Code No: R22029 **R10** SET - 1

II B. Tech II Semester Supplementary Examinations, April-2018
ELECTRICAL CIRCUIT ANALYSIS - II
(Electrical and Electronics Engineering)
(For 2011 B.Tech and 2012 Lateral Entry B.Tech admitted batch onwards)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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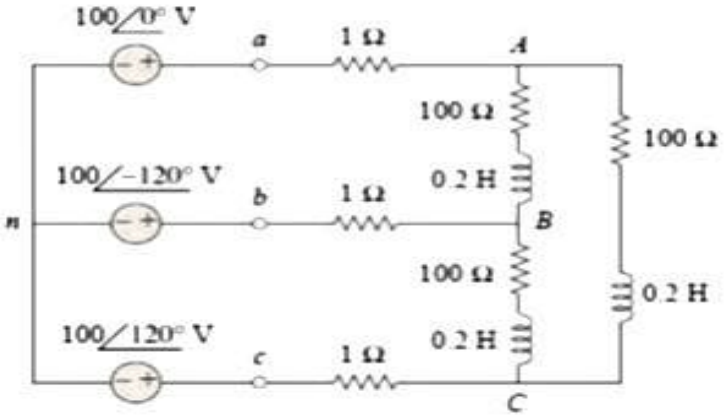
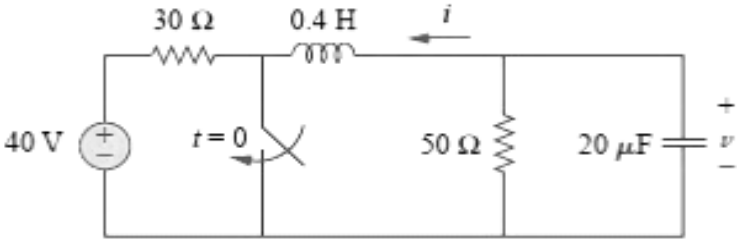
1. a) For the balanced Y – Δcircuit in below figure, find the line current I_{aA}, the phase voltage V_{AB}, and the phase current I_{AC}. Assume that the source frequency is 60Hz. (8M)



b) Prove that the three phase system uses a lesser amount of wire than the single phase system for the same line voltage V_L and the same absorbed power P_L (7M)

2. a) An unbalanced, star-connected load is supplied from a 3-phase, 415 V source. The three phase loads are purely resistive. These loads are 25Ω, 30Ω and 40 Ω, and are connected in the red, yellow and blue phases respectively. Determine the value of the neutral current, and its phase angle relative to the red phase current. (8M)
b) Measure power dissipation in unbalanced three-phase loads using the 2 and 3-wattmeter methods, and hence derive the expression for load power factor. (7M)

3. a) Write the first-order differential equation of source free RL circuit and show that the natural response of the *RL* circuit is an exponential decay of the initial current. (7M)
b) Find $v(t)$ for $t > 0$ in the RLC circuit of below figure. (8M)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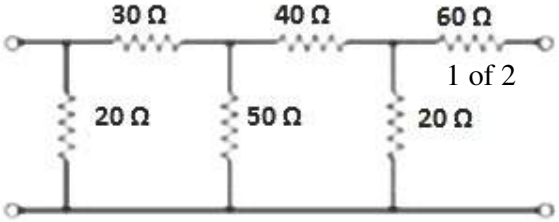
4. a) A series RL circuit with R = 30 Ω and L = 0.1 H has a sinusoidal voltage source v = 100 sin (314 t + ϕ) volts. Find the expression for current. (10M)
   b) Derive the expression for voltage of parallel R-C circuit when excited by a sinusoidal current source. (5M)

5. a) Obtain the ABCD parameter representation of the circuit in below figure. (8M)

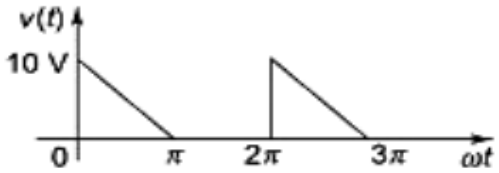


1 of 2

   b) Describe the poles and zeros of network functions. (7M)

6. a) Write the step-by-step testing procedure for positive realness of a function. (8M)
   b) Test the following function for positive realness: (7M)
   $\frac{s(s+3(s+5))}{(s+1)(s+4)}$

7 Find the exponential Fourier series for the waveform shown in below figure and plot the spectrum. Concert the coefficients obtained in to the trigonometric series coefficients. (15M)



8. a) Determine the Fourier transforms of the function $g(t) = u(t) - u(t-1)$ (5M)
   b) Use the Fourier transform to find i(t) in the circuit of below figure, if $v_s(t) = 10e^{-2t}u(t)$. (10M)