

B.Tech. SEM -IV Electrical 2014 Course (CBCS) : WINTER - 2017

SUBJECT : NETWORK ANALYSIS

Day : Wednesday
Date : 22/11/2017

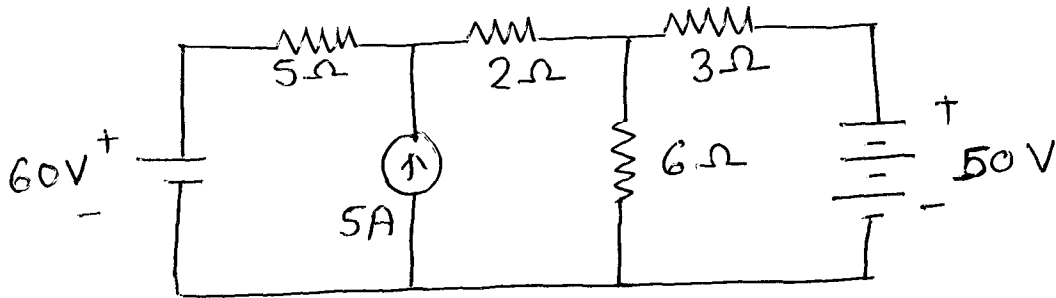
Time : 02.30 PM TO 05.30 PM
Max. Marks : 60

W-2017-2080

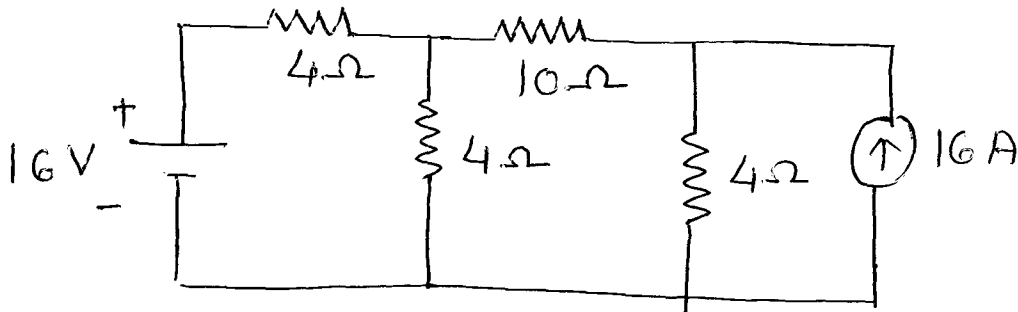
N.B.:

- 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) For the network shown in figure find current in branch ab by mesh analysis. [05]

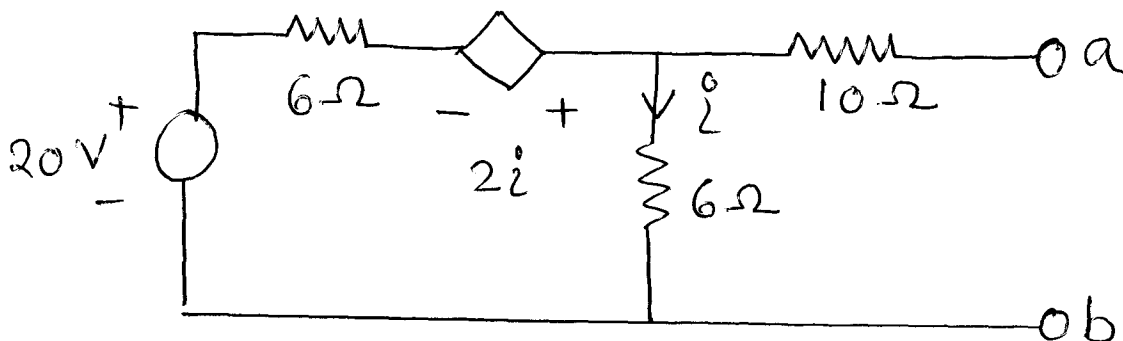


b) Find the current through 10 Ω resistance in the given network by using superposition theorem in figure. [05]

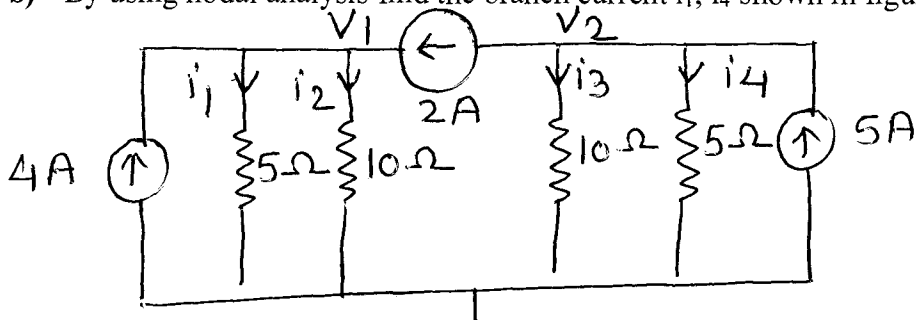


OR

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



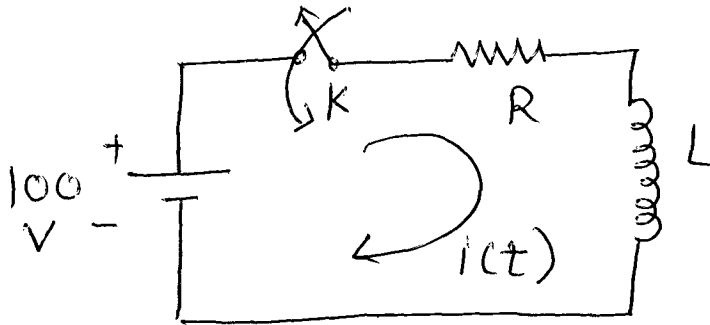
b) By using nodal analysis find the branch current i_1 , i_4 shown in figure. [05]



P.T.O.

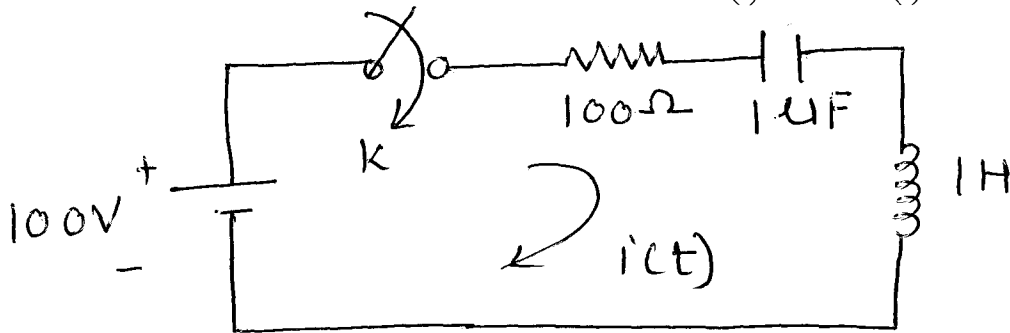
Q.2 a) A series R-C circuit with initial current I_0 in the capacitor is connected to a d.c. voltage V at $t = 0$. Derive expression for the instantaneous current through the capacitor for $t > 0$. [05]

b) 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: $V = 100 \text{ V}$, $R = 1000 \Omega$ and $L = 1 \text{ H}$. [05]



OR

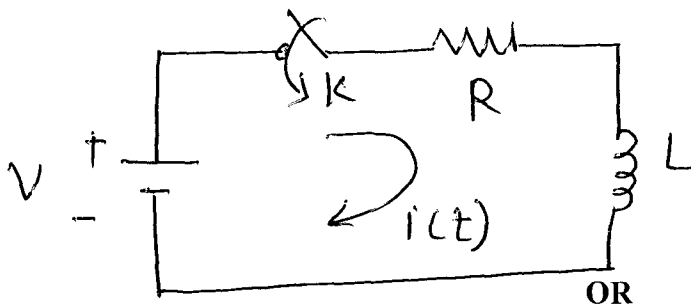
a) In the given circuit figure switch 'K' is closed at $t = 0$ with capacitor uncharged and zero current in the inductor. Find $di(t)/dt$ and $d^2i(t)/dt^2$ at $t = 0$. [05]



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

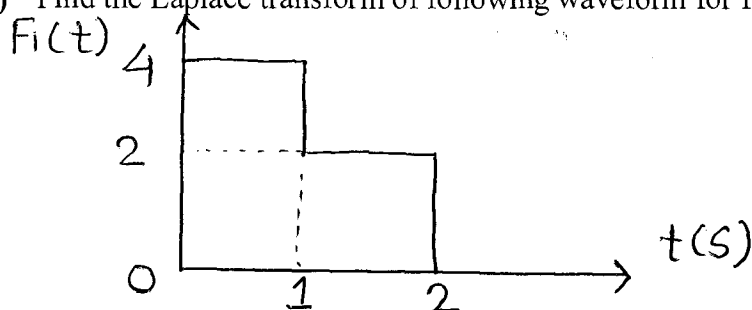
Q.3 a) State and explain time displacement theorem and convolution theorem. [05]

b) For figure shown in figure if switch is closed at $t = 0$ find expression for resulting current by using Laplace transform. [05]



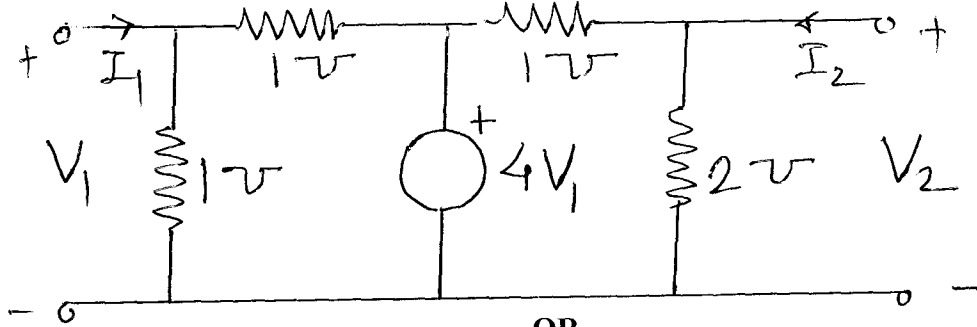
a) Define and explain the characteristics of: [05]
 i) Unit step function
 ii) Unit ramp function
 iii) Unit impulse function

b) Find the Laplace transform of following waveform for figure. [05]



Q.4 a) Derive the condition of reciprocity and symmetry in ABCD parameters. [05]

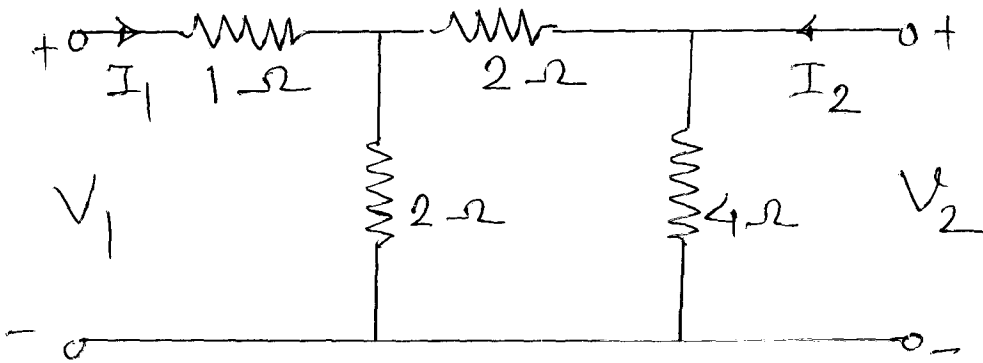
b) Find Y parameters of the network shown [05]



OR

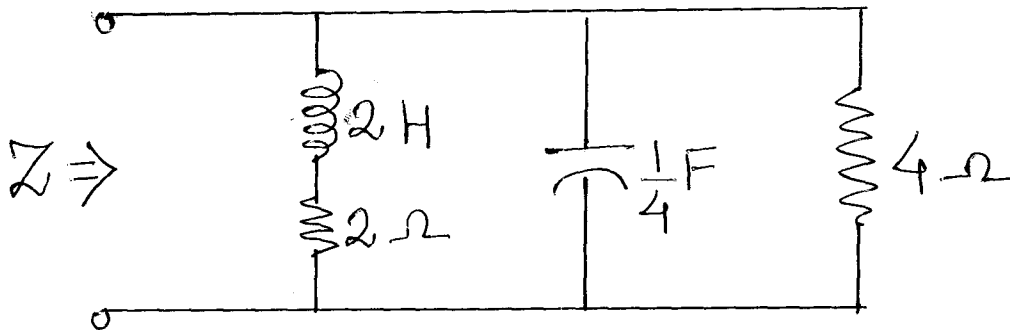
a) Express Hybrid parameters in terms of Z parameters. [05]

b) Find Z parameters of the network shown [05]



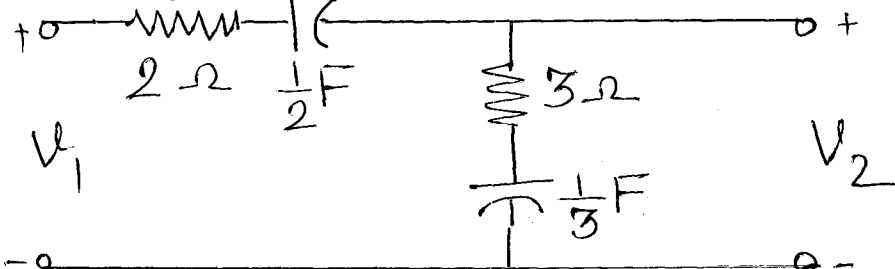
Q.5 a) $z(s) = \frac{25}{s^2 + 4}$ Draw its pole zero plot. [05]

b) Find driving point impedance for [05]



OR

a) Find voltage ratio transfer function for [05]

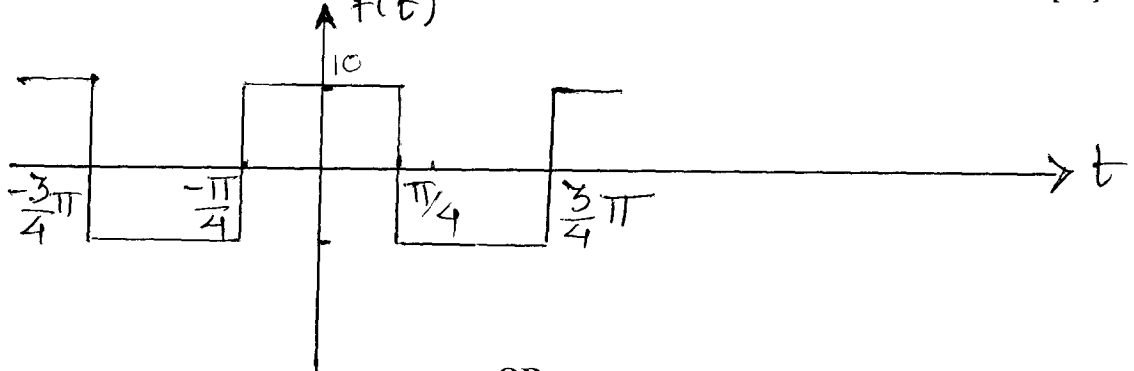


b) Define the following: [05]

- i) Driving point impedance and admittance.
- ii) Transfer impedance and admittance.
- iii) Voltage and current transfer ratio.

- Q.6 a) Explain the following: [05]
 i) Even function symmetry
 ii) Half wave symmetry

- b) Obtain Fourier series for $f(t)$ [05]



OR

- a) Function $f(t)$ is defined as [05]

$$f(t) = \begin{cases} 0 & , -T/2 < t < -T/4 \\ 1 & , -T/4 < t < T/4 \\ 1 & , T/4 < t < T/2 \end{cases}$$

Find the Fourier series of it.

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

