Roll No. ..... **Total Pages : 04**

BT-3/D-20 **43140**

NETWORK THEORY

EC-213A

Time : Three Hours] [Maximum Marks : 75

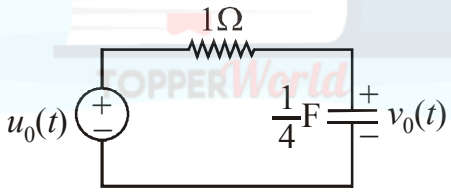
Note : All questions in Part A and Part B are compulsory. Attempt any *four* questions from Part C selecting at least *one* question from each Unit.

Part A

1. Answer the following questions : **5×3=15**

(i) Explain the properties of tree in a graph.

(ii) Assuming $v_0 = t\,u(t)$, find $i(t)$ in RC circuit of figure shown.



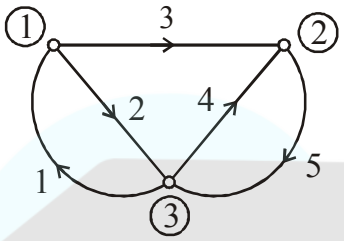
(iii) Define energy sources.

(iv) Explain T section network.

(v) Check whether the polynomial $s^4 + 7s^3 + 4s^2 + 18s + 6$ is Hurwitz or not.

Part B

2. In the tree link graph of given figure, develop the fundamental cutest matrix and equilibrium index on nodal basis. **5**



3. Enlist the restriction on location of poles and zeros in driving point function. **5**

4. Derive *z*-parameters for two port network. **5**

5. Design an *m* derive T section for low pass filter having cutoff frequency 7 kHz, design impedance 600 Ω and frequency of infinite attenuation of 10.5 kHz. **5**

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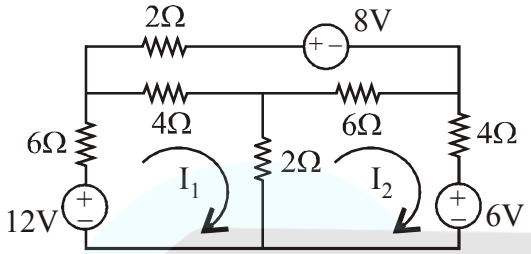
Part C

Unit I

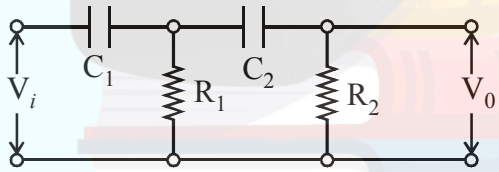
6. Derive the expression for impulse response in a series RLC circuit. **10**

7. A network has been shown in fig. Write down the tieset matrix and obtain network equilibrium equation in matrix form using KVL. Calculate loop currents : **10**

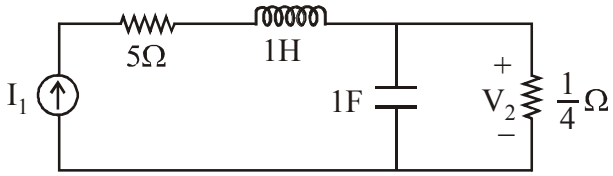


Unit II

8. Find the voltage transfer ratio of network given : **10**



9. Find the pole zero plot of driving point and transfer impedance of network : **10**



Unit III

10. Derive the relationship of ABCD parameters in terms of Z, Y and *h* parameters. **10**

11. Derive the transient response in series RL circuit with DC excitation. **10**

Unit IV

12. Find the first and second Foster form of driving point function $Z(s) = 2(s^2 + 1)(s^2 + 9)/s(s^2 + 4)$. **10**

13. Explain positive real functions with its properties. **10**

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