Code: 13A04101 **R13**

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

NETWORK ANALYSIS

(Common to ECE & EIE)

Time: 3 hours Max. Marks: 70

PART - A

(Compulsory Question)

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

(a) Distinguish between dependent and independent sources.

(b) A battery has an internal resistance of 0.5 ohm and open circuit voltage of 12 V. What is the power lost within the battery and the terminal voltage on full load if a resistance of 3 ohms is connected across the terminals of the battery?

(c) In a series R-L circuit, the current and voltages are given as $i = 1\cos(314t - 20°)$, $v = 10\cos(314t + 10°)$. Find the values of R and L.

(d) Draw the phasor diagrams of voltage and current in RL and RC series circuits.

(e) What are the properties of resonance of RLC series circuit?

(f) Discuss the concept of dot convention.

(g) The Z-parameters of a circuit are given by $\begin{bmatrix} 4 & 1 \\ 3 & 3 \end{bmatrix}$, obtain the transmission parameters.

(h) What are the conditions for reciprocity and symmetry in ABCD parameters?

(i) What are the disadvantages of constant – k filters?

(j) Mention the frequency limits of low pass and high pass filters.

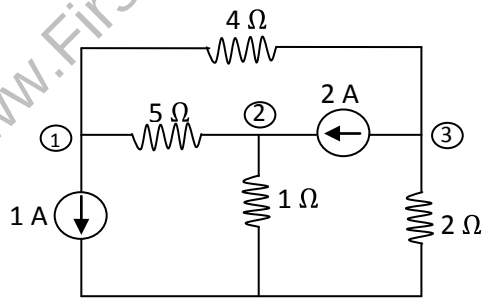
PART - B

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

UNIT - I

2 (a) Explain the procedure of source transformation.

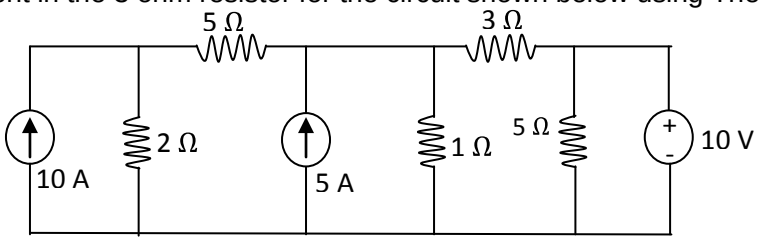
(b) Using nodal analysis, find the current and voltage drops through 5 ohm resistor for the network shown below.



OR

3 (a) Discuss the procedure of fundamental cutest matrix formation.

(b) Find the current in the 3 ohm resistor for the circuit shown below using Thevenin's theorem.



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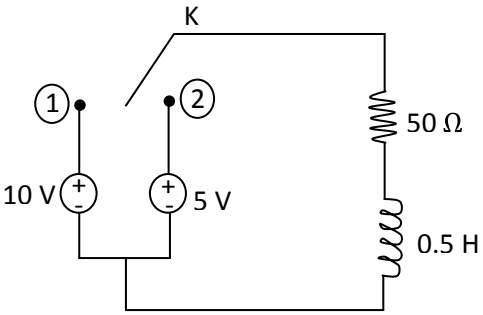
UNIT - II

4 (a) Explain the following for sinusoidal wave:
(i) Form factor. (ii) Peak factor.

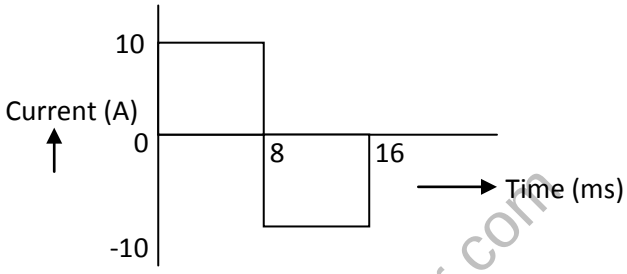
(b) In figure below, switch is closed at position 1 at t = 0. At t = 0.5 m sec, the switch is moved to position 2. Find the expression for the current in both the conditions.



OR

5 (a) Define RMS value and average value.

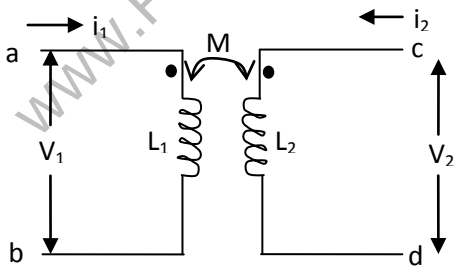
(b) For the periodic waveform shown below, determine the following:
(i) Frequency. (ii) RMS value. (iii) Average value. (iv) Form factor. (v) Peak factor.



UNIT - III

6 (a) Explain how the resistance, inductive and capacitive reactance varies with frequency in RLC series circuits.

(b) In figure below, let L_1 = 0.4 H, L_2 = 2.5 H, k = 0.6 and $i_1 = 4i_2 = 20\cos(500t-20°)$ mA. Evaluate the following at t = 0, (i) i_2. (ii) V_1. (iii) The total energy stored in the system.



OR

7 (a) Explain in detail about linear transformers.

(b) A series RLC circuits has R = 2 ohm, L = 2 mH, C = 10 micro farads. Calculate
(i) Q factor of the circuit. (ii) The bandwidth.
(iii) The resonant frequency. (iv) The half power frequencies f_1 and f_2.

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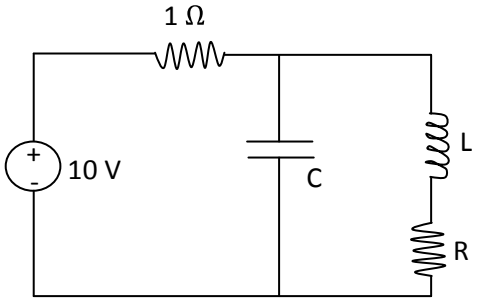
UNIT - IV

8 (a) Obtain the state equation for the circuit shown in figure below, given L = 1H, C = 0.25 F, R = 5 ohm.

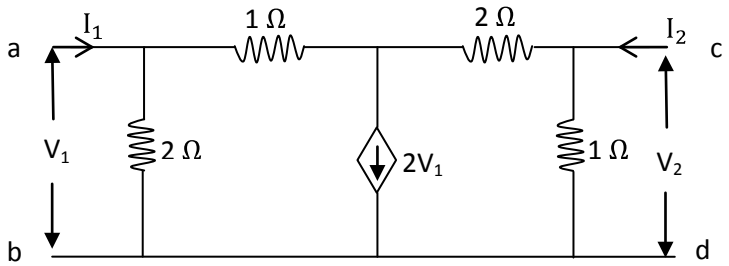


(b) Derive the ABCD parameters in terms of Z and h parameters.

OR

9 (a) What are the advantages of state variable analysis?

(b) Find the open circuit impedance parameters of the circuit shown below.



UNIT - V

10 Design a constant k low pass filter having cut off frequency 2.5 kHz and design resistance R_0 = 700 ohms. Also find the frequency at which this filter produces attenuation of 19.1 dB. Find its characteristic impedances and phase constant at pass band and stop or attenuation band.

OR

11 (a) Mention the applications of the filters.

(b) Design an m derived high pass filter having a design impedance of 600 ohms, cut off frequency of 5 kHz and m = 0.35. Also determine the frequency of infinite attenuation.

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