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

ELECTRICAL CIRCUITS

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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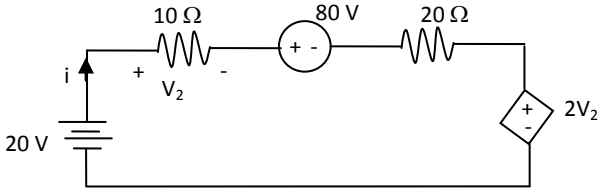
1 Answer the following: (10 X 02 = 20 Marks)

(a) Explain the properties of series and parallel magnetic circuits.

(b) State how AC is supplied to DC.

(c) Explain measurement of reactive volt-ampere method and prove that: $W_r = \sqrt{3}(W_1 - W_2)$.

(d) Find the current 'I'.



(e) Explain line spectra and phase spectra in Fourier transforms.

(f) What are the properties of Fourier series and Fourier transforms?

(g) Explain parallel connection of two – port networks.

(h) The impedance function of a parallel networks has pole located at $-3 \pm j4$ rad/sec. If the value of L = 1H. Determine 'R'.

(i) Explain properties of Compensation and Tellegen's theorem.

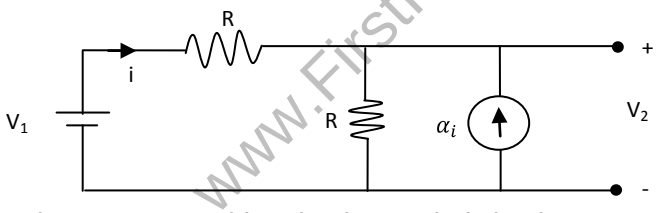
(j) The number of turns on a coil having time constant of are doubled. The new time constant will be -----.

PART – B

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

UNIT – I

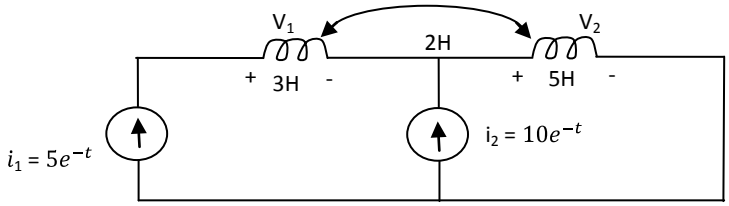
2 (a) Consider the circuit as shown in figure below which has the current-dependent current source. Also find the value of $\frac{V_2}{V_1}$.



(b) What are the energy consideration in coupled circuits.

OR

3 (a) Find the instantaneous voltages V_1 and V_2 in the coupled inductance in the circuit.



(b) Explain B-H curve and Hysteresis loop for magnetic material.

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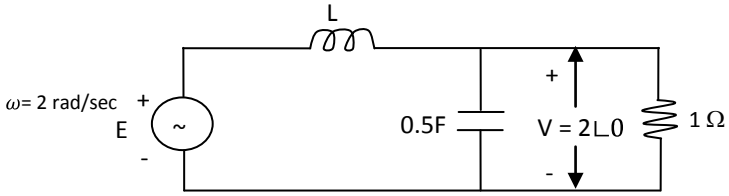
UNIT – II

4 (a) A 440/254 volts, 3-phase, 4-core supplies an unbalanced load represented by the following impedances in ohms connected between R, Y, B and neutral 16+j12, 14-j21 and 25. The phase sequence RYB. Calculate the current in each conductor of the cable and the reading on each of the three wattmeter's connected in each line and neutral.

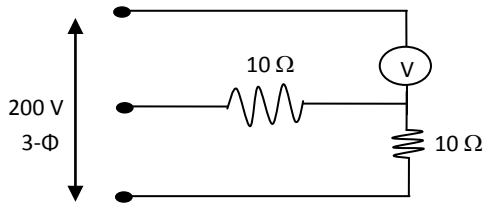
(b) What are the advantages of sinusoidal quantities over the other quantities?

OR

5 (a) For the circuit shown below, how much the voltage across the inductor leads the voltage across the capacitor?



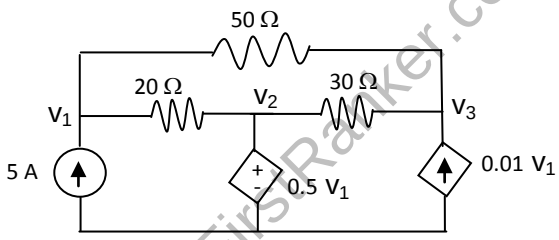
(b) A voltmeter with a resistance of 10 kW is connected as shown in figure below. Find the reading on the voltmeter. (i) In the condition shown. (ii) When the voltmeter shunted by a 5 kW resistor.



UNIT – III

6 (a) Explain admittance locus diagrams.

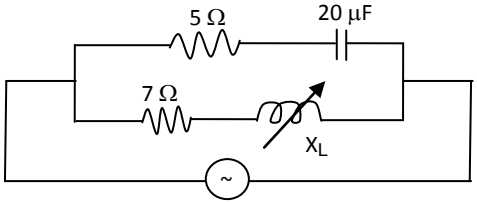
(b) The following network use Nodal analysis to determine V_1, V_2 and V_3.



OR

7 (a) Explain properties of Cut set and Tie set and incident matrix.

(b) The locus of the admittance locus shown in figure below. Determine the variable inductance values, so that the phase angle between the supply voltage and supply current is zero. Assume W = 5000 rad/sec.



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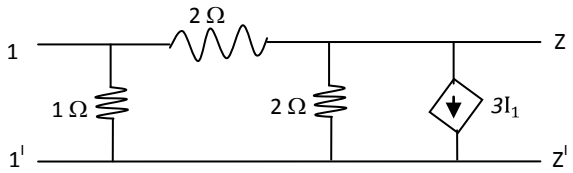
UNIT – IV

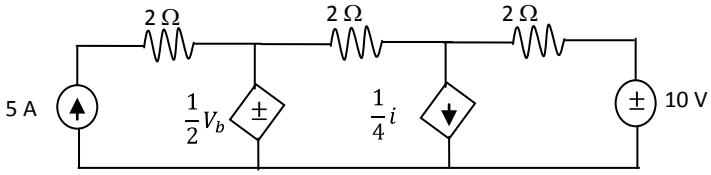
8 (a) Obtain the z-parameters for the following figure.



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

OR

9 (a) Find the 'I_n' in the circuit using Norton's theorem.



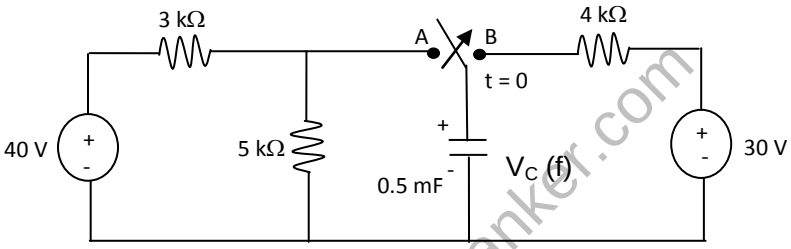
(b) The following equations given the voltages V_1 and V_2 at the ports of a two – port networks:

$V_1 = 5I_1 + 2I_2$, $V_2 = 2I_1 - I_2$

A load resistor of 3 Ω is connected across port-2, calculate the input impedance.

UNIT – V

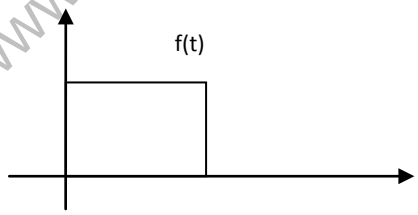
10 For the circuit shown below, a switch has been in position A for a long time at t = 0, switch is moved to B then the capacitor voltage V_C (t) for t > 0 is.



OR

11 (a) Derive the transient response in RLC circuit with sinusoidal excitation.

(b) Determine the relative frequency distribution of a single rectangular pulse of amplitude A and duration T.



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