(Pages : 4) **6508**

Reg. No. : .....

Name : .....

Third Semester B.Tech. Degree Examination, November 2013

(2008 Scheme)

Branch : Electrical and Electronics

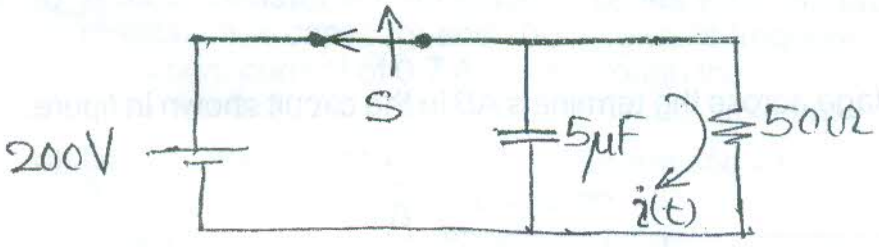
08.304 : NETWORK ANALYSIS AND SYNTHESIS (E)

Time : 3 Hours Max. Marks : 100

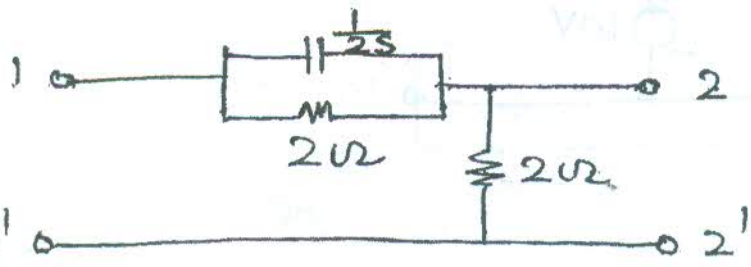
***Instruction**: Answer **all** questions from Part **A** and one **full** question from **each** Module of Part **B**.*

PART – A

1. State and explain Thevenin's theorem.
2. With an example explain mesh current analysis.
3. For a series circuit consisting of 10 Ω , 0.1 H and 10 μ F, determine the impedance at 10 Hz above resonant frequency.
4. A balanced delta connected load of (2 + j3) Ω per phase is connected to a balanced 3 – ϕ, 440 V supply. Find the total active power and reactive power in the circuit.
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 Z-parameters of a two port network.
8. Outline the design procedure of K-type high pass filter.
9. Derive an expression for the characteristic impedance of a symmetrical T-section.
10. Check the positive realness of the following function :

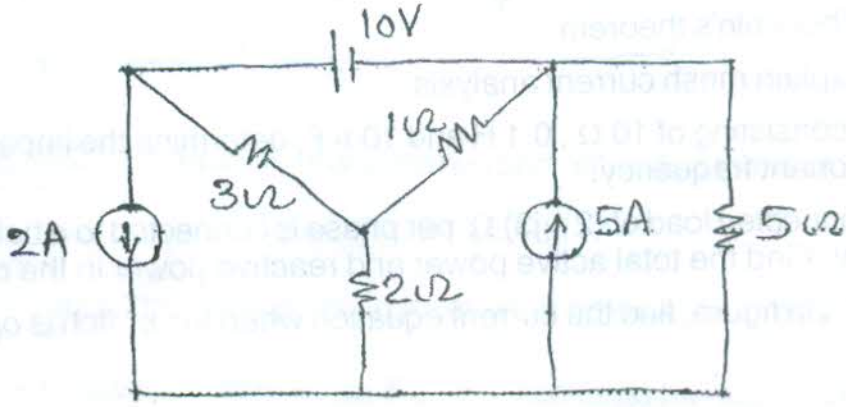
$$Z(s) = \frac{(s^2 + 2s + 25)}{(s + 4)}$$

(10×4=40 Marks)

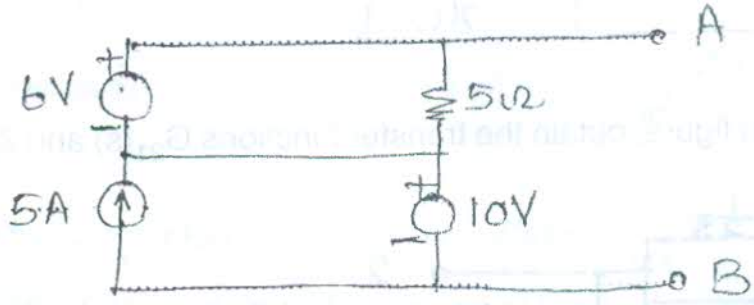
PART – B

MODULE – I

11. a) Find the power delivered by the 5A current source in the circuit shown in figure by using nodal method. **10**

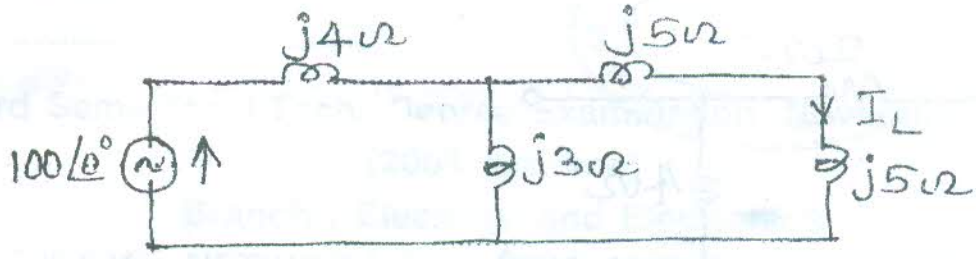


b) Determine the voltage across the terminals AB in the circuit shown in figure. **10**



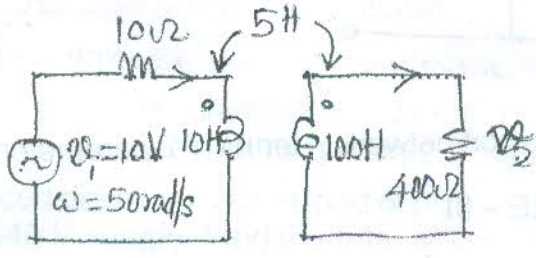
OR

12. a) For the circuit shown in figure, determine the current I_L by applying Thevenin's theorem. 6



b) A $3-\phi$ three wire unbalanced load is star connected. The phase voltages of the two arms are $V_R = 100\angle -10^\circ$ and $V_Y = 150\angle 100^\circ$. Calculate voltage between star point of the load and the supply neutral. 7

c) For the circuit shown in figure, find the ratio $\frac{V_2}{V_1}$. 7

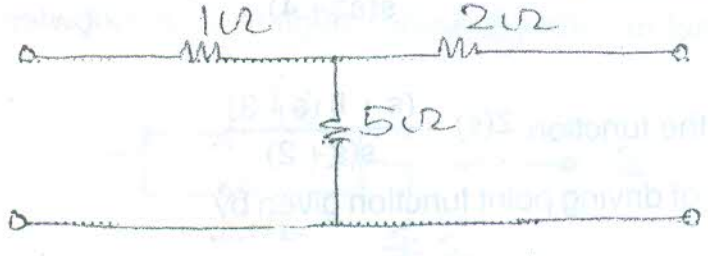


MODULE – II

13. a) A 50 Ω resistor is connected in series with an inductor having internal resistance, a capacitor and 100 V variable frequency supply. At 200 Hz, a maximum current of 0.7 A flows through the circuit and voltage across the capacitor is 200 V. Determine the circuit constants. 6

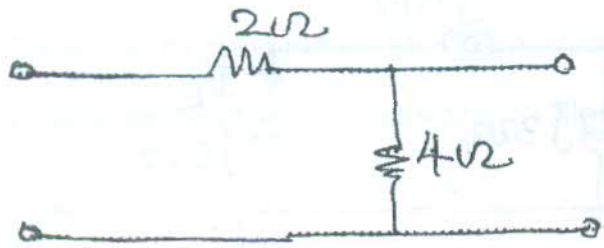
b) Derive expressions for transient current and voltage across capacitor in series RC circuit impressed by dc voltage. 7

c) Find the transmission parameters for the circuit shown in figure. 7

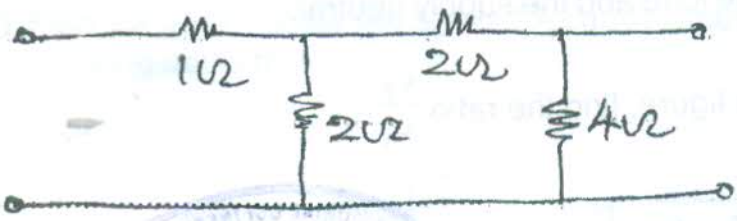


OR

14. a) Find h-parameters for the network shown in figure : 6



b) Find the Z-parameters for the circuit shown in figure. 7



c) Express ABCD parameters of a given two port network in terms of Z parameters. 7

MODULE – III

15. a) Discuss about the restrictions on location of poles and zeroes in driving point function. 6

b) Design a K-low pass filter (both T and π sections) having a cut-off frequency of 2 KHz to operate with a terminated load resistance of 500 Ω. 7

c) Design an m-derived π-section low pass filter having cut-off frequency of 1 KHz, design impedance of 400 Ω, and the resonant frequency 1100 Hz. 7

OR

16. a) Find the second Foster realisation of $Z(s) = \frac{4(s^2+1)(s^2+16)}{s(s^2+4)}$. 7

b) Find the first Foster form of the function $Z(s) = \frac{(s+1)(s+3)}{s(s+2)}$. 7

c) Find the second Cauer form of driving point function given by

$$Z(s) = \frac{10s^4 + 12s^2 + 1}{2s^3 + 2s}.$$ 6