SS

Code: 13A04101

B.Tech II Year II Semester (R13) Supplementary Examinations December/January 2015/2016

NETWORK ANALYSIS

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

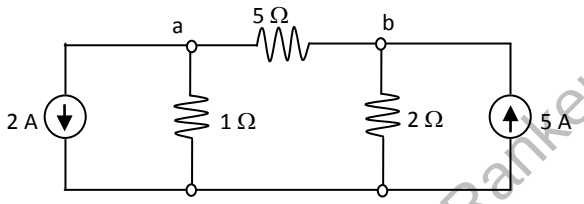
(a) What are the limitations of Norton's theorem?
(b) What are the properties of the complete incidence matrix?
(c) Define poles and zeros of the system function.
(d) A series R – L circuit with parameters R = 5 Ω and L = 10H is supplied by a source of 20 V. Calculate time constant.
(e) Define quality factor and sensitivity of a series RLC circuit.
(f) Define mutual inductance.
(g) Define reverse factor voltage transfer of a series of hybrid parameters.
(h) What are the advantages of state variable analysis?
(i) Define Neper and Decibel.
(j) What are the limitations of passive filters?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

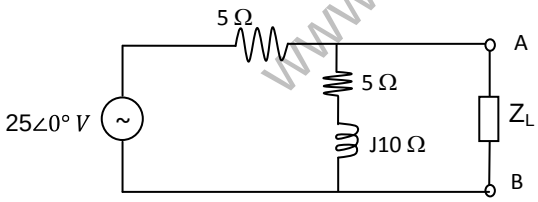
UNIT – I

2 (a) Write a brief note on source transformation technique.
(b) Find the current through 5 Ω resistor.



OR

3 (a) State Thevenin's theorem. Write the procedure to obtain Thevenin's equivalent circuit.
(b) Find the value of Z_L to be connected across terminals AB in figure given below for maximum power transfer. Also obtain the maximum power absorbed by Z_L.



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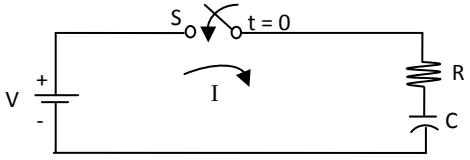
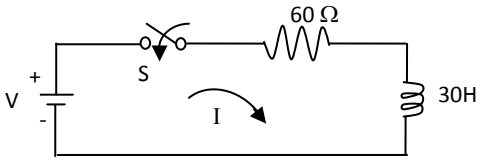
UNIT – II

4 (a) Derive the expression for voltage across a capacitor in R – C series circuit shown in figure below.

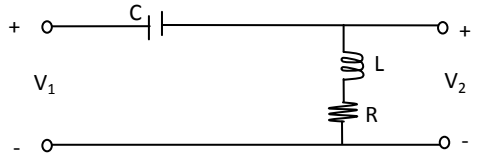


(b) A series R – L circuit with R = 60 Ω and L = 30 H has a constant voltage V = 120 V applied at t = 0 as shown in figure below. Determine the current (I), the voltage across resistor and voltage across the inductor.

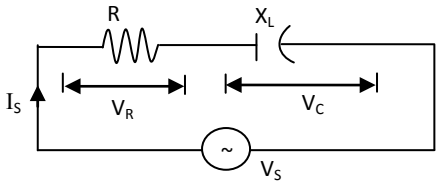


OR

5 (a) Determine the voltage transfer function and driving point impedance of the network given below.



(b) For the circuit shown, find the power factor, true power, reactive power and apparent power. Given that V_S = 50 V, R = 100 Ω and X_L = -j200 Ω.



UNIT – III

6 (a) Derive the expression for bandwidth and Q-factor of parallel resonant circuit.

(b) An impedance coil having resistance 15 Ω and inductance oil of 0.02H is connected in series with 0.01 μF capacitor. Calculate: (i) Q of the foil. (ii) Resonant frequency of the circuit.

OR

7 (a) What are the similarities and dissimilarities between magnetic circuits and electrical circuits?

(b) A solenoid of 540 turns is wound on a continuous ring of iron. The mean diameter of ring is 18 cm and the relative permeability of iron is 1250. Calculate the current required so that the flux density in iron is 1 Wb/m^2.

UNIT – IV

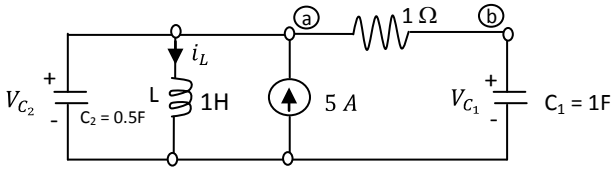
8 (a) Express Y – parameters in terms of ABCD parameters.

(b) A two-port network has the following parameters: Z_{11} = 30 Ω, Z_{22} = 40 Ω and Y_{12} = 0.05 mohs. Calculate the ABCD parameters of the network.

OR

9 (a) Prove that the overall z-parameters of series connected two two-port networks are the sum of corresponding of the two networks.

(b) Obtain the state equation for the circuit shown in figure below.



UNIT – V

10 (a) Classify the filters depending upon frequency characteristics. Discuss them.

(b) Design a constant – K low pass filter for T and π sections with cut-off frequency of 4000 Hz and nominal impedance of 700 Ω.

OR

11 (a) What are the drawbacks of constant – K filters?

(b) Design a band-elimination filter having design impedance of 250 Ω and cut-off frequencies f_1 = 2 kHz and f_2 = 8 kHz.

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