Roll No. ..... Total Pages : 3

BT-3/D-21 **43140**

NETWORK THEORY

Paper–EC-213A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

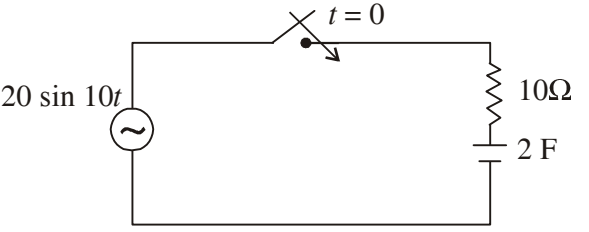
UNIT–I

1. (a) What is incidence matrix in network? Explain its properties.

(b) Find the step response (by applying of a constant voltage source at the close of a switch) of a series RLC circuit.

2. (a) What are singularity functions? Give examples.

(b) In the circuit shown in fig, find the transient current when the switch is closed at $t = 0$. Assume zero initial conditions.



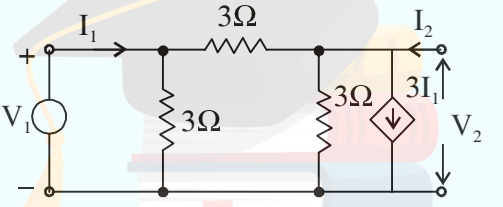
UNIT–II

3. Derive the Transient Response in series R–C circuit with sinusoidal excitation for second order circuit. A step voltage of 10 V is applied at $t = 0$ in a R–C series circuit where R = 2Ω. C = 2F. The initial charge of the capacitor is nil. calculate $i(t)$ using Laplace Transform.

4. The Laplace transform of a voltage $v(t)$ is $V(s) = 4(s + 1)/(s + 2)(s + 3)$. Draw poles and zeros of this function and determine $v(t)$ using pole-zero plot.

UNIT–III

5. (a) Determine the *y*-parameters of the network shown in figure.



(b) The Z-parameters of a two port network are Z11 = 15, Z22 = 24, Z12 = Z21 = 6.

Determine (i) ABCD parameters and (ii) Equivalent T network.

6. (a) Derive the *h*-parameters of Two port networks. Also determine the condition of reciporicity and symmetry in *h*-parameter network.

(b) Explain the parallel connection of Two port network.

UNIT–IV

7. (a) Design a T and π section constant-K Low pass filter having a cut-off frequency of 2 kHz and nominal impedance R_0 = 600 Ω. Obtain a) characteristics impedance and phase constant at 24 kHz when cut off frequency is 10 kHz.

(b) List and explain the synthesis properties of R-L impedance functions.

8. (a) Design an *m* drive T section for high pass filter having cut off frequency 10 kHz, design impedance 600 Ω and frequency of infinite attenuation of 15 kHz.

(b) Describe the criterion to determine whether a polynomial is Hurwitz polynomial or not.

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