B.TECH. SEM -IV ELECTRICAL 2014 COURSE (CBCS) :
SUMMER - 2018
SUBJECT : NETWORK ANALYSIS

Day : **Thursday**
Date : **07/06/2018**

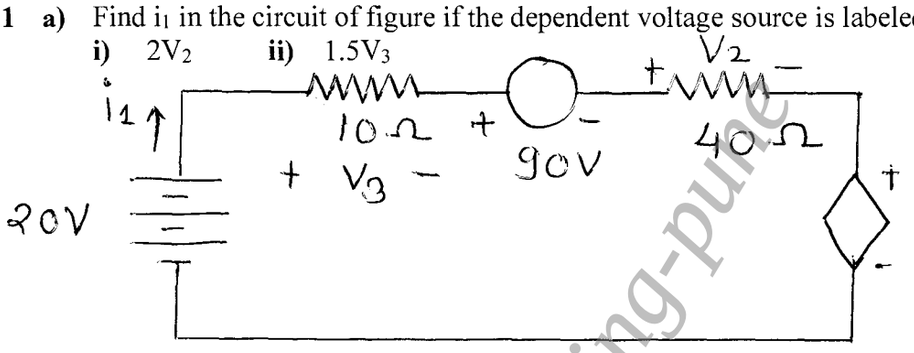
Time : **10.00 AM TO 01.00 PM**
Max. Marks : 60

S-2018-2288

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable **CALCULATOR** is allowed.
4) Assume suitable data if necessary.

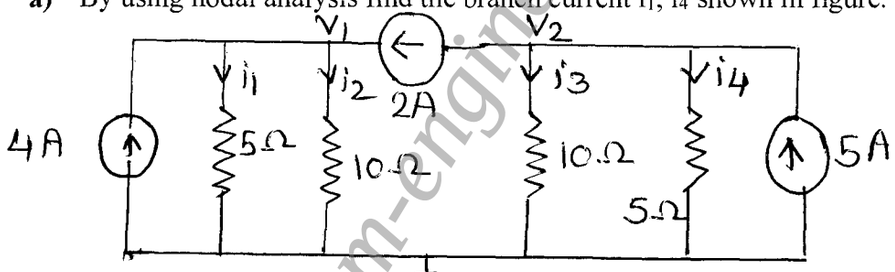
Q.1 **a)** Find i_1 in the circuit of figure if the dependent voltage source is labeled: **[05]**
i) $2V_2$ **ii)** $1.5V_3$



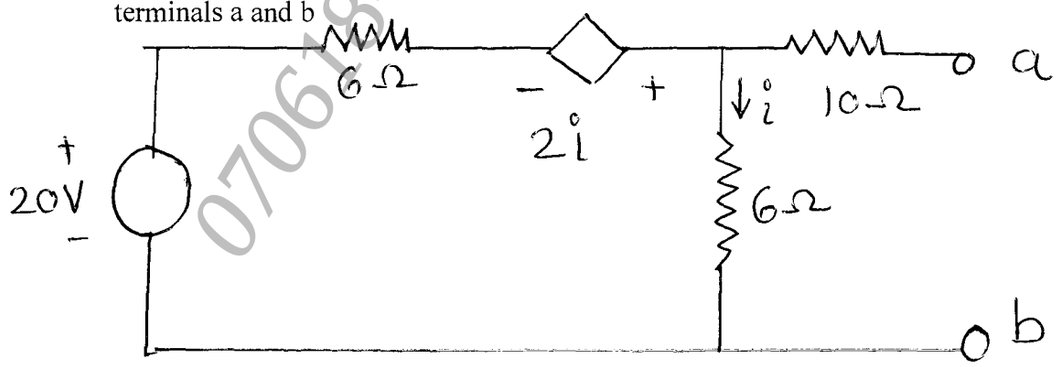
b) State and explain Reciprocity theorem. **[05]**

OR

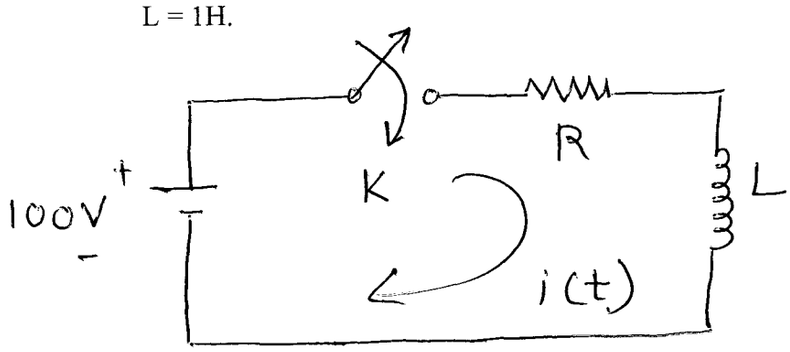
a) By using nodal analysis find the branch current i_1, i_4 shown in figure. **[05]**



b) Find the Thevenin's equivalent for the circuit shown in figure with respect to terminals a and b **[05]**



Q.2 **a)** In the network of figure. If t = 0, switch 'k' is closed. Find the value of i, di/dt and d^2i/dt^2 at $t = 0^+$ for element values as follows: V= 100 V, R = 1000 Ω and L = 1H. **[05]**



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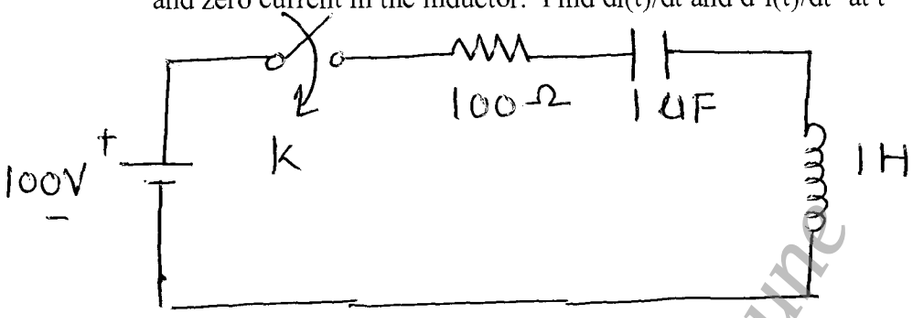
b) A series R-C circuit with initial current I_0 in the capacitor is connected to a d.c. voltage V at t = 0. Derive expression for the instantaneous current through the capacitor for t > 0. **[05]**

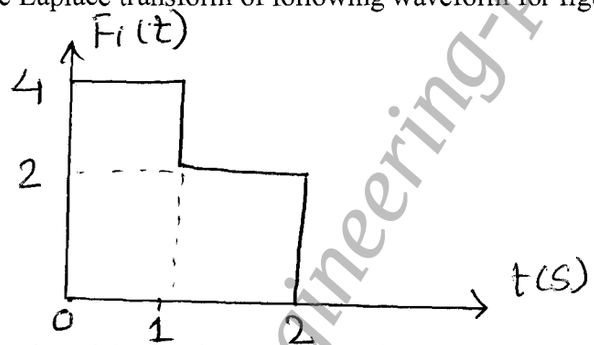
OR

a) What is the significance of initial conditions? Write a note on initial conditions in basic circuit. **[05]**

b) In the given circuit figure switch 'K' is closed at t = 0 with capacitor uncharged and zero current in the inductor. Find $di(t)/dt$ and $d^2i(t)/dt^2$ at t = 0. **[05]**



Q.3 **a)** Find the Laplace transform of following waveform for figure. **[05]**



b) Define and explain the characteristics of: **[05]**

i) Unit step function
ii) Unit ramp function
iii) Unit impulse function

OR

a) State any three properties of Laplace transform. **[05]**

b) State and explain time displacement theorem and convolution theorem. **[05]**

Q.4 **a)** Express Transmission parameters in terms of Z parameters. **[05]**

b) State and explain the method to calculate driving point impedance at port 1 with port 2 open. **[05]**

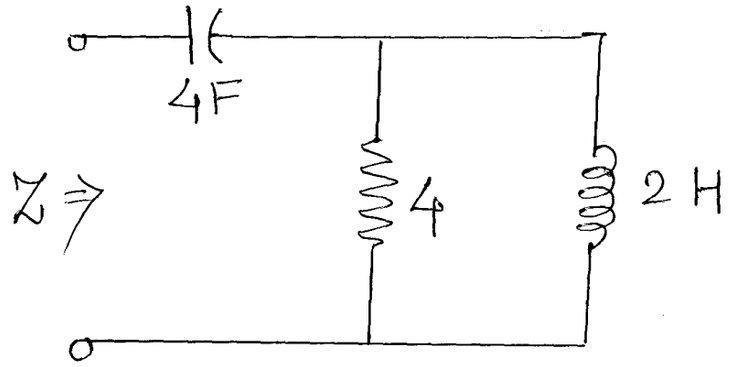
OR

a) Express Hybrid parameters in terms of Y parameters. **[05]**

b) Draw the equivalent circuit of the hybrid parameter representation. **[05]**

Q.5 **a)** $Y(s)=\dfrac{25}{(s+4)\left(s^2+2s+2\right)}$. Obtain pole zero diagram. **[05]**

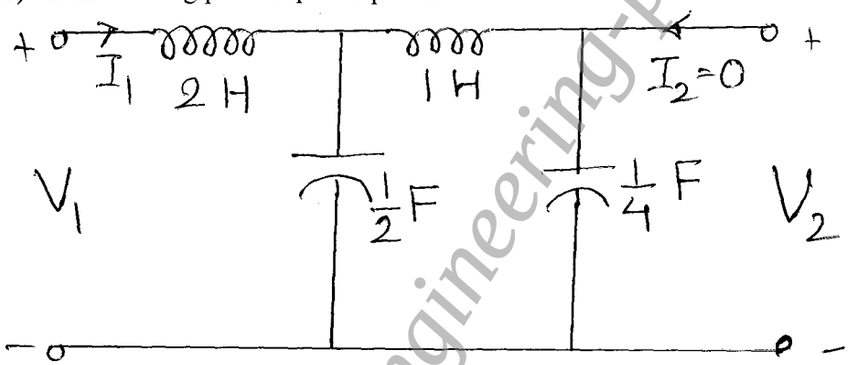
b) Find z(s) for following network. **[05]**



OR

a) What are the necessary conditions for a transfer function? **[05]**

b) Find driving point input impedance of ladder network. **[05]**

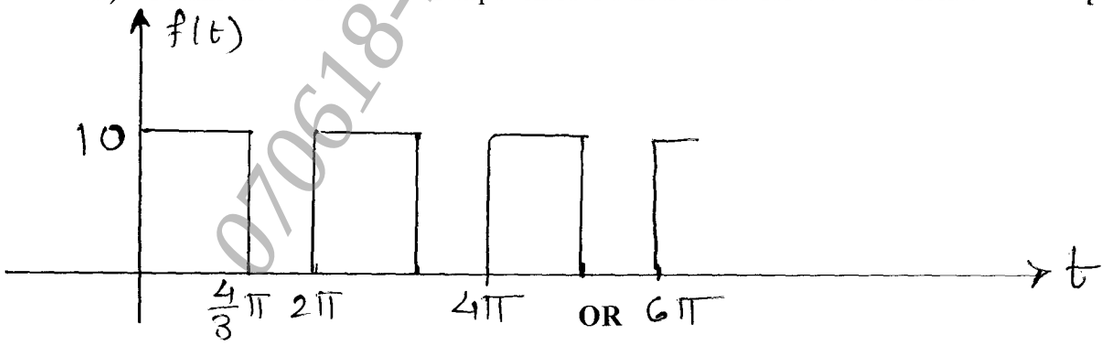


Q.6 **a)** Explain the following: **[05]**

i) Odd function symmetry

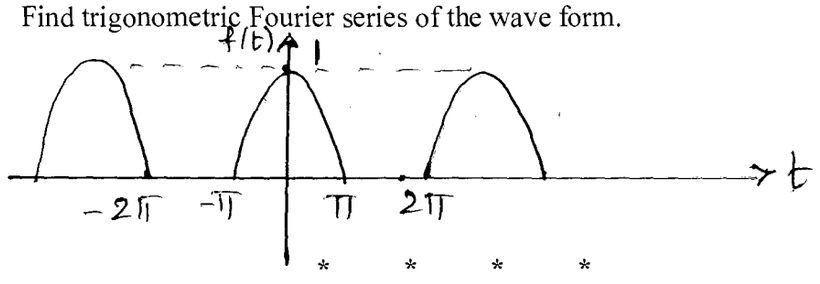
ii) Triqonometric form of Fourier series

b) Obtain the coefficients of exponential Fourier series for the wave form. **[05]**



a) Obtain the Fourier expansion in exponential form for the square wave defined as $f(t)=\begin{cases}1, & 0<t<T/2\\ -1, & T/2<0<T\end{cases}$ **[05]**

b) Find trigonometric Fourier series of the wave form. **[05]**



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