Code: 13A04101

SS

B.Tech II Year II Semester (R13) Regular Examinations May/June 2015

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)

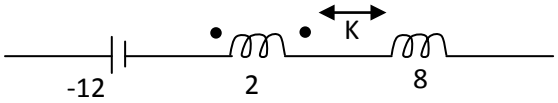
(a) Give the properties of Miller and Tellegen's theorem.

(b) Explain the concept of parallel convention 2, two-port networks.

(c) The s-domain function $G(S) = \frac{S+1}{S(S+2)}$. Find the initial value of g(t).

(d) The number of turns of a coil having a time constant "t" are doubled. What will be the new time constant?

(e) In the series circuit shown below for the series resonance at the value of the coupling coefficient "k" will be.



(f) The impedance function of a parallel RLC circuit has poles located at -3±j4 rad/sec. If the value of L = 1H, determine R.

(g) Obtain the state model for the system describe by: $\dddot{Y} + 7\ddot{Y} + 5\dot{Y} + 6Y = \ddot{u} + 3\dot{u} + 2u$.

(h) Explain the advantage of state variable analysis.

(i) Define characteristic impedance "Z_0".

(j) Mention any two properties of symmetrical networks.

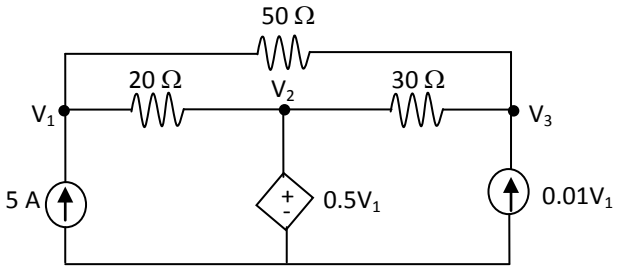
PART – B

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

UNIT – I

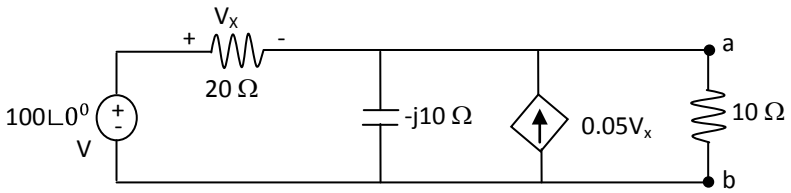
2 (a) Explain the properties of cut-set, tie-set and incident matrix.

(b) By using nodal analysis determine the V_1 and V_3 for the network shown below.



OR

3 (a) Find the current through 10 ohm resistor using Thevenin's theorem for the given network.



(b) State and explain maximum power transfer theorem with a circuit excited by AC source.

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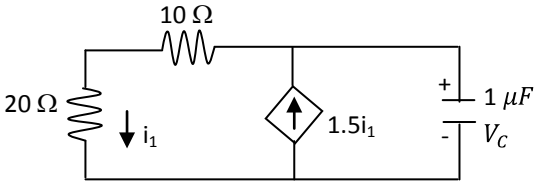
UNIT – II

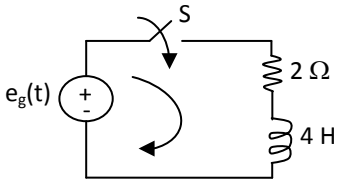
4 (a) Find the voltage labeled V_C for $t \geq 0$ if $V_C(0)$ is 2 V.



(b) Obtain the transient response of a RC circuit excited by sinusoidal input.

OR

5 (a) The circuit shown below, the voltage across the circuit is $e_g(t)$ = 2.5t volts. What are the values of $V_L(t)$ at 4 sec.



(b) Explain the complex frequeny plane and properites.

UNIT – III

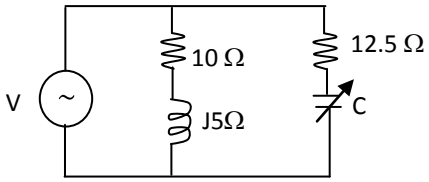
6 (a) A RLC circuit comprising a 10 ohm resistance is to have a bandwidth of 100 rad/sec. determine the value of the capacitance to make the system to resonate at 400 rad/sec, selectivity if the resistance is altered to 50 ohms and what are the half power frequencies.

(b) Explain the concept of modeling of coupled circuits.

OR

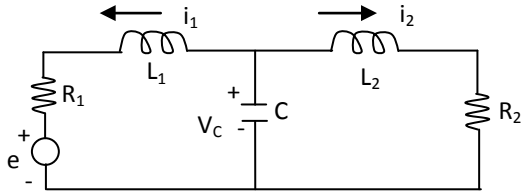
7 (a) Derive the expression for energy stored in magnetic field.

(b) Determine the value of capacitance C in order to resonant at 6366 Hz for the given circuit.



UNIT – IV

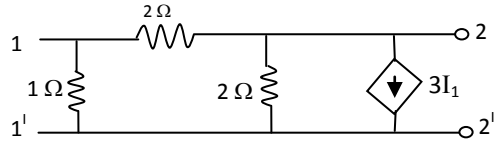
8 (a) Obtain the state space representation of RLC network.



(b) Explain image parameters in two port network.

OR

9 (a) For the network shown in figure below, find z-parameters.



(b) Obtain a state model of the systems described by the tranferfunction $\frac{Y(S)}{U(S)} = \frac{5}{S^3+6S+7}$.

UNIT – V

10 (a) Explain the analysis of prototype band stop filter. Derive the expression for pitch factor.

(b) Design a constant K-pass filter having f_C = 4 kHz and design impedance R_0 = 600 ohms by using section.

OR

11 (a) Discuss about composite filters.

(b) Design a T-section constant K-pass filter having a cut-off frequency of 10 Hz and design impedance R_0 = 600 ohms. Find the characteristic impedance and phase constant at 25 kHz.

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