Printed Pages : 7

NEE402

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 121410

Roll No.

B. Tech.

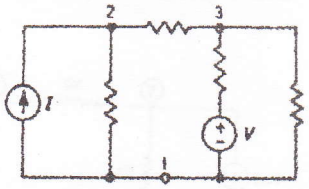
(SEM. IV) THEORY EXAMINATION, 2014-15

NETWORK ANALYSIS AND SYNTHESIS

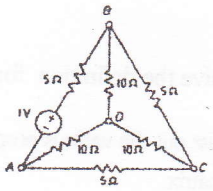
Time : 3 Hours] [Total Marks : 100

1 Attempt **any four** parts 5×4=20

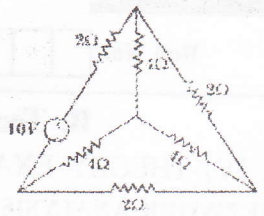
(a) Draw the graph of the network shown in the figure and draw all possible trees of th.e network.



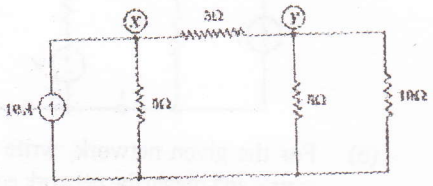
(b) For the given network, write down the tie set matrix and obtain the network equilibrium equation in matrix form using KVL.



(c) Write down the fundamental loop matrix of the network shown below.



(d) Using graph theory, find the node voltage at X and Y for the network shown in the figure.

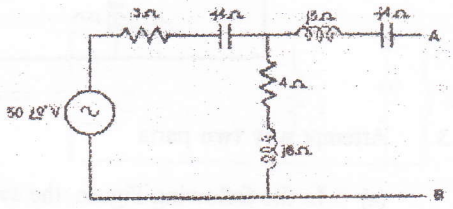


(e) Give the definition. for the tree, co tree and link.

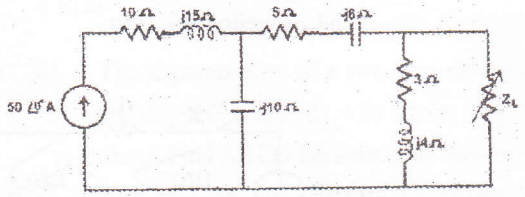
(f) List out the various properties of complete incidence matrix.

2 Attempt **any two** parts **10×2=20**

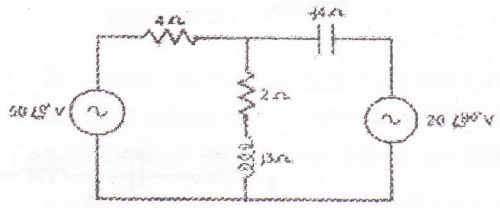
(a) Determine the Thevenin equivalent for the given network.



(b) Find the maximum power delivered to the load for the network shown in the figure.



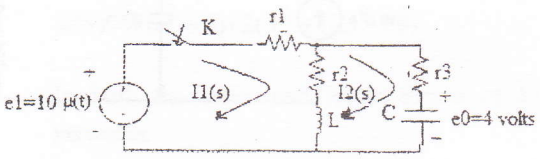
(c) For the circuit shown, determine the cum:tit in (2+3j) ohm by using superpositiÖn theorem.



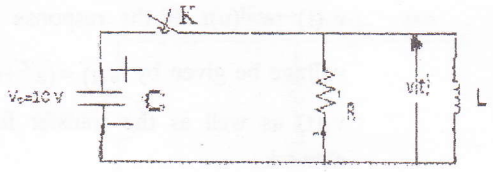
3 Attempt **any two** parts **10×2=20**

(a) In the following Figure, the switch is closed at position 1 at t=0. At t=0.5 m sec the switch is moved to position 2. Find the expression for the current in both the conditions.

(b) A time domain network shown in the figure. Find the loop currents in Laplace domain as well as in time domain when r1=r2=r3=1 Ω. H and C=1F. Initial potential in the capacitor is e0 through the initial currents through the inductor and capacitor are zero.



(c) The given figure represents a parallel RLC circuit where R-0.1 Ω, L-0.5H and C is 1 F. Capacitor C has an initial voltage of 10 V (polarity being shown in the fiv,ure). The switch K is closed at time t=0. Obtain V(t).



4 Attempt **any two** parts **10×2=20**

(a) Design the T and ∏ section of a prototype high pass filter having cut-off frequency of 20 kHz and design impedance of 450 ohms. Also find. its characteristic impedance and. phase constant at 25 k Hz as well as determine the attenuation at 4 kHz.

(b) (i) The Z-parameters of a two port network are Z_{11}=10 ohms, Z_{22}=20 ohms, Z_{12}=5 ohms. Find ABCD Parameter of this -two port network and. find its equivalent T network.

(ii) A symmetrical T-section has the following o.c and s.c impedances: $Z_{o.c}$=800 ohms, Z_{sc}=600 ohms. Determine T section parameters to represent the two portnetwork.

(c) In a, linear two port network, $v_1(t)$ and $v_2(t)$ be the input voltage and its response at the output, $v_2(t)=te^{-2t}(u)t$. If the response to an impulse voltage be given by $v(t)=(e^{-t}+e^{-2t})u(t)$ find. $v_1(t)$ as well as the transfer function of the network..

5 Attempt **any two** parts **10×2=20**

(a) A function is given by

$$Z(s)=\frac{S^3+5s^2+9S+3}{S^3+4s^2+7S+9}$$

Find the positive realness of the function.

(b) Realise the function of

$$Z(s)=S(s^2+4)/2(S^2+1)(s^2+9)$$

In both the caner and foster fonn.s of LC networks.

(c) Design a constant k-low pass filter having cut-off frequency 2.5 kHz and design resistance R_0=700 Ω. Also find the frequency at which this filter produces attenuation of 19.1 dB. Find its characteristics impedances and phase constant at pass band and stop or attenuation band. Also draw the π and T section.
