Birla Institute of Technology and Science, Pilani (Rajasthan)
EEE F111 ELECTRICAL SCIENCES
First Semester 2017-18

Date : 10/10/2017 **Mid Semester Test (Open Book)** **Max. Marks: 105**
Max Time : 90 min

NOTE: Attempt all parts of a particular question in sequence.

Q:1 For the circuit shown in Figure 1(i), the inductor current $i_L(t)$ is described by the function given in Figure1 (ii), then sketch and label (a) indicated voltage v(t) (b) energy stores in inductor i.e. $W_L(t)$ (c) power dissipated in resistor i.e. $P_R(t)$ (d) Current through resistor i.e. $i_R(t)$ and (e) Total supply current $i_S(t)$. **[20]**

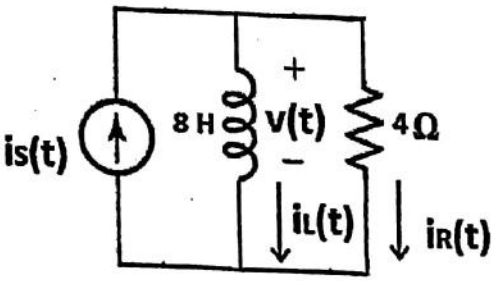

Figure 1(i)

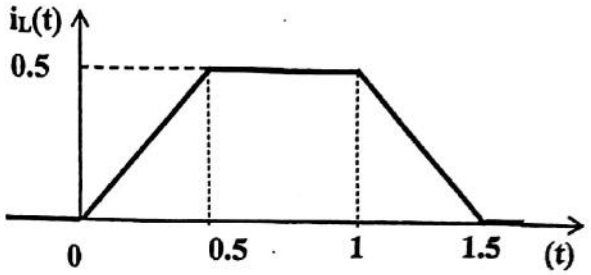

Figure 1(ii)

Q:2 In the circuit shown in Figure 2, find *Vx* and *Vy* using principle of superposition. Also calculate power consumed by dependent source. **[20]**

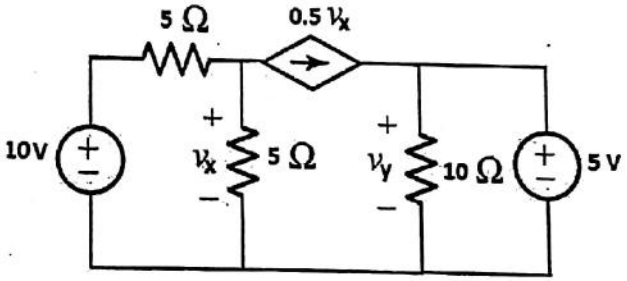

Figure 2

Q:3 For the circuit shown in the Figure 3, suppose $V_s(t) = 12\,\text{V}$ for $t < 0\,\text{s}$ and $V_s(t) = 0$ for $t \geq 0\,\text{s}$. Identify the type of response and also find $V_1(t)$ & $V_2(t)$ for all time. **[25]**

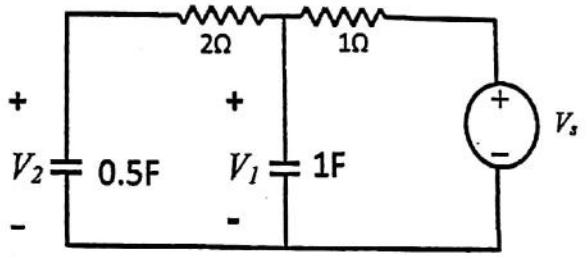

Figure 3

P.T.O.

Q:4(A) For the circuit as shown in Figure 4 (i), find the expression for half power frequency. Also plot the $\left|\frac{V_2}{V_1}\right|$ with respect to frequency (ω). [15]

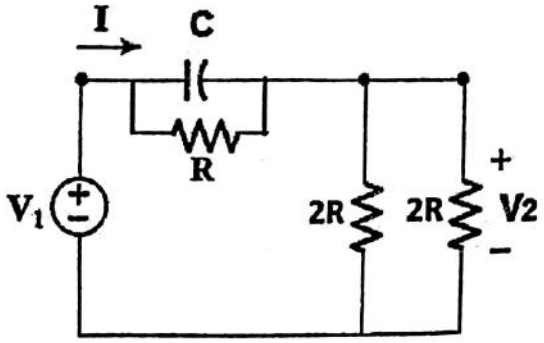

Figure 4 (i)

Q:4(B) For the circuit shown in Figure 4 (ii), find (a) power factor of source (a) the value of impedance "Z" (b) active and reactive power consumed by each element (c) value of capacitor to be connected across terminals 'A' and 'B' so that overall power factor becomes unity.

Given: RMS current in N-B branch is 3 ∠-70° amperes and frequency is 50 Hz. [25]

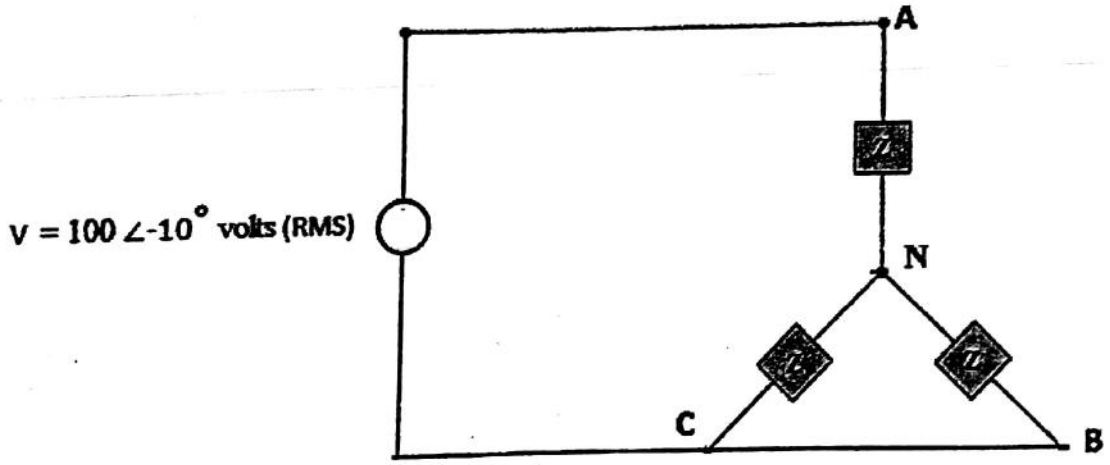

Figure 4 (ii)

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