(Pages : 4) **9710**

Reg. No. : .....

Name : .....

Third Semester B.Tech. Degree Examination, January 2016
(2013 Scheme)
13.303 : NETWORK ANALYSIS (AT)

Time : 3 Hours Max. Marks : 100

PART – A

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

1. State Millman's theorem.
2. List all the properties of a transfer function.
3. Define initial value theorem.
4. Obtain the incidence matrix of the graph shown in Fig. 1

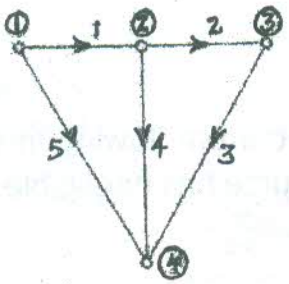

Fig. 1

5. List the properties of series RLC resonant circuit.
6. Define and write the importance of image impedance.
7. List the necessary and sufficient conditions for a positive real function.
8. Synthesize a half sine wave with amplitude unity and duration $T/2$.
9. List the conditions for the stability of a network.
10. Show that for an ideal transformer, $L_1L_2 - M^2 = O$. **(10×2 = 20 Marks)**

P.T.O.

PART – B

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

MODULE – I

11. a) Draw the graph and possible trees of the network given in Fig. 2. **8**

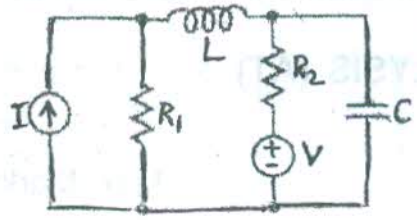

Fig. 2

b) Determine the equivalent circuit impedance about the points AB, supply current and the power dissipated in the resistor of the network given in Fig. 3 **12**

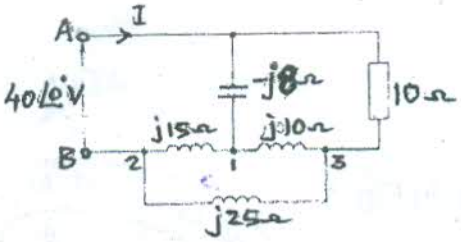

Fig. 3

OR

12. a) State and use Thevenin's theorem to determine the current flowing in the $(4 + j3)\Omega$ impedance and its direction. Assume the source has negligible internal impedance. Also draw the Norton's equivalent. **14**

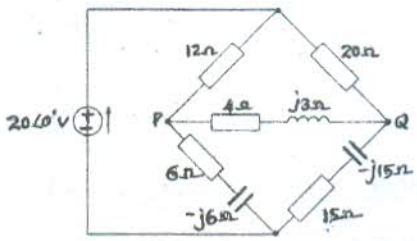

Fig. 4

b) Synthesize the given waveform in terms of basic functions. **6**

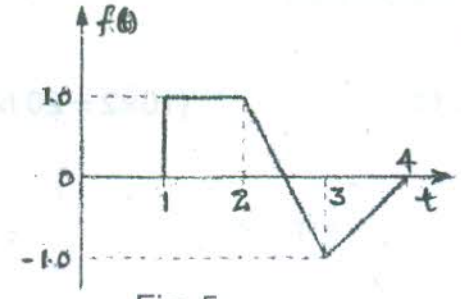

Fig. 5

MODULE – II

13. a) A voltage is expressed as $V(s) = \frac{s+1}{s(s^2+4s+4)}$. If this voltage is applied across a resistance of 0.25Ω only. Find the current through the resistor in time domain. 8

b) In the network shown in Fig. 6, the initial voltage retained by the capacitor C_1 is 100 v while there is no initial voltage stored in C_2. Switch 'k' is closed at t = 0. Find the voltage drop across the capacitors C_1 and C_2 at $t = \infty$. 12

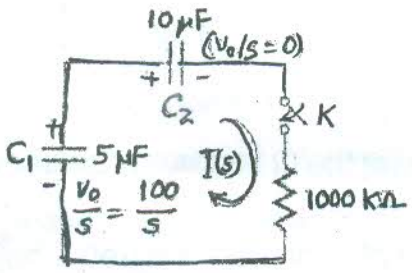

Fig. 6

OR

14. a) The network shown in Fig. 7 is initially under steady state condition with switch 'S' is closed. Switch 'S' is opened at t = 0. Find the voltage across the inductance L. 14

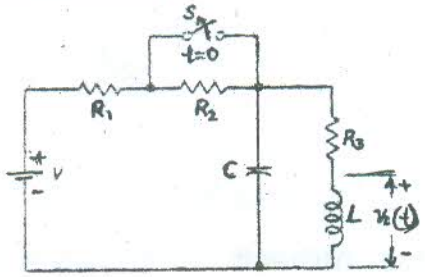

Fig. 7

b) For the network given in Fig. 8 Find the voltage transfer function Vc/v and plot the pole zero locations. 6

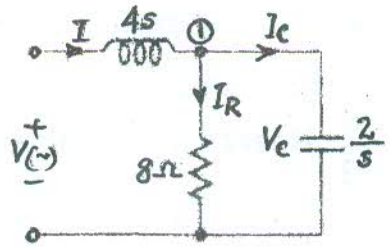

Fig. 8

MODULE – III

15. a) Prove that for a passive reciprocal network AD – BC = 1. Where A, B, C and D are the elements of a transmission matrix. **5**

b) Find the Z, Y and T parameters for the network shown in Fig. 9. **15**

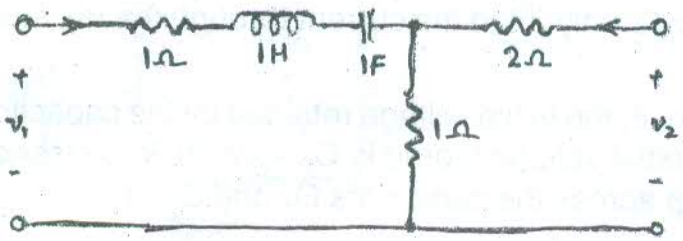

Fig. 9

OR

16. a) Define Q factor and describe the factors affecting the Q factor and selectivity of a resonant circuit. **8**

b) Define resonance and obtain the equation and value of resonant frequency of the circuit given in Fig. 10 where R = 22Ω, C = 10 μF and L = 0.1 H. **12**

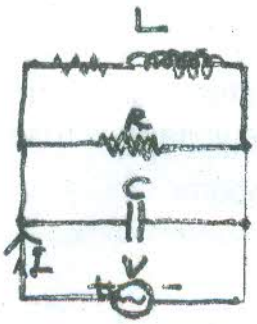

Fig. 10

MODULE – IV

17. a) List the properties of Hurwitz polynomial and test whether the given polynomial is Hurwitz or not. $S^4 + S^3 + 6S^2 + 3S + 6$. **10**

b) An impedance function of the input of a network is represented by

$Z(S) = \frac{S^2 + 5S + 4}{S^2 + 2S}$. Realize it in the first Foster form. **10**

OR

18. A driving point function is given by $F(S) = \frac{S^2 + 6S + 8}{S^2 + 4S + 3}$. Realize the function using both the Cauer forms. **20**