01-01-2020

Roll No. ..... Total Pages : 05

BT-3/D-19 **33140**

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 incidence matrix in a graph.

(ii) Explain impulse function and unit step function.

(iii) What are energy sources ?

(iv) Explain π section network.

(v) Check whether the polynomial $s^5 + s^3 + s$ is Hurwitz or not.

Part B **20**

Note : Attempt all questions.

Unit I

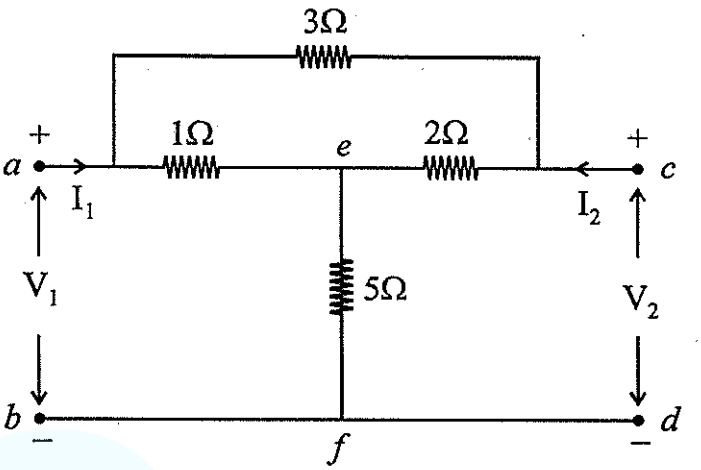
2. Determine the step response of RL parallel circuit. 5

Unit II

3. Explain necessary conditions for transfer function. 5

Unit III

4. Determine open circuit parameter for given circuit. 5



Unit IV

5. Design an *m* derive T section for high pass filter having cutoff frequency 5 KHz. Design impedance 600Ω and frequency of infinite attenuation of 10.5 KHz. 5

Part C

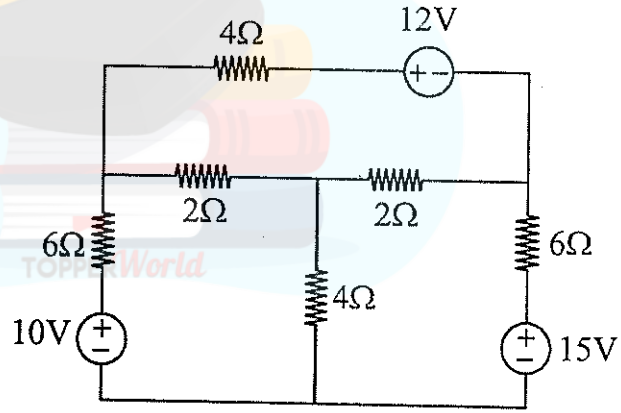
40

Note : Attempt *one* question from each Unit.

Unit I

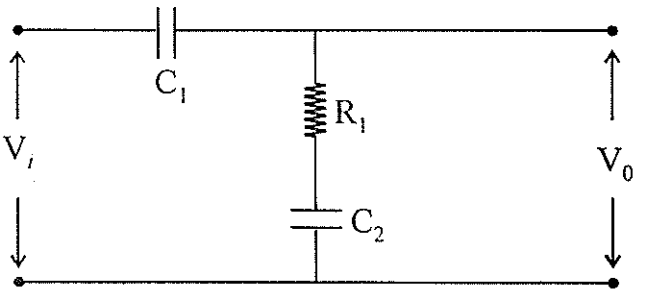
6. In a series RC circuit, the resistance is of 2Ω while capacitor is of 1/4F. Find the transfer function of voltage and drop across the capacitor assuming supply voltage to be $V_0(t) = t\,u(t)$. **10**

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**

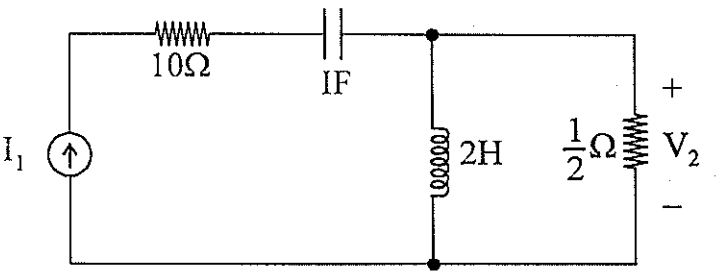


Unit II

8. Find the voltage transfer ratio of network given.



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



Unit III

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

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

Unit IV

12. Find the First and Second Foster form of driving point function : **10**

$$Z(s) = 8\left(s^2 + 4\right)\left(s^2 + 25\right) / s\left(s^2 + 16\right)$$

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