DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Electronics and Telecommunication Engineering **Sem: III**

Subject Name: Network Analysis **Subject Code: BTEXC304**

Max Marks: 60 **Date: 07-12-2018** **Duration: 3 Hr.**

Instructions to the Students:

1. *Solve **ANY FIVE** questions out of the following.*
2. ***Draw figures wherever necessary.***
3. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.*
4. *Use of non-programmable scientific calculators is allowed.*
5. *Assume suitable data wherever necessary and mention it clearly.*

(Level/CO) Marks

Q. 1 Solve the following. **CO01**

A) In the circuit shown in Fig. 1, determine current through 5 ohm resistance using mesh analysis. **[06]**

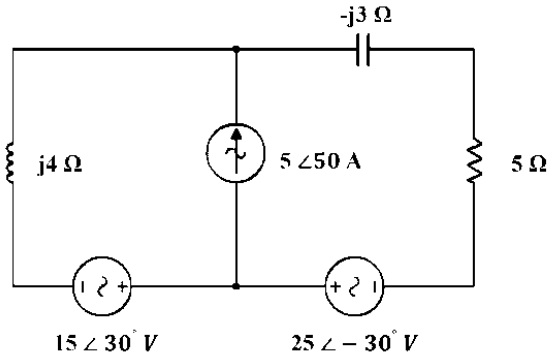

Fig. 1

B) In the circuit shown in Fig. 2, obtain the value of the load impedance between the terminals X and Y for maximum power transfer. Hence, determine the maximum power absorbed by this load. **[06]**

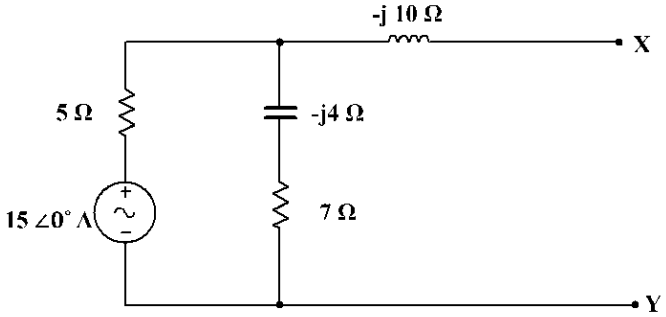

Fig. 2

Q.2 Solve Any Two of the following. **CO01, CO02**

A) Derive expression for frequencies at which voltage across L and C are maximum in a series resonant circuit. Also determine values of voltages across L and C at this frequency. **[06]**

B) A coil of 12H and resistance of 15Ω is shunt with 100pf capacitor. The combination is connected across a generator of 100V, having internal resistance of 70kΩ, Determine **[06]**
(a) voltage across parallel circuit at resonance and
(b) bandwidth.

C) Derive an expression for selectivity and bandwidth of anti-resonant circuit. If the circuit impedance of a parallel resonating frequency is (100 + j10) Ω at frequency 2.5 MHz. Find value of L and C if the Q of inductor is 6 and it is constant. **[06]**

Q. 3 Solve the following. **CO01, CO02**

A) For a symmetrical T network, explain briefly the terms, **[08]**
a) characteristic impedance
b) Propagation constant.
Also derive and expressions for these parameters in terms of circuit impedances.

B) Design a prototype low pass filter sections so as to have design impedance of 700Ω and f_c = 2kHz. Find circuit elements. Also find characteristic impedance Z_o at frequency of 1kHZ, 2kHz and 5kHz. **[04]**

Q.4 Solve any two of the following. **CO01**

A) For a 2-port passive network, define- **[06]**
(a) driving point impedance
(b) driving point admittance
(c) current transfer ratio
(d) transfer admittance

B) For the network shown in Fig. 3 below, determine Z (open circuit impedance) parameter. Also verify condition for reciprocity and symmetry for the same. **[06]**

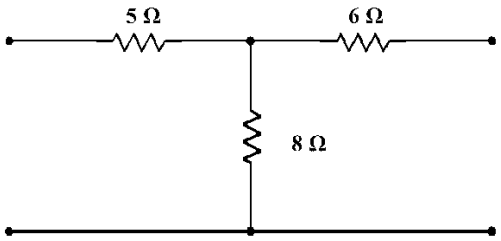

Fig. 3

C) Obtain equations for Y-parameters in terms of Z, h and ABCD parameters. **[06]**

Q. 5 Solve the following. **CO01,CO03**

A) In the R-C circuit shown in below Fig 4, the switch is closed at $t = 0$. Obtain expression for current *i(t)*. **[06]**

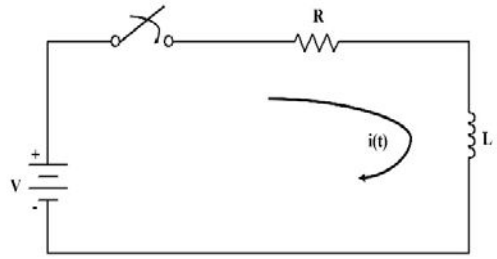

Fig 4

B) In the circuit shown in Fig.5, the switch K is moved from position 'a' to position 'b' at t = 0. A steady state having previously been established at when the switch was position 'a'. Using Laplace Transform method, find value of *i(t)*. **[06]**

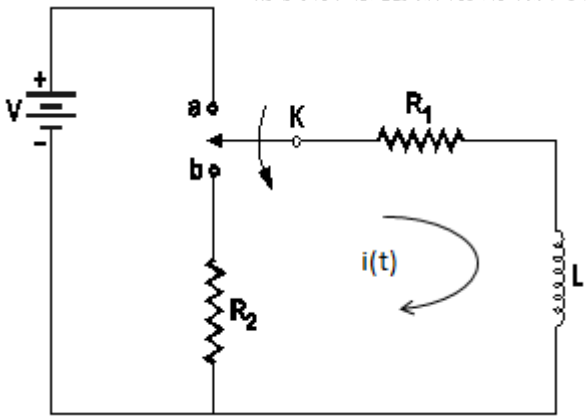

Fig. 5

Q. 6 Solve the following. **CO03, CO04**

A) For a transmission line of length *l*, starting from the differential equations, derive the expressions for the sending-end voltage and current in terms of receiving end voltage and currentsand the secondary line constants. **[06]**

B) A 50 Ω lossless transmission line of length 1.37 λ is terminated into load of (60 + j 40) Ω. Using Smith Chart, Find **[06]**

a) input impedance of the line
b) input and load admittances
c) Reflection coefficient in amplitude and phase
d) Standing wave ratio (S)
e) Minimum and maximum values of the impedances along the line
f) Distance of 1st voltage minima and maxima from the load

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2018

Course: B. Tech in Electronics and Telecommunication Engineering **Sem: III**

Subject Name: Network Analysis **Subject Code: BTEXC304**

Max Marks: 60 **Date: 07-12-2018** **Duration: 3 Hr.**

Instructions to the Students:

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(Level/CO) Marks

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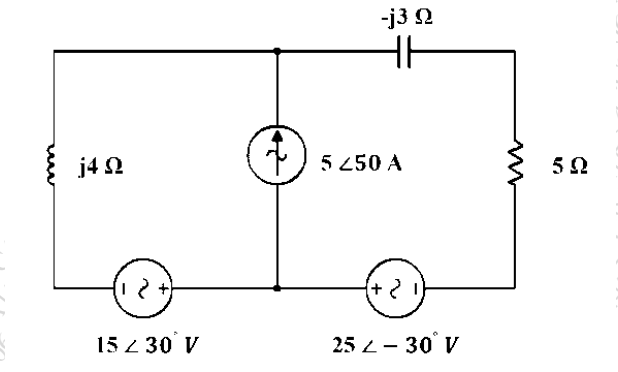

Fig. 1

B) In the circuit shown in Fig. 2, obtain the value of the load impedance between the terminals X and Y for maximum power transfer. Hence, determine the maximum power absorbed by this load. **[06]**

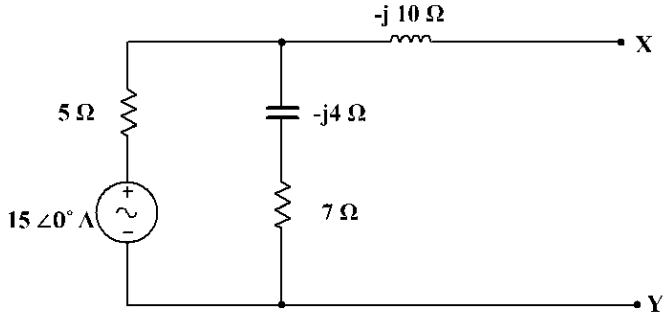

Fig. 2

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(a) driving point impedance
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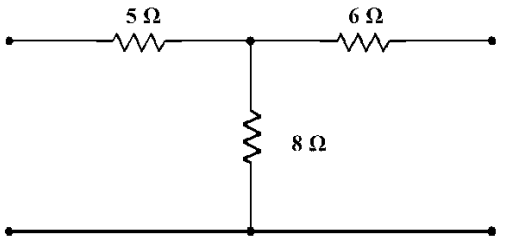


Fig. 3

C) Obtain equations for Y-parameters in terms of Z, h and ABCD parameters. **[06]**

Q. 5 Solve the following. **CO01,CO03**

A) In the R-C circuit shown in below Fig 4, the switch is closed at $t = 0$. Obtain expression for current *i(t).* **[06]**

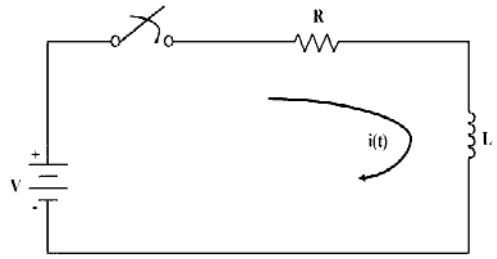
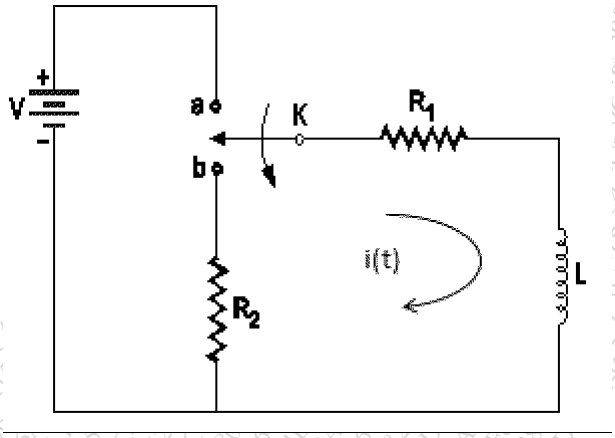


Fig 4

B) In the circuit shown in Fig.5, the switch K is moved from position 'a' to position 'b' at t = 0. A steady state having previously been established at when the switch was position 'a'. Using Laplace Transform method, find value of *i(t)*. **[06]**



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c) Reflection coefficient in amplitude and phase
d) Standing wave ratio (S)
e) Minimum and maximum values of the impedances along the line
f) Distance of 1st voltage minima and maxima from the load

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Summer 2019

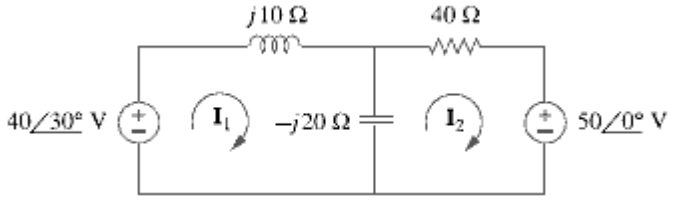
Course: B. Tech in Electrical Engineering **Sem: III**

Subject Name: Network Analysis And Synthesis. **Subject Code: BTEEC 302.**

Max Marks:60 **Date:29/05/2019** **Duration: 3 Hr.**

Instructions to the Students:

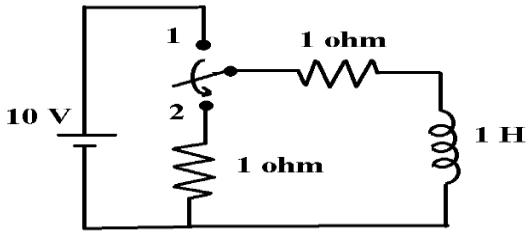
1. *Solve **ANY FIVE** questions out of the following.*
2. *The level question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	Explain various types of Electrical sources.	**(CO1)**	**5M**
B)	Explain the i. Active & Passive Circuit Element ii. Linear & non-linear Circuit Element iii. Unilateral & Bilateral Circuit Element	**(CO1)**	**5M**
C)	Explain with an Example Superposition theorem.	**(CO2)**	**5M**
Q.2	**Solve Any Two of the following.**		
A)	Define the terms with an example: i. Tree ii. Co-Tree, iii. Twigs and Links (chords)	**(CO1)**	**5M**
B)	Explain Equilibrium equation on loop basis.	**(CO2)**	**5M**
C)	What is Duality and dual network? Explain Duality and dual network with an example.	**(CO2)**	**5M**
Q. 3	**Solve the following.**		
A)	Explain first order series R-L circuit.	**(CO2)**	**5M**
B)	 Fig.1 For the circuit in Fig. 1, find 'I1' and 'I2' by Mesh Analysis	**(CO4)**	**5M**

Q.4 Solve Any Two of the following.

A) Calculate the Laplace transform for
i. Unit step function
ii. Ramp function
iii. Impulse function **(CO3) 5M**

B)

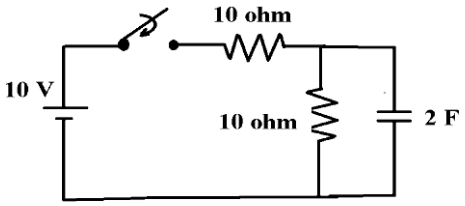


(CO3) 5M

Fig.2

In the network of Fig.2 the switch is moved from the position 1 to 2 at t = 0, steady state conditions having been established in the position 1.Determine i(t) for t > 0 at position 2.

C)



(CO3) 5M

Fig.3

The switch in the network shown in Fig.3 is closed at t = 0. Determine the Voltage across the Capacitor at t > 0

Q. 5 Solve Any Two of the following.

A) Explain Open circuit Impedance (Z) parameters. **(CO2) 5M**

B) Explain Short circuit Admittance (Y) parameters. **(CO2) 5M**

C) Explain Z-parameters in terms of Y-parameter and Y-parameters in terms of Z-parameter **(CO2) 5M**

Q. 6 Solve the following.

A) Explain i. LC Low Pass Filter ii.LC High Pass Filter **(CO4) 5M**

B) A T-section low pass filter has series inductance 80 mH and shunt capacitance 0.022 μF. Determine the cut-off frequency and nominal design impedance (R0). Also design an equivalent π-section. **(CO4) 5M**

End

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

Winter Semester Examination – December - 2019

Branch: Electronics & Telecommunication Engineering **Sem.:- III**
Subject with Subject Code:- Network Analysis (BTEXC304) **Marks: 60**
Date:- 17/12/2019 **Time:- 3 Hr.**

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Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

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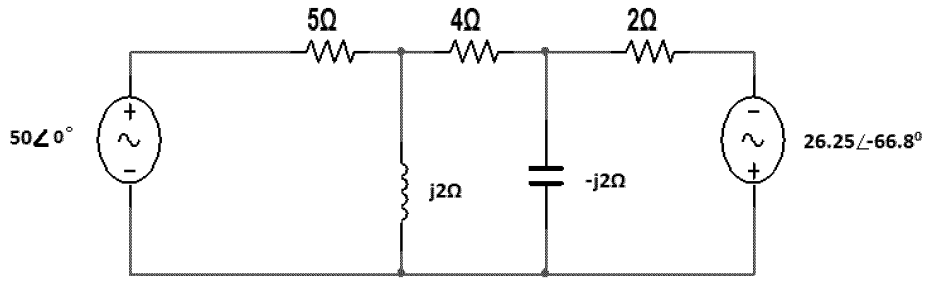
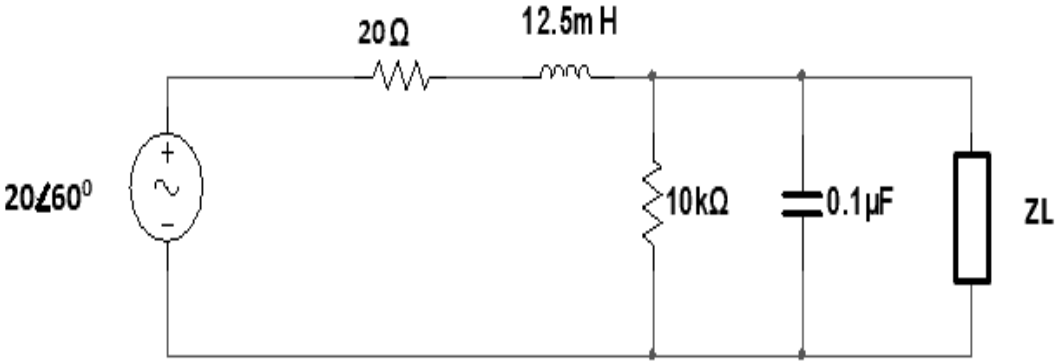
(Marks)

Q.1. a) State Kirchoff's laws for electric circuit. Also Find the current flowing through 4 Ω resistor using source transformation and shifting in following circuit. (06)

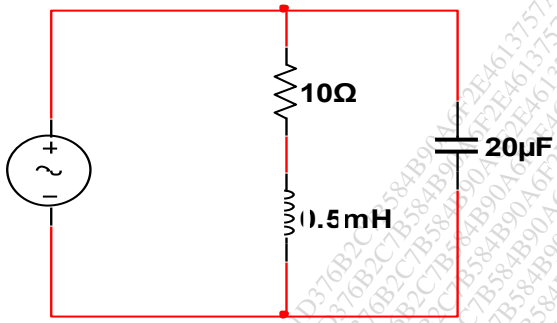


b) Find the value of load impedance 'Z_L' for which power transfer is maximum in following circuit for w =400 rad/s & also value of max power transferred to the load. (06)



Q.2. a) Define and derive an expression for bandwidth of series resonant circuit. (06)

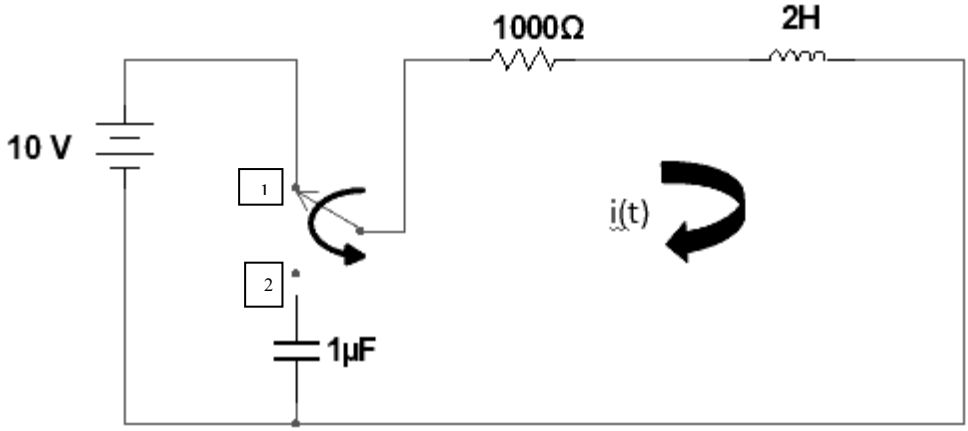
b) For the network shown below, (06)
where R_L=10 Ω, L= 0.5H, C= 20uF, determine its resonant frequency, minimum admittance, quality factor, bandwidth, upper and lower half power frequencies.



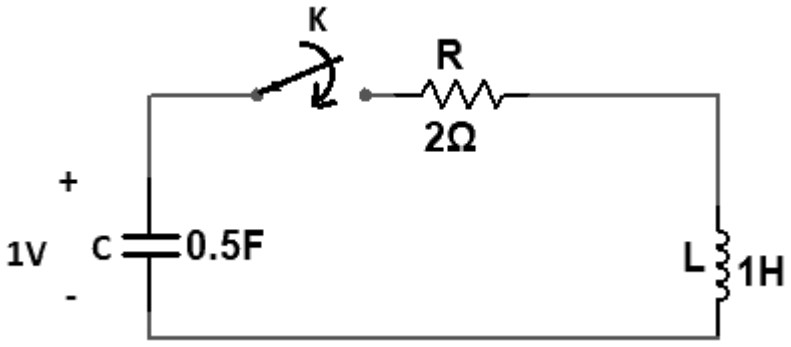
Q.3. a) For symmetrical T network, derive an expressions series and shunt arm impedances in terms of characteristic impedance and propagation constant. (06)

b) Design a constant –k LPF to be terminated in 600 Ω, having cut off frequency 2KHz. Find characteristic impedance & Phase constant at 1.5KHz. (06)

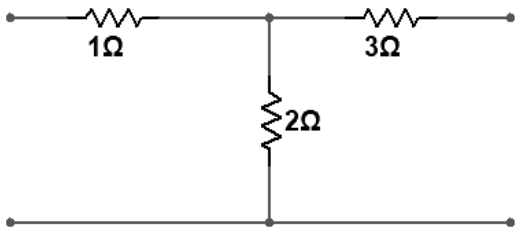
Q.4. a) In the circuit shown in figure below, the switch is changed from 1 to 2 at t=0, Determine initial condition of i, di/dt, d^2i/dt^2 at t = 0+ (06)



b) For series RLC circuit (as shown in figure below), the capacitor is initially charged to 1volt, find the current i(t), when switch k is closed at t= 0 Using Laplace transform. (06)



Q.5. a) For network given below, determine its h parameters and verify condition for reciprocity. (06)



b) Find Z parameters in terms of Y and h parameter for two port network. (06)

Q.6. a) Derive an expression for Zo for a transmission line terminated in Zo. (06)

b) A 50Ω lossless transmission line of length 1.37 λ which is terminating into load of (200 + j80) Ω. Using Smith Chart find the input impedance of line, reflection coefficient in amplitude and phase and standing wave ratio. (06)

Paper End

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

Winter Semester Examination – Dec. - 2019

Branch: S. Y. B. Tech (Electrical Engineering) **Sem.:-** III

Subject:- Network Analysis & Synthesis- BTEEC302 **Marks: 60**

Date:- 12/12/2019 **Time:- 3 Hr.**

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Instructions to the Students

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2. Attempt **any five** questions of the following.
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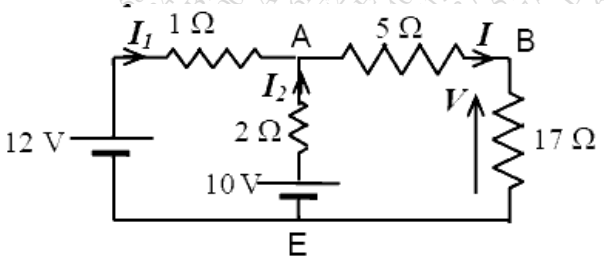
(Marks)

Q.1. a) Find I in the circuit shown in below Fig. by using superposition theorem (6)



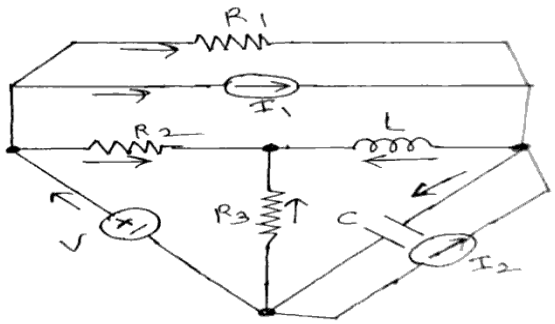
b) Define the following terms :- (6)

(i) Unilateral element (ii) Bilateral element (iii) Linear element

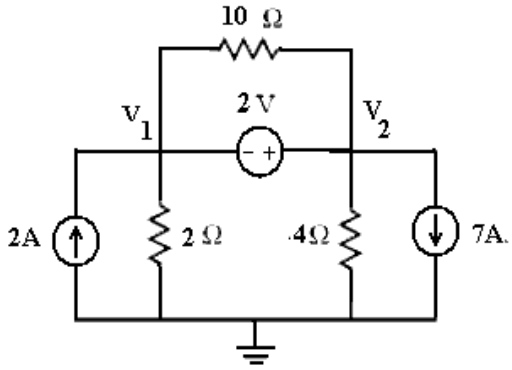
(iv) non-linear element.

Q.2. a) Draw oriented GRAPH for given electrical network. (6)

Find 1) Rank of graph 2) Number of Branches 3) Number of Trees 4) Number of Twigs 5) Number of Links/ Chords

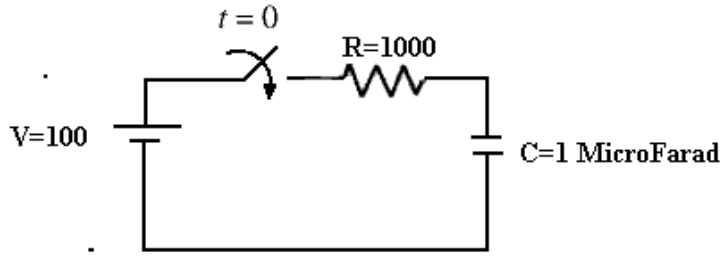


b) By using the supernode concept find out the node voltages V_1 & V_2 (6)

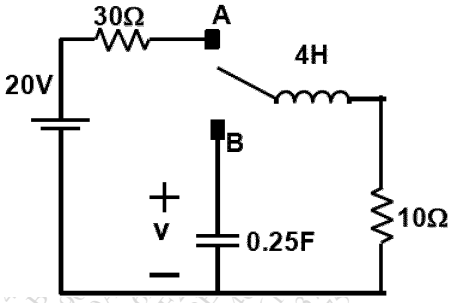


Q.3. a) In the circuit shown in Fig. the switch is closed at t=0 Find the values of i , $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ (6)

at $t=0^+$ if R=1000Ω, C=1μF and V=100V. Capacitor is initially uncharged.



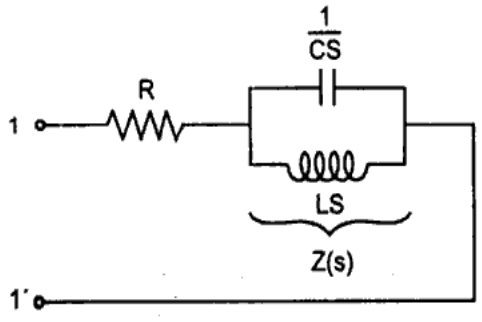
b) In the circuit shown in Fig., the switch is moved from A to B at t=0. Find v(t) for t>0. (6)



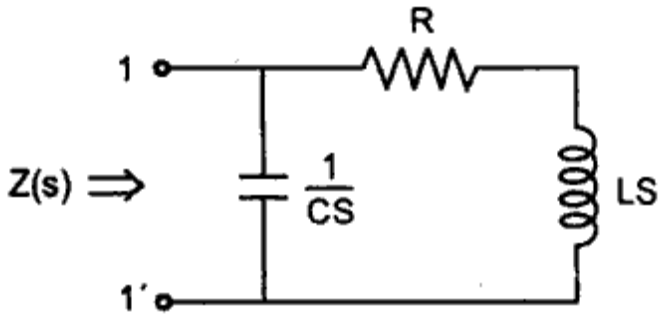
Q.4. a) State and Prove Convolution integral theorem for Laplace transform. (6)

b) Find out $Z_{11'}(S)$ and $Y_{11'}(S)$ of networks shown below.

(i) (3)

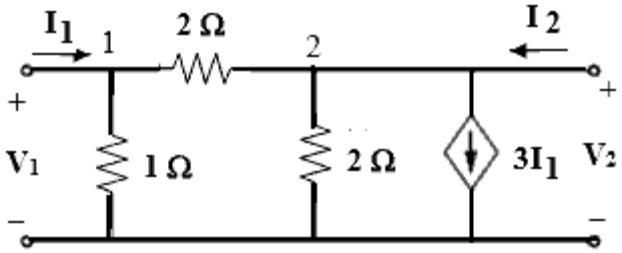


ii) (3)



Q.5. **Solve Any TWO**

a) Find Y and Z parameters for the network shown in Fig. which contains a current controlled source. (6)



b) State and prove the symmetry & reciprocity conditions for transmission line parameters. (6)

c) The Z Parameter of A Two Port Network Are Z11 = 20 Ω, Z22= 30 Ω, Z12=Z21=10 Ω. (6)

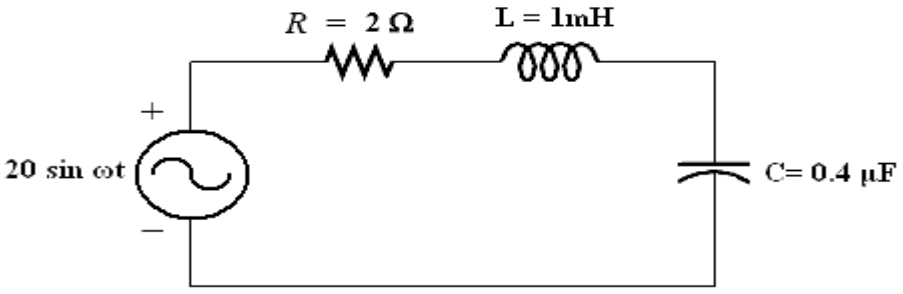
Find Y And ABCD parameters.

Q.6. a) In the circuit in Fig., R = 2 &, L = 1 mH, and C = 0.4 μF. (6)

(i) Find the resonant frequency and the half-power frequencies.

(ii) Calculate the quality factor and bandwidth.

(iii) Determine the amplitude of the current at ω_0, ω_1, and ω_2.



b) Write a note on Low pass & High pass, Band pass & band reject filter. (6)

Paper End