(Pages : 4) **8714**

Reg. No. : .....

Name : .....

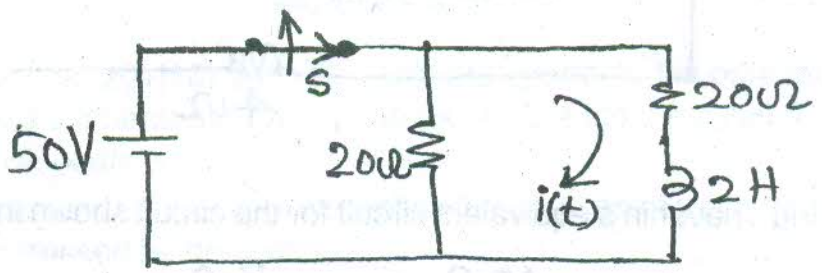
Third Semester B.Tech. Degree Examination, December 2015
(2008 Scheme)
Branch : Electrical and Electronics
08.304 : NETWORK ANALYSIS AND SYNTHESIS (E)

Time : 3 Hours Max. Marks : 100

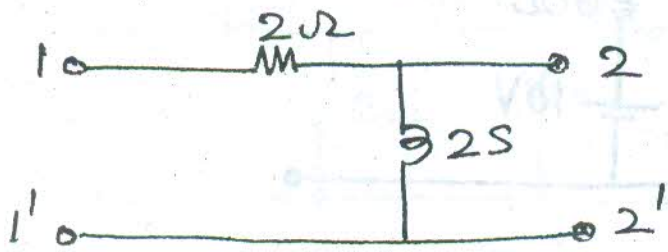
Answer **all** questions from Part **A** and **one full** question from **each** Module of Part **B**.

PART – A

1. State and explain Super position theorem.
2. With an example explain node voltage analysis.
3. Determine the resonant frequency for a series circuit consisting of 10 Ω, 0.5 mH and 10 μF.
4. A 3 – ϕ balanced delta connected load of (4+j8) Ω perphase is connected across a 400 V, 3 – ϕ balanced supply. Calculate the total active power drawn by the load.
5. For the circuit shown in Figure, find the current equation when the switch is opened at t = 0.



6. For the network shown in figure, obtain the transfer functions $G_{21}(s)$ and $Z_{21}(s)$.



P.T.O.

7. Explain Y – parameters of a two port network.

8. What are the drawbacks of constant K type filters ?

9. Derive an expression for the characteristic impedance of a symmetrical π –section.

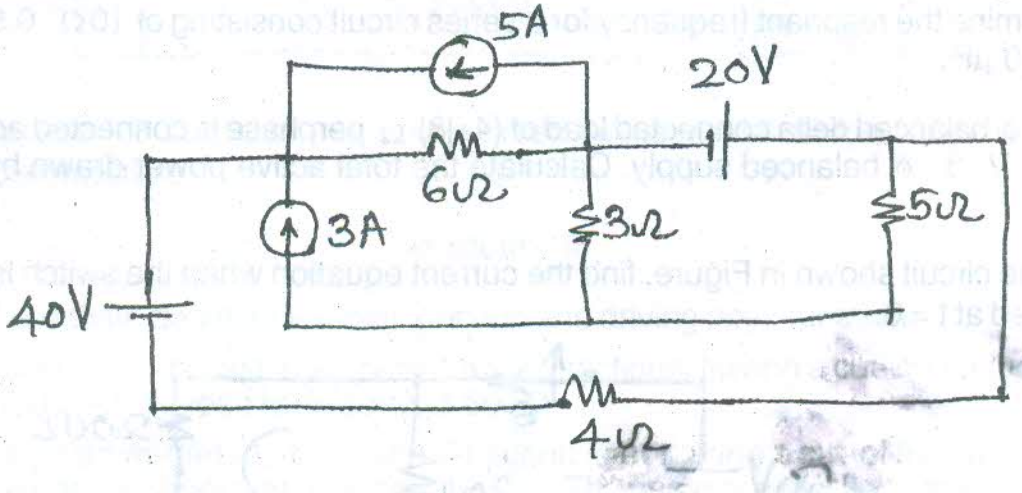
10. Check the positive realness of the following function : $z(s) = \frac{s+3}{s+1}$

(10×4 = 40 Marks)

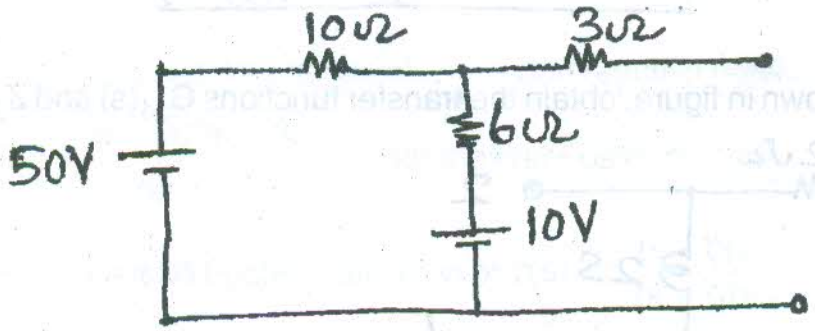
PART – B

Module – I

11. a) Determine the power dissipated in 5Ω resistor in the circuit shown in figure. **12**

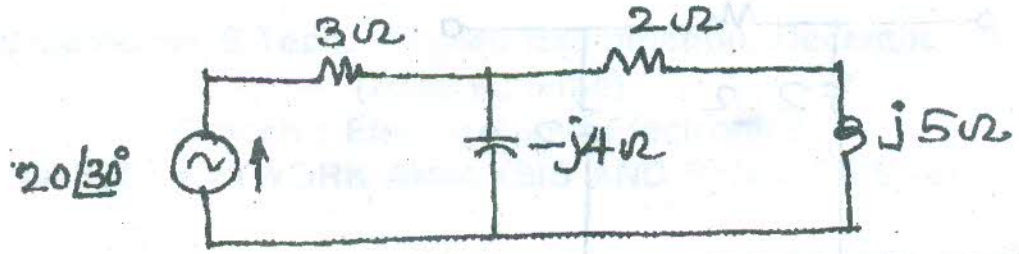


b) Find Thevenin's equivalent circuit for the circuit shown in figure. **8**



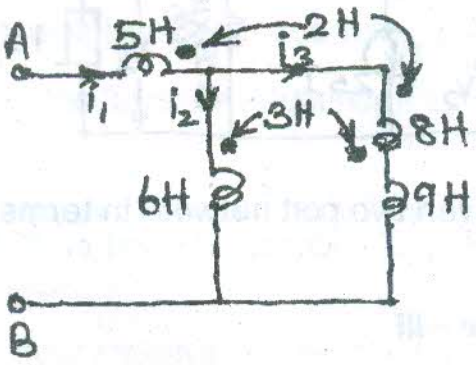
OR

12. a) For the circuit shown in figure, determine the power output of the source and the power in each resistor. 6



b) A symmetrical $3-\phi$, 100 V, 3 wire supply feeds an unbalanced star connected load with impedances of the load as $5\angle 0°\ \Omega$, $2\angle 90°\ \Omega$, and $4\angle -90°\ \Omega$. Find the line currents. 7

c) Calculate the effective inductance of the circuit shown in figure across AB. 7

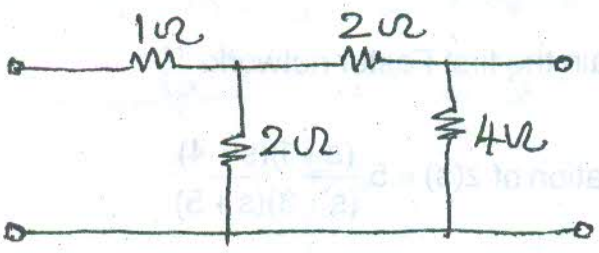


Module – II

13. a) Two impedances (20+j10) and (10 – j30) are connected in parallel and this combination is connected in series with (30 + jX). Find the value of X which will produce resonance. 6

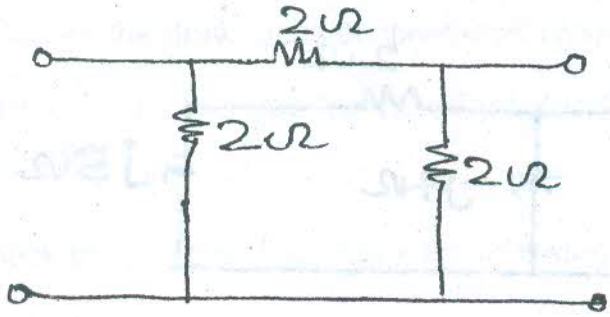
b) Derive expressions for transient current and voltage across inductor in series RL circuit impressed by dc voltage. 7

c) Find the Y-parameters for the network shown in figure. 7

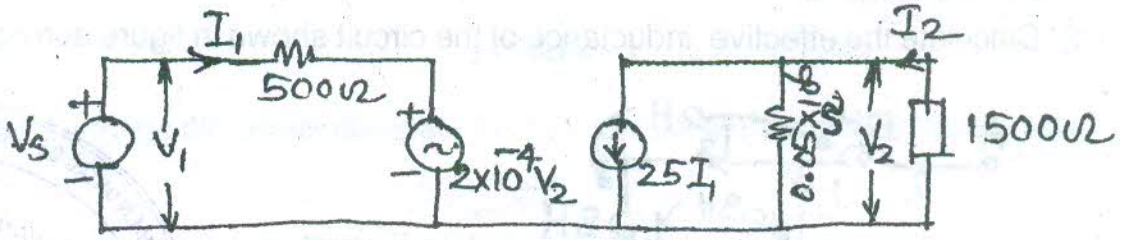


OR

14. a) Find the transmission parameters for the circuit shown in figure. 6



b) For the hybrid equivalent circuit shown in figure, determine the current gain and the voltage gain. 7



c) Express ABCD parameters of a given two port network in terms of the Y-parameters. 7

Module – III

15. a) Differentiate between transfer function and driving point function. 6

b) Design a K-high pass filter (both T and π sections) having a cut- off frequency of 1 kHz with a load resistance of 600 Ω. 7

c) Design an m-derived low pass T-section filter having a cut-of frequency of 6 kHz and a design impedance of 500 Ω. The frequency of infinite attenuation should be 1.75 times the cut - off frequency. 7

OR

16. a) The driving point impedance of a one-port reactive network is given by

$z(s) = 5\dfrac{(s^2+4)(s^2+25)}{s(s^2+16)}$ obtain the first Foster network. 7

b) Find the second Foster realisation of $z(s) = 5\dfrac{(s+1)(s+4)}{(s+3)(s+5)}$. 7

c) Find the first Cauer form of the function $z(s) = \dfrac{(s+3)(s+7)}{(s+2)(s+4)}$. 6