B. Tech · sem - III E & TC

B. Tech. Sem -III (E & TC Engg.) (2014 COURSE) (CBCS) : SUMMER - 2019

SUBJECT : NETWORK THEORY

Day : Wednesday
Date : 15/05/2019

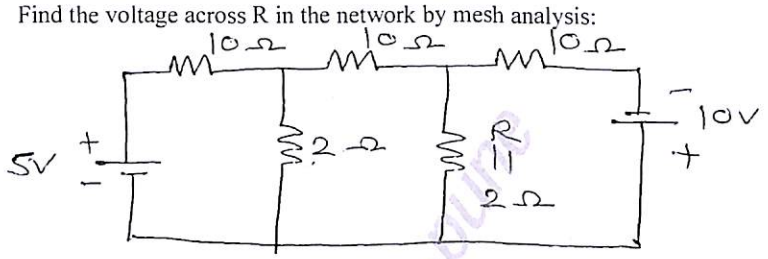
Time : 02.30 PM TO 05.30 PM
Max. Marks : 60

S-2019-2590

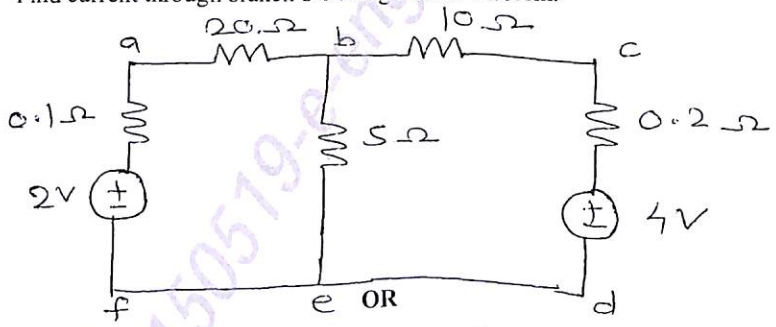
N. B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.
4) Use of non-programmable calculator is **ALLOWED**.
5) Assume suitable data, if necessary.

Q. 1 a) Find the voltage across R in the network by mesh analysis: **(05)**

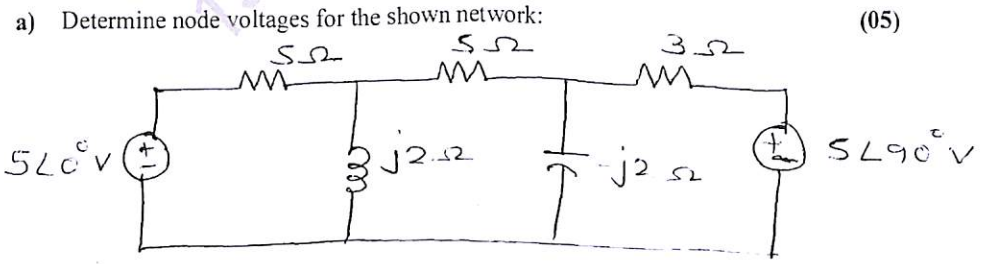


b) Find current through branch b-e using Norton theorem: **(05)**

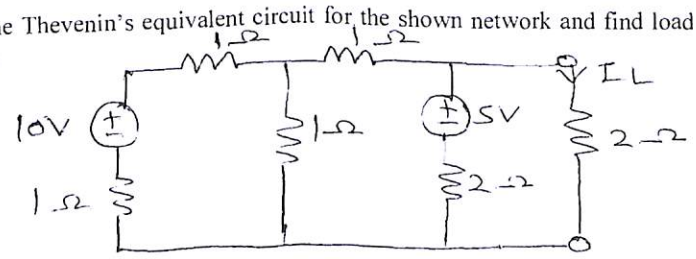


OR

a) Determine node voltages for the shown network: **(05)**



b) Draw the Thevenin's equivalent circuit for the shown network and find load current: **(05)**



P. T. O.

Q. 2 a) What is tree and what are the properties of tree? **(05)**

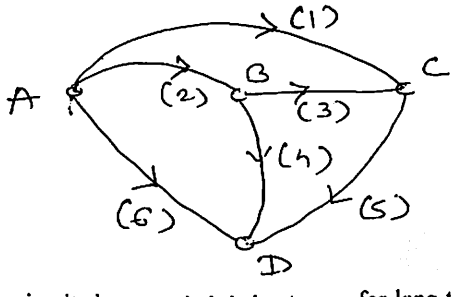
b) Draw the oriented graph from reduced incidence matrix: **(05)**

$$A = \begin{bmatrix} 0 & 0 & -1 & 1 & -1 & 0 \\ -1 & 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 & -1 \end{bmatrix}$$

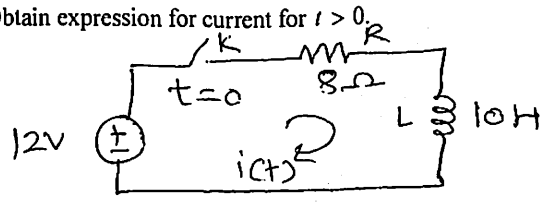
OR

a) What is the use of network equilibrium equation? **(05)**

b) Find the proper cut-sets for the following graph: **(05)**



Q. 3 a) In the circuit shown switch is kept open for long time. At $t = 0$ it is closed. Obtain expression for current for $t > 0$. **(05)**



b) For series RL circuit **(05)**

Find: $i, \frac{di}{dt}, \frac{d^2i}{dt^2}$ *at* $t = 0^+$ Where $V = 200V$, $R = 5\ \Omega$ and $L = 3H$

OR

a) Find transient response of driven R-C circuit **(05)**

b) What are the initial conditions of passive components? **(05)**

Q. 4 a) Find effect of anti-resonance on selectivity and bandwidth. **(04)**

b) A practical parallel resonant circuit consists a coil of 0.1 H inductance with 10 Ω leakage resistance with a 10 μF capacitor in parallel with it. Find frequency at which current in the circuit which is properly resistive. Also find impedance under resonance. **(06)**

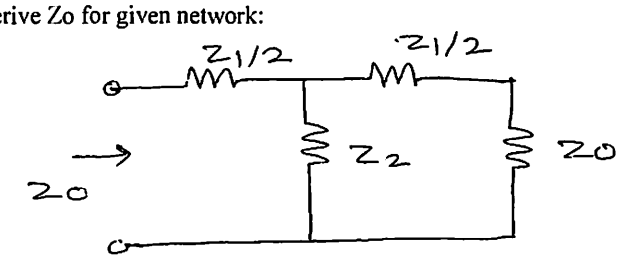
OR

a) A series resonant circuit has impedance of 500 Ω at resonant frequency, cut-off frequencies are 10 KHz and 100 KHz. Determine: **(07)**

i) Resonant frequency
ii) Value of R, L, C components
iii) Quality factor at resonant frequency

b) What is anti-resonance and what is the application of the same? **(03)**

Q. 5 a) Derive Zo for given network: **(05)**



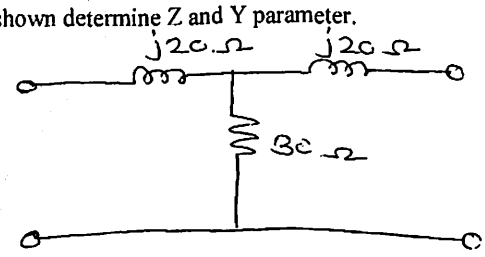
b) A π - Low pass filter network consists of a series arm inductance of 20 mH and two shunt arm capacitor of 0.16 μF each. Calculate cut-off frequency , attenuation and phase shift at 1.5 KHz. **(05)**

OR

a) What are the design formulae of K-high pass filter? **(05)**

b) Design k-T section LPF to be terminated into 1kΩ and having a cut-off frequency of 3 KHz. Determine frequency at which filter offers an attenuation of 20dB. **(05)**

Q. 6 a) For the network shown determine Z and Y parameter. **(05)**



b) Derive Z parameter in terms of ABCD parameter. **(05)**

OR

a) Find symmetry and reciprocity conditions of h parameters. **(05)**

b) When two networks are connected in parallel find y parameters for the combined network. **(05)**

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