



(Pages : 4)

9705

Reg. No. :

Name :

**Third Semester B.Tech. Degree Examination, January 2016
(2013 Scheme)**


13.303 : NETWORKS AND SYSTEMS (E)

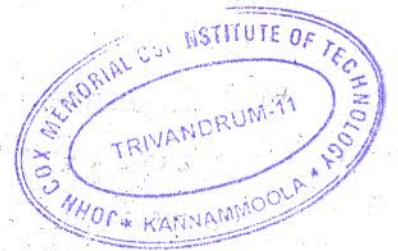
Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **2** marks.

1. Explain dot rule for coupled circuits.
2. Explain Parseval's theorem.
3. Explain the condition for existence of Fourier series for a function.
4. What is meant by poles and zeros of a network function ?
5. Explain the terms tree and graph.
6. Explain the different types of passive filters.
7. Explain T and pi equivalent of two-port networks.
8.  Determine the Y-parameters of the network.
9. Explain causal and non-causal systems.
10. List the properties of RL impedance function.



(10x2=20 Marks)

P.T.O.

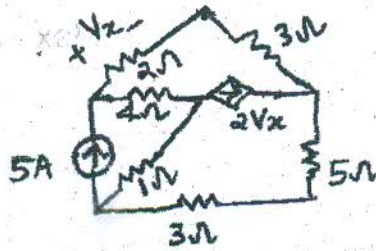
PART – B

Answer **one full** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) Calculate the power delivered to 5Ω resistor by node analysis.

8



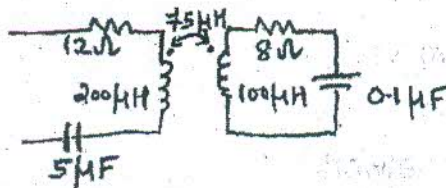
- b) A 3-phase, 400 V, RYB system supplies an unbalanced 3 wire, star connected load of $Z_R = (4 + j8)\Omega$, $Z_Y = (3 + j4)\Omega$, $Z_B = (15 + j20)\Omega$. Find the line currents and neutral shift voltage.

12

OR

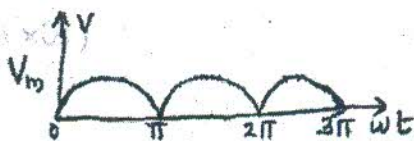
12. a) A voltage of 115 V at a frequency of 10 KHz is applied to the primary of the given coupled circuit. Determine the total impedance referred to primary and the currents in primary and secondary.

12



- b) Find the Fourier series expansion of the given wave form.

8

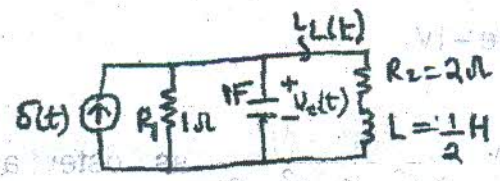




Module - II

13. a) Plot the poles and zeros of $H(s) = \frac{2s}{(s^2 + 4s + 8)}$ and use it to find the magnitude and phase for $\omega = 0, 1, 3$. 10

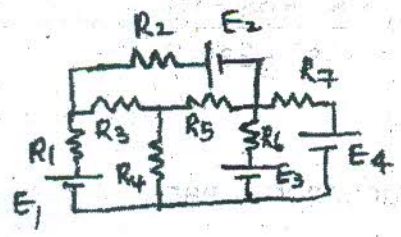
b) Find the $u_L(t)$ and $i_L(t)$ in the circuit assuming zero initial conditions. 10



OR



14. a) Draw the linear oriented graph and write the incidence matrix. 10



b) The reduced incidence matrix of a graph is given by
$$\begin{bmatrix} 0 & 1 & 0 & -1 & -1 & 1 \\ 0 & -1 & 1 & 0 & 1 & 0 \\ 1 & 0 & -1 & 0 & 0 & 0 \end{bmatrix}$$

Draw the oriented graph. Determine f-cutset matrix. 10

Module - III

15. a) Find Z parameters in terms of (i) ABCD and (ii) h parameters. Determine the condition for (ii) reciprocal and (iv) symmetrical network in terms of Z-parameters. 14

b) Determine the overall T parameters of the combined network, given 2 networks whose individual T parameters are known and connected in cascade. 6

OR



16. a) Design a T-section constant K-high pass filter having cut off frequency of 10 KHz and design impedance of $600\ \Omega$. Find its characteristic impedance and phase constant at 25 KHz. **10**
- b) Design n-derived T and π networks low pass filter with design impedance $900\ \Omega$ cut off frequency 0.9 KHz and infinite attenuation frequency 1 KHz. **10**

Module – IV

17. a) Synthesize the network function $Z(s) = \frac{s(s^2 + 4)}{2(s^2 + 1)(s^2 + 9)}$ as Foster I and Foster II form. **14**
- b) Determine whether the following functions represent driving point impedance of an RC network $Z_1(s) = \frac{s^2 + 1}{s^2 + s + 4}$; $Z_2(s) = \frac{s^2 + 3s + 1.5}{4s^2 + 2s + 2}$. **6**

OR

18. a) Find whether the following systems are linear or non-linear
- i) $y(t) = 2 \frac{dx(t)}{dt}$ ii) $y(t) = \log[x(t)]$. **10**
- b) Define LTI system and
- i) Verify whether the given system is linear and time invariant
- $$3 \frac{dy}{dt}(t) + 5y(t) = x(t).$$
- ii) Find whether the following systems are causal or non-causal
- a) $y(t) = x(t) + x(t - 1)$
- b) $y(t) = x(t^2)$. **10**