Exam.Code:0933
Sub. Code: 6973

1108
B.E., (Electrical and Electronics Engineering)
Third Semester
EE-305: Network Analysis and Synthesis

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Missing data (if any) can be appropriately assumed.*

x-x-x

Q1. Explain briefly. (5x2=10)

a) State Thevenin's theorem?
b) Consider any electrical circuit having at least one independent voltage and current source along with five resistances. Draw it's oriented graph, and incident matrix.
c) Write voltage current equations for z and g parameters for two port network.
d) Write the conditions for the network function considered to be stable, unstable and marginal stable.
e) State and explain with one example the initial and final value theorems.

Part A

Q2. A) Obtain the output V_o across x-y using mesh analysis as shown in Fig 1. (05)

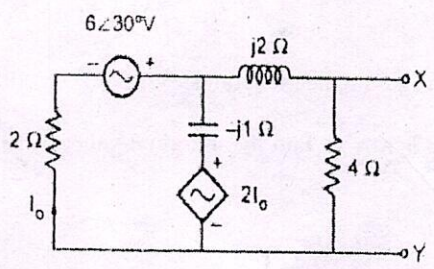

Fig.1

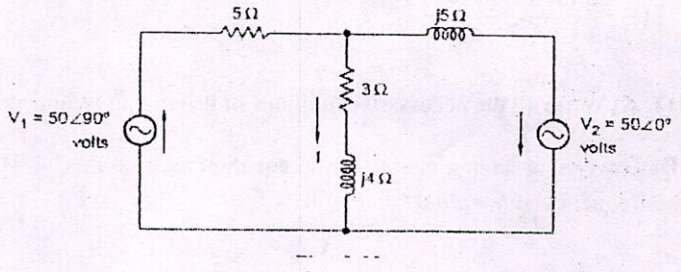

Fig.2

B) Verify superposition theorem for the current through 3 + j4 branch as shown in Fig.2. (05)

Q3. A) For the network shown in Fig.3 write the graph of the network and obtain the tie set schedule considering J_1, J_2 and J_5 as tree branches. Calculate all branch currents. (05)

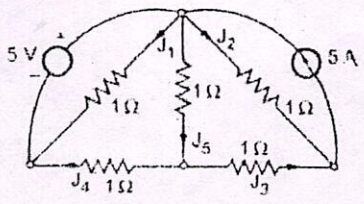

Fig.3

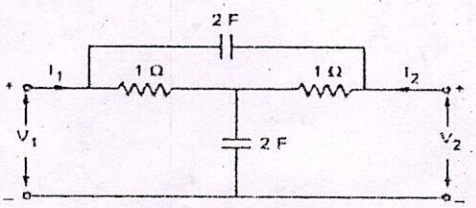

Fig.4

B) Find the network function Z11(s) and Z12(s) for the network shown in the Fig.4 (05)

Q4. A) Determine the transmission parameters of a network function shown in Fig.5 considering three sections are connected in cascade together. (05)

P.T.O.

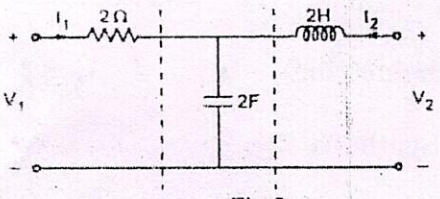

Fig.5

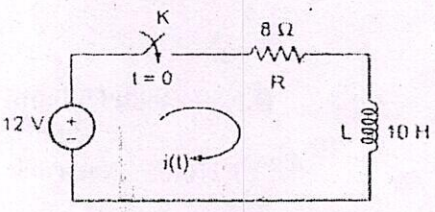

Fig.6

B) Derive the Z and Y parameters in terms of the T parameters of two port network. (05)

Part B

Q5. A) In the circuit shown in Fig. 6 initially switch is kept open for long time. At t= 0, switch K is closed. Obtain expression for current in the circuit for t > 0. Find value of current at t= 0.25 sec. what will be the current in circuit in one time constant period? Determine the instant of time at which the current in the circuit reaches to 1.2 A. Same question will also be solved using the Laplace transformation to verify. (07)

B) Using the convolution theorem, find the inverse Laplace transform of the following function. (03)

i) $F(s) = 1/(s(s+1))$

ii) $F(s) = 1/(s-a)^2$, iii) $F(s) = s/((s+1)(s+2))$

Q6. Determine the Foster and Cauer forms of realization of the driving point impedance function.

$$Z(s) = \frac{4(s^2+1)(s^2+9)}{s(s^2+4)}$$

(10)

Q7. A) Write all the necessary conditions of driving point impedance and admittance functions. (05)

B) For system having characteristic equation as $s^4 + 22s^3 + 10s^2 + s + K = 0$, find the marginal value of K and the frequency at marginal value of K. (05)

x-x-x