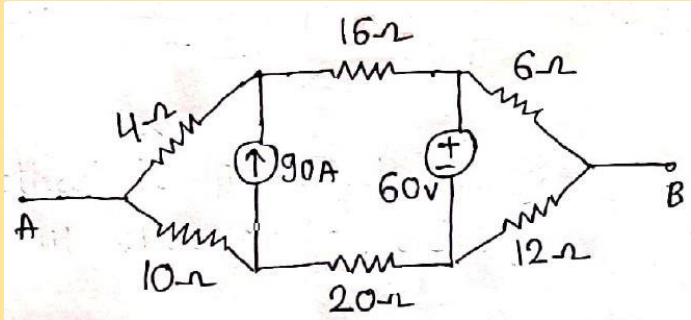
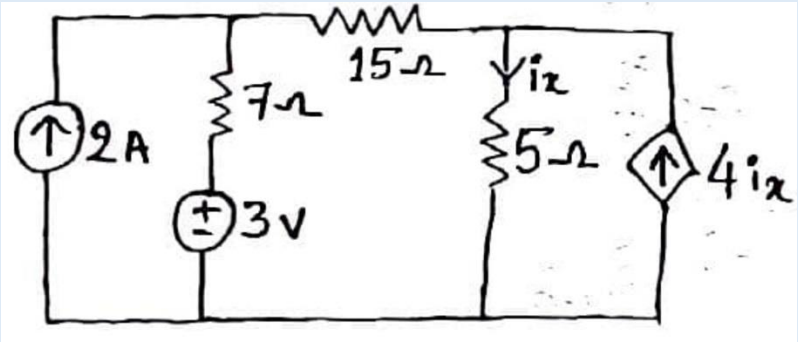
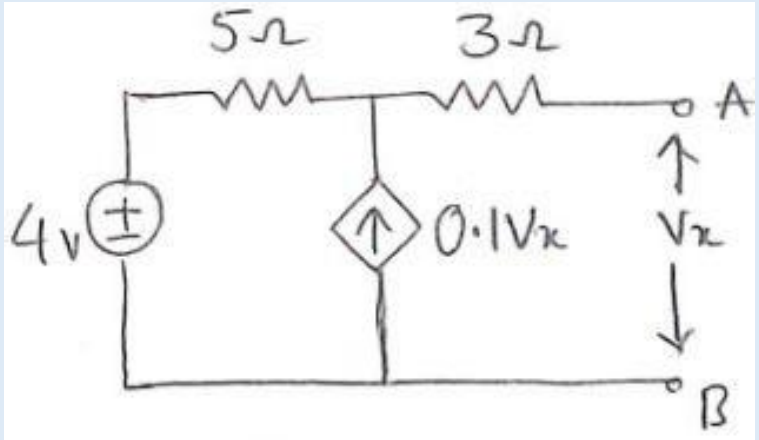
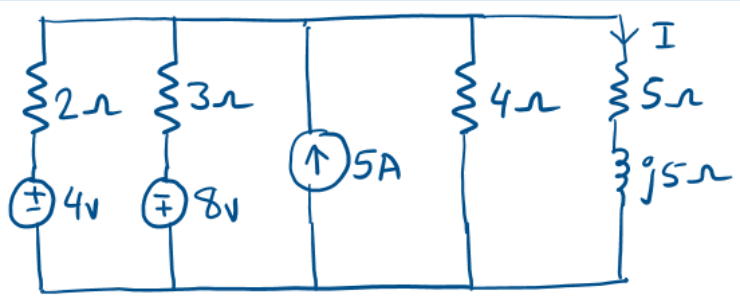
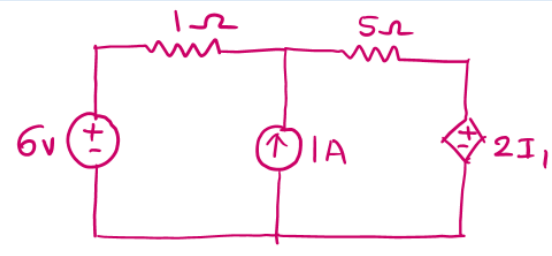
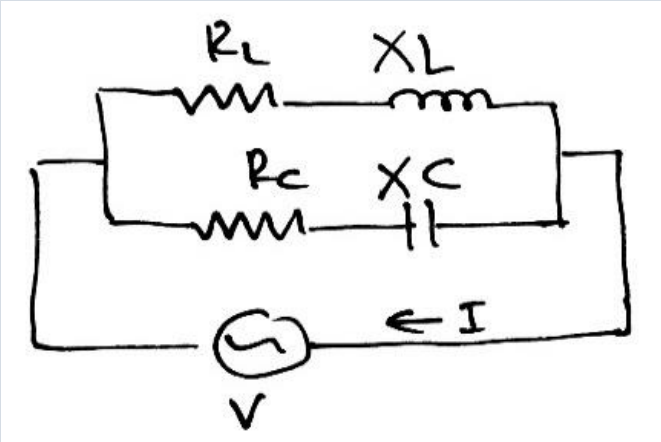
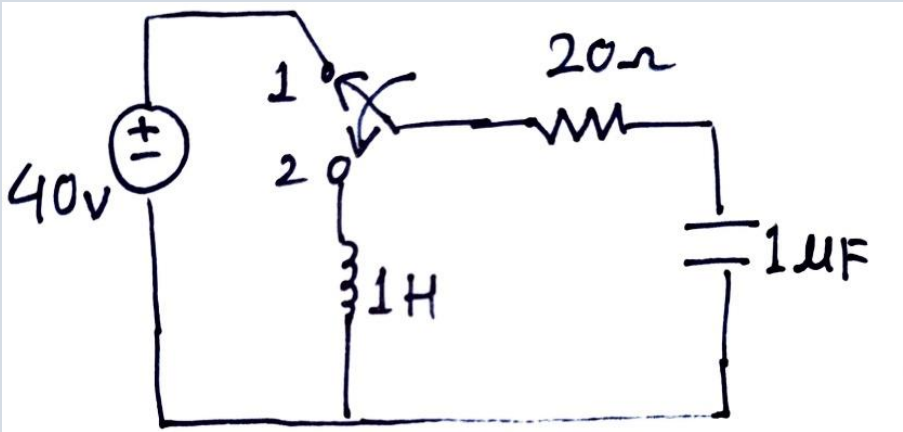
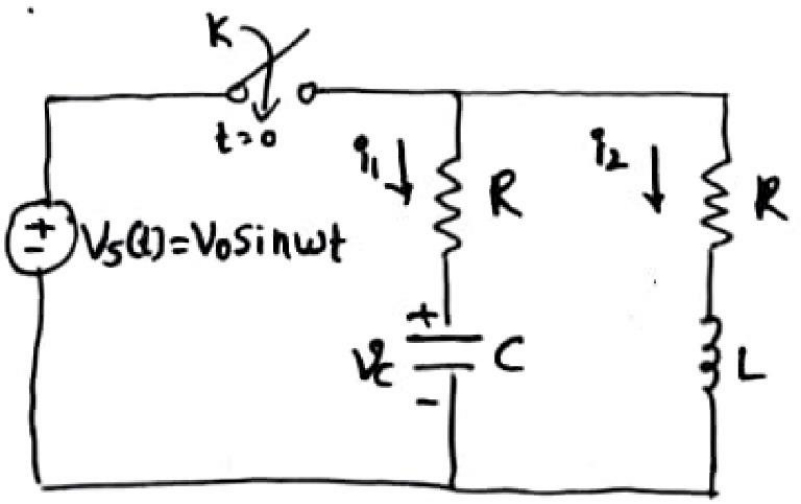
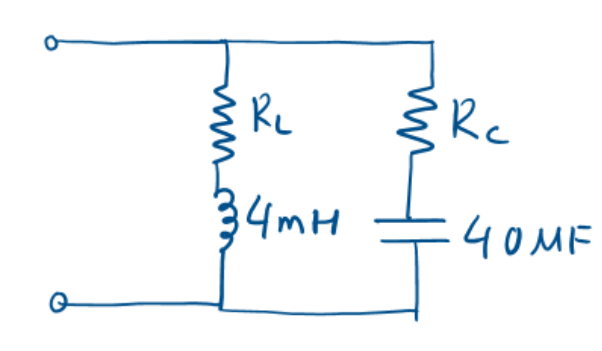
1a.	Determine Voltage V3 using mesh analysis. 	https://youtu.be/eCt1o_qRYDs
1b.	Find V1, V2, V3 using node analysis. 	https://youtu.be/QcJowGkCJ5M

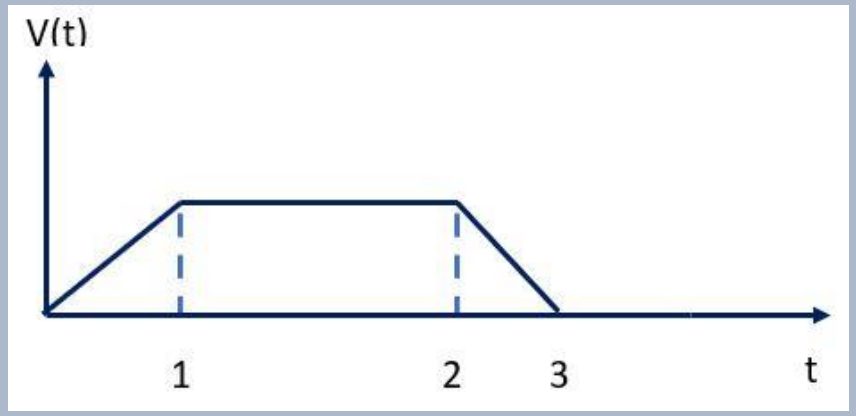
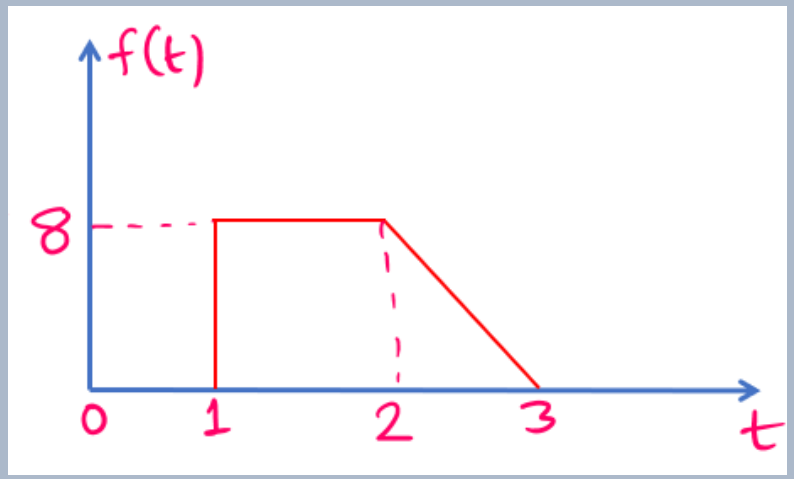
1c.	Find equivalent resistance between A and B. 	https://youtu.be/C6CDc0rKOKA
2a.	Find V using loop analysis. 	https://youtu.be/PRYPVxA0plw
2b.	Find Vx using Node analysis. 	https://youtu.be/hP45GKwFo-Q

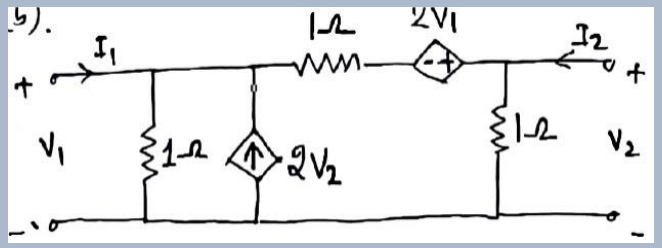
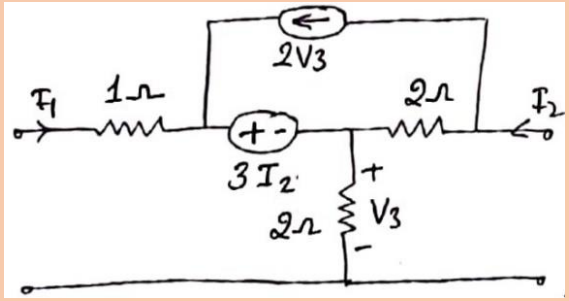
2c.	Reduce the network using source transformation and shifting. 	https://youtu.be/DBsQHdxYpi8
3a.	Find current Ix using superposition theorem. 	https://youtu.be/dem_91MjoE4
3b.	Determine Thevenin's equivalent circuit. 	https://youtu.be/pTD8ug3Zqy8

3c.	Use Millman's theorem to find current I, for the circuit shown below. 	https://youtu.be/zmR0OTTg9fU
4a.	Determine current through 1 Ω resistor using Norton's theorem, for the circuit shown below 	https://youtu.be/M5zxLnwiCwQ
4b.	Determine load resistor RL to receive maximum power from the source. Also find the maximum power delivered to the load in the circuit shown below.	
4c.	State and verify reciprocity theorem for the circuit shown below.	https://youtu.be/QzD6GLs1yQw (Statement)

5a.	Derive the expression for resonant frequency. 	https://youtu.be/mY9Zvi2x2mk
5b.	An impedance coil having a resistance of 4Ω and an inductance of 1mH connected in series with 10μF capacitor. Determine Resonant frequency, Half power frequencies, impedance at resonance, Q of the circuit and Bandwidth.	https://youtu.be/kocfkaGg8w0
5c.	In the network shown below, the switch k is changed position from a to b at $t = 0$, the steady state is reached at position a. Find $\boldsymbol{i}$, $\frac{\boldsymbol{di}}{\boldsymbol{dt}}$, $\frac{\boldsymbol{d^2i}}{\boldsymbol{dt^2}}$ at $\boldsymbol{t = 0^+}$. 	https://youtu.be/s_dSHq1xdPE

6a.	Find $\frac{di1}{dt}, \frac{di2}{dt}$ at $t = 0^+$. 	https://youtu.be/aj785r6ULJ8
6b.	Determine RL and RC for which the circuit shown in figure resonates at all frequencies 	https://youtu.be/1jlAX3Rp6hI
6c.	Show that resonant frequency of series resonant circuit is equal to the geometric mean of two half power frequencies.	https://youtu.be/E6Gd9JDngnw
7a.	State and prove initial and final value theorem in Laplace transformation	https://youtu.be/6CYsSUIcvNk

7b.	Find Laplace transform of the given waveform. 	https://youtu.be/wgt0WnLFioI
7c.	Find Laplace transform of unit step function	https://youtu.be/IfEx_2U28gw
8a.	State and prove shifting theorem	https://youtu.be/9z4zZUuTtSU
8b.	Verify initial value theorem, given $f(t) = 10e^{5t}$	
8c.	Find Laplace transform of the signal shown below 	https://youtu.be/fRJmY8UxOsA
9a.	Three impedances $Z_1 = 20\angle 30\ \Omega$, $Z_2 = 40\angle 60\ \Omega$ and $Z_3 = 10\angle -90\ \Omega$ are delta connected to a 400V, 3-phase system as shown below. Determine the i) Phase currents and ii) Line currents	

9b.	Find Y parameters. 	https://youtu.be/LHxxZA-0HtI
9c.	Express Y parameters in terms of Z parameters.	https://youtu.be/LTxQBrd4EHo
10a.	A unbalanced four wire star connected load has a balanced voltage of 400V, the loads are Z1=(4+j8) Ω, Z2=(3+j4) Ω, Z3=(15+j20) Ω. Calculate i) Line currents ii) Current in the neutral wire	
10b.	Find Z and T parameters. 	https://youtu.be/HjGAFEpsHeU
10c.	Define H parameters with necessary equations	

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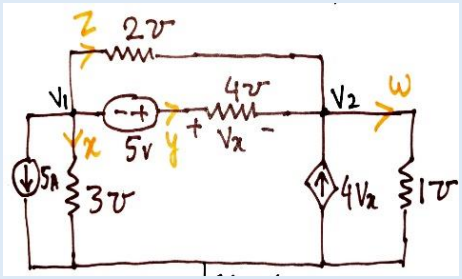
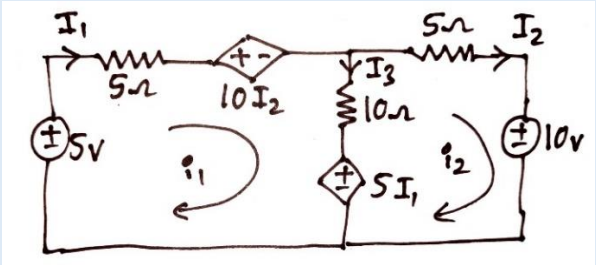
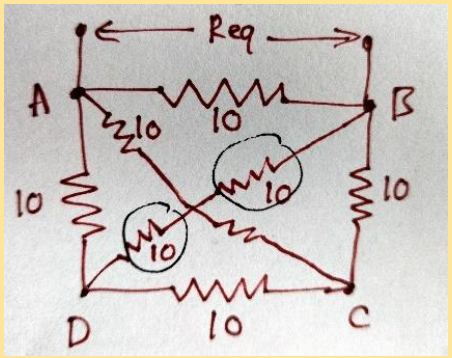
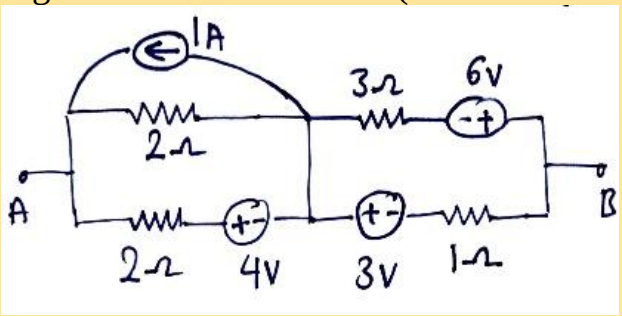
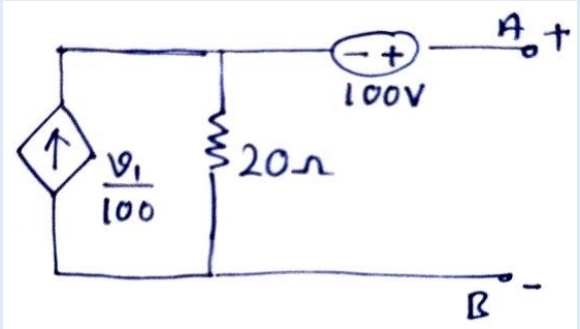
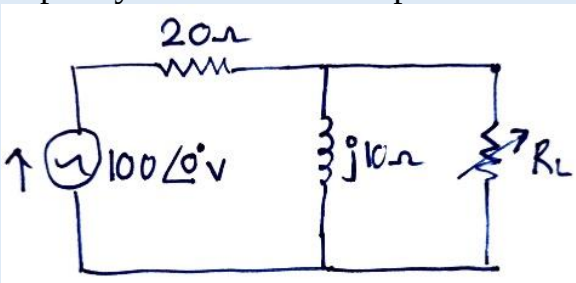
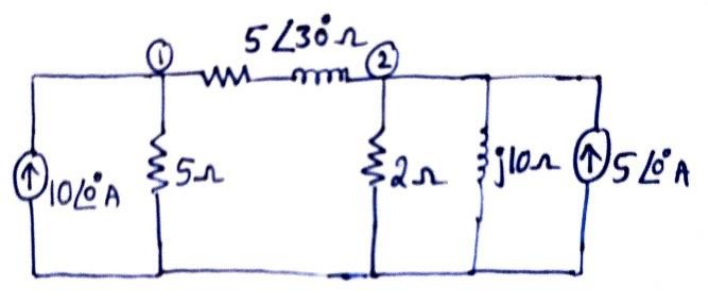
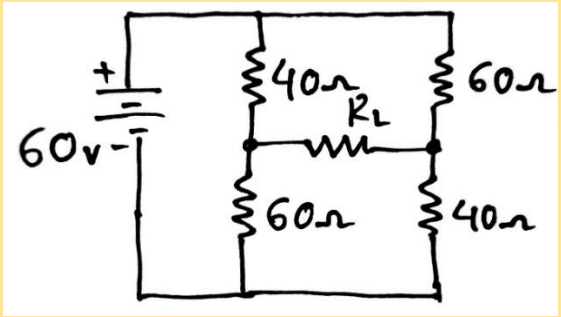
Subject: Electric Circuit Analysis (18EE32)
(Network Theory) (Network Analysis)

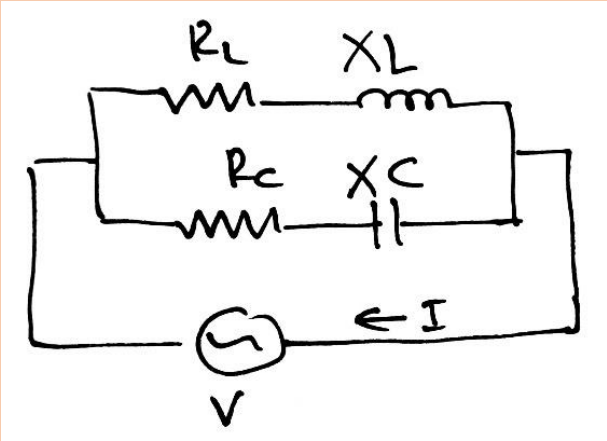
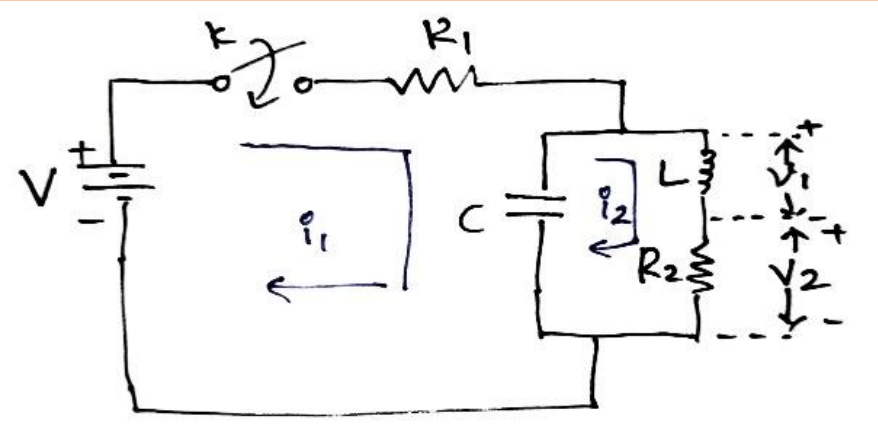
Solution for Dec-2019/Jan.2020 Question paper

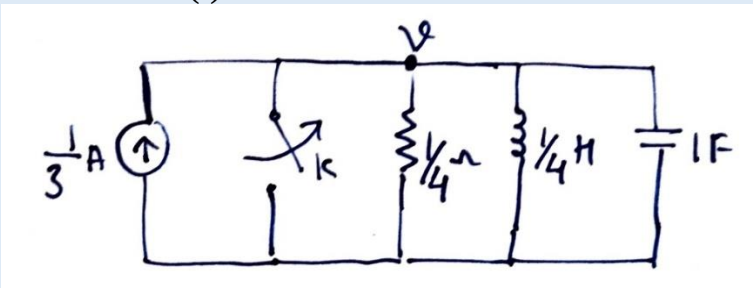
Click on corresponding You-tube video link to for the solution.

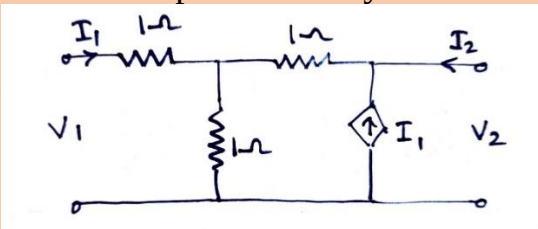
	Problem	You-Tube Link for solution
1 a)	Setup nodal equations for the circuit of Fig. Ql(a) and then find the power supplied by 5 – V source. 	https://youtu.be/pqOEakh5o0M
1 b)	Making use of source shifting procedure, simplify the circuit of Fig. Ql(b) in such a way that the voltage Vx is determined.	
1 c)	Use mesh analysis to determine the branch currents in the network indicated in Fig. Ql(c). 	https://youtu.be/t-P9oRppOv0

2 a)	Find Req' for the network shown in Fig. Q2(a) across A and B. 	https://youtu.be/P2kV2NOXbU0
2 b)		
2 c)	Reduce the network of Fig. 22(c) to a form with only one current source across terminals using source transformation (terminals A and B). 	https://youtu.be/Mg7Ifr9VjnM
3 a)	Find the Thevenin's equivalent circuit at the terminals A and B of the circuit in Fig. Q3(a). 	https://youtu.be/95toHh8Izxc

3 b)	Find the value of RL in the network shown in Fig. Q3(b) that will absorb a maximum power and specify the value of that power. 	https://youtu.be/XSjhU_yMvkg
3c)	In the network shown in Fig. Q3(c) the voltage source of 5V causes a current l in the 2ohm resistor. Find I. Verify the reciprocity theorem.	
4 a)	In the network shown in Fig. Q4(a) determine the nodal voltage V, using superposition theorem. 	https://youtu.be/VrdsfYKI_yc
4 b)	Use Thevenin's theorem to find current in Ri= 62 in Fig. Q4(b). 	https://youtu.be/VBp2jKNAQ7M
4 c)	State and prove Millman's theorem.	https://youtu.be/_a5HT5WRCMY

5a)	Derive the expression for resonant frequency for the general parallel resonant circuit shown below. 	https://youtu.be/mY9Zvi2x2mk
5b)	**For the circuit shown below, has zero capacitor voltage and zero inductor current when the switch k is open. At t=0, the switch k is closed. Solve for** **i) V1** and V2 at at $t = 0^+$ **ii)** $\frac{dv1}{dt}$, $\frac{d^2v2}{dt^2}$ **at** $t = 0^+$ **iii)** $\frac{dv1}{dt}$, $\frac{d^2v2}{dt^2}$ **at** $t = \infty$ 	https://youtu.be/m11iom05SXc

6 a)	Circuit shows RLC parallel circuit excited by a DC current source. At t=0, the switch k is opened. Find V(t). 	https://youtu.be/-cXYdCY5u6Q
6 b)	A 400Hz AC source is connected in series with a capacitor and a coil whose resistance and inductance are 20mΩ and 6mH respectively. If the circuit is in resonance at 200Hz, Find i) Value of Capacitor ii) Voltage across capacitor. iii) Maximum energy stored. iv) Half power frequencies	https://youtu.be/sNfnpgC_GR4
6c)	What are initial conditions in network? Write the equivalent form of the network elements in terms of the initial conditions	
7a)	Find Laplace transform of the square wave shown below.	https://youtu.be/OcjdYov6204 (replace 'T' by 'a' in video)
7b)	Fig. shows a series RLC circuit excited by a voltage V(t)=12 sin 5t. The initial current in the circuit is 5A and the initial voltage across capacitor is 1V with polarity shown. Find i(t) using Laplace transformation method.	
7c)	State and prove initial value theorem in the context of Laplace transformation	https://youtu.be/6CYsSUIcvNk
8a)	A rectangular voltage pulse of unit height and duration 'T' is applied to a series R-C combination at t=0. Determine voltage across capacitance 'C' as a function of time. Use Laplace Transformation method.	https://youtu.be/PgNK_MrEbPQ
8b)	Find the Laplace Transforms of the two different functions given below and sketch the waveforms.	
9a)	A symmetrical 3-φ, 100 V, 3-wire supply feeds an unbalanced star connected load with impedance of the load as $Z_R = 5\angle 0\ \Omega$, $Z_Y = 2\angle 90\ \Omega$ and $Z_B = 4\angle -90\ \Omega$. Find the line currents, voltage across impedances and displacement natural voltage. Also calculate the power consumed by the load. Draw phasor diagram sequence RYB. Take VRY as reference.	

9 b)	Find Z and ABCD parameters. Find whether the network is Reciprocal? Or Symmetrical? 	https://youtu.be/iSx1Q7MAQpk
10a)	A 3-φ delta connected load has $Z_{RY} = (100 + j50)\Omega$, $Z_{YB} = (20 - j75)\Omega$ and $Z_{BR} = (70.7 + j70.7)\Omega$ and it is connected to balanced 3-φ, 400V supply. Determine the line currents, power consumed by the load. Sketch the phasor diagrams. Assume RYB phase sequence and take V_{YB} as the reference phasor.	
10b)	For the circuit shown below, find Y parameters. Is the network symmetrical? Or Reciprocal?	

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