Ajay Kumar Garg Engineering College, Ghaziabad

Department of Electrical & Electronics Eggs.

SESSIONAL TEST-2

Course: B. Tech. **Semester:** III
Session: 2017-18 Odd **Section:** EC-1, EC-2, EC-3 & EI
Subject: Network Analysis & Synthesis **Sub. Code:** REE-305
Max. Marks: 50 **Time Allowed:** 2 Hours

Section-A

A. Attempt all parts. (5x2 = 10)

1. Define Laplace Transform and distinguish between one-sided two-sided Laplace Transforms.
2. Define Initial value and final value theorems.
3. Define the terms Planar Graph and tree.
4. What do you mean by duality in an electric network?
5. What is Bode plot?

Section- B

B. Attempt all parts. (5x5=25)

6. Prove that signals $x_1(t) = e^{-at}\,u(t)$ and $x_2 = -e^{-at}\,u(-t)$ have the same Laplace Transform but differ in Region of Convergence (ROC). Plot also their ROCs.
7. Find the Laplace Transform of the Periodic Waveform shown in Fig.1

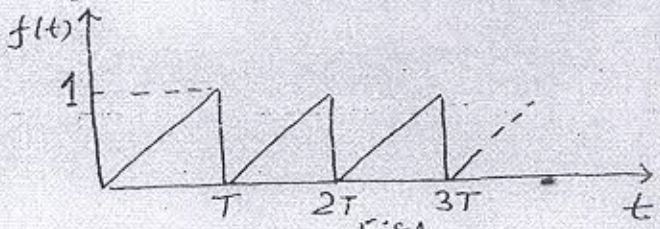

Fig 1

8. Draw the pole-zero plot of the network function

$$F(s)=\frac{3s}{(s+1)(s+4)}$$

And obtain the f(t) from pole-zero plot.

9. For the graph shown in Fig 2, obtain the basic loop matrix and basic cut-set matrix. Take 1, 2 and 3 as tree branches.

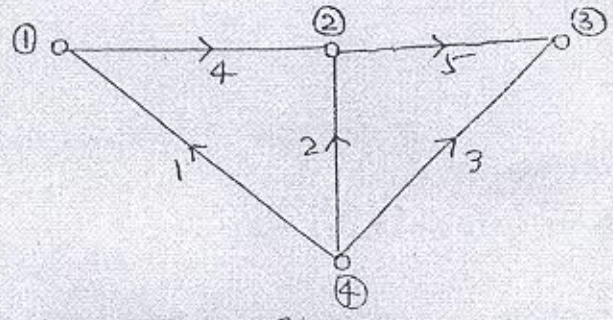

Fig 2

10. State the Routh-Hurwitz stability criteria. Using Routh stability criteria, check the stability of the system whose characteristic equation is given by M

$q(s) = 2s^5 + s^4 + 6s^3 + 3s^2 + s + 1$

Section- C

C. Attempt all parts. (2x7.5=15)

11. State the Superposition theorem. Using Thevenin's theorem find the current through the capacitor for the circuit shown in Fig. 3 H

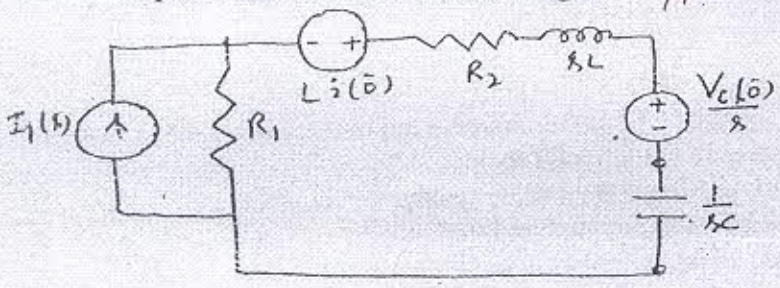

Fig. 3

12. Using graph theory, obtain the node equations of the network shown in Fig. 4 M

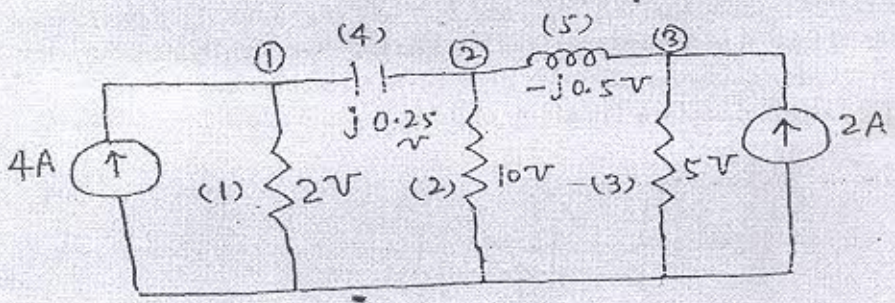

Fig. 4

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