



Roll No.....

National Institute of Technology Delhi

End Semester Examinations November 2016

Course Name: Network Analysis

Course Code: EE-211

Maximum Marks – 50

Total Time: 3:00 Hours

Note:

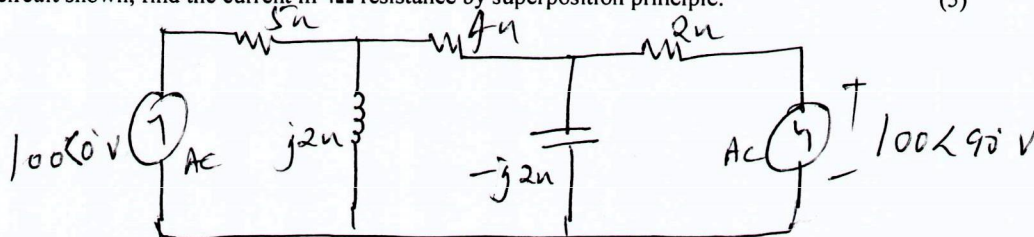
- All Questions are compulsory.
- Assume data where ever required.

Section A (01 mark each and all parts are compulsory)

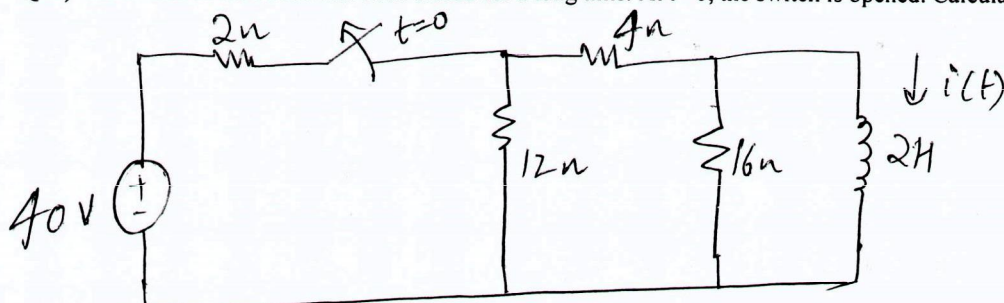
- Q1) What is the time constant of RC circuit with $R = 100\Omega$ and $C = 2000\mu F$? (1)
- Q2) What is free and forced response? (1)
- Q3) When 'supermesh' analysis is used? (1)
- Q4) Write the condition for critical damping in RLC series circuit? (1)
- Q5) Define graph of a network. (1)
- Q6) What are planar and non-planar graphs? (1)
- Q7) Maximum power transfer occurs at a
(a) 100% efficiency (b) 50% efficiency (c) 25% efficiency (d) 75% efficiency (1)
- Q8) State compensation theorem. (1)
- Q9) Write the expression for Millman's equivalent source of n number of parallel connected sources. (1)
- Q10) What are links and twigs? (1)

Section B (Any four (04) are to be attempted)

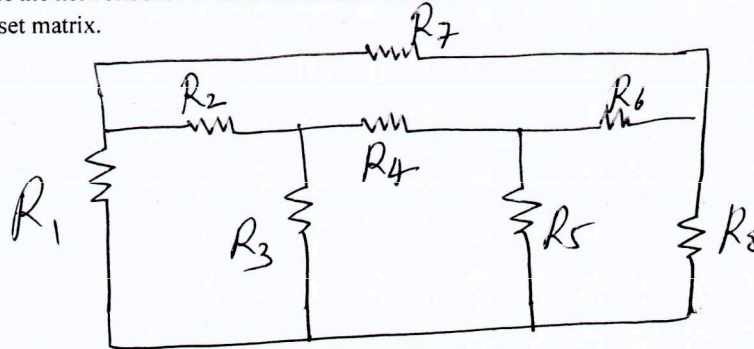
- Q11) In the circuit shown, find the current in 4Ω resistance by superposition principle. (5)



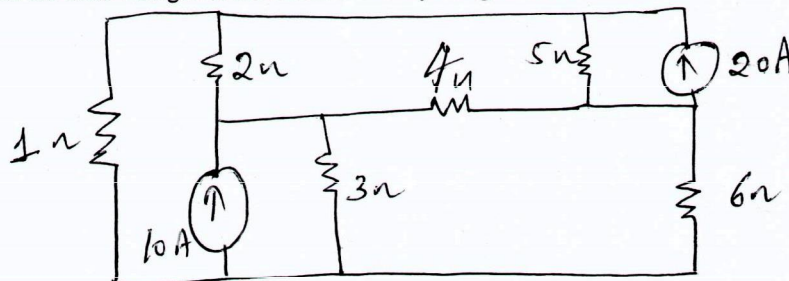
- Q12) The switch in the circuit has been closed for a long time. At $t=0$, the switch is opened. Calculate $i(t)$ for $t > 0$. (5)



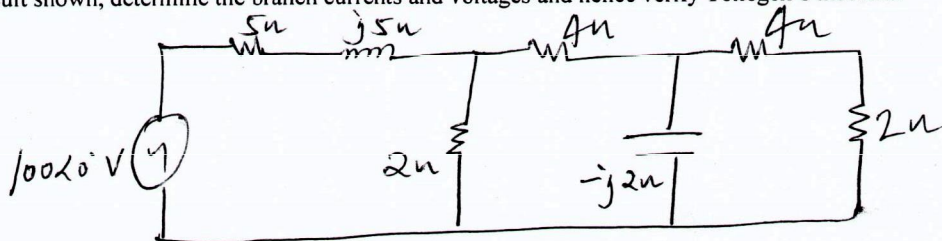
Q13) Draw the graph of the network shown. Select a suitable tree and obtain the tie-set matrix. Write down the KVL equations from the tie-set matrix. (5)



Q14) Determine the node voltages of the circuit shown by using cut-set schedule. (5)



Q15) In the circuit shown, determine the branch currents and voltages and hence verify Tellegen's theorem. (5)



Section C (Any two (02) are to be attempted)

Q16) In a series RLC circuit, the maximum inductor voltage is twice the capacitor voltage maximum. However, the circuit current lags the applied voltage by 30° & the instantaneous drop across the inductance is given by $V_L = 100 \sin 377t$ Volt. Assuming the resistance being 20Ω , find the values of inductance & capacitance. (10)

Q17) The applied voltage in a parallel RLC circuit is given by, $V = 50 \sin (5000t + \pi/4)$ V. If the values of R, L & C be given as 20Ω , 1.6×10^{-3} H & $20 \mu\text{F}$, find the total current supplied by the source. (10)

Q18) The circuit was in steady state with the switch is in position 1. Find the current $i(t)$ for $t > 0$, If the switch is moved from position 1 to 2 at $t = 0$. (10)

