U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

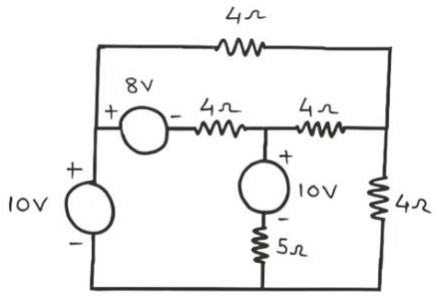
December 2023 Supplementary Examinations

Programme: B.E. **Semester: III**
Branch: ETE, EIE **Duration: 3 hrs.**
Course Code: 22ES3PCECA **Max Marks: 100**
Course: Electric Circuit Analysis

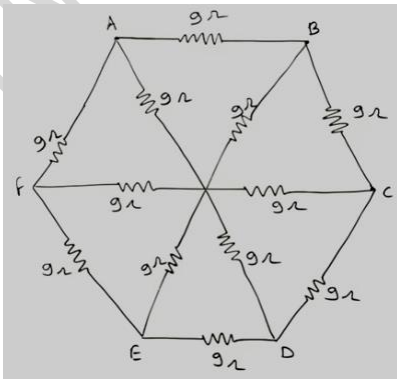
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

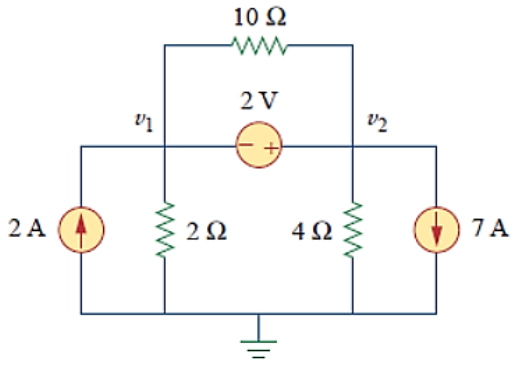
1 a) Find the current flowing through 5Ω resistor using mesh analysis **06**



b) Determine the total resistance between terminal 'A-B' using Star- Delta conversion (All the resistors' values are 9Ω) **07**



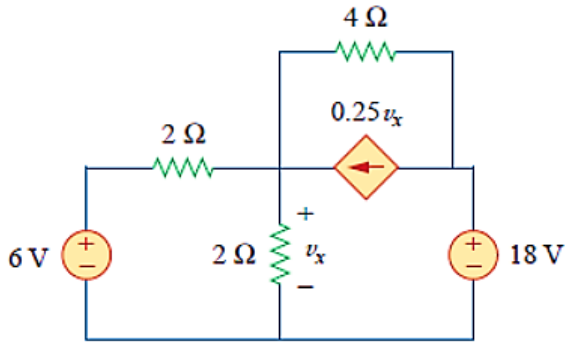
c) For the circuit, find the node voltages V_1 & V_2 using nodal analysis. **07**



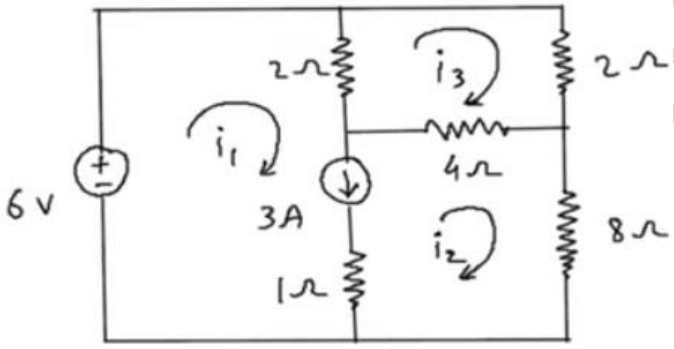
Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

OR

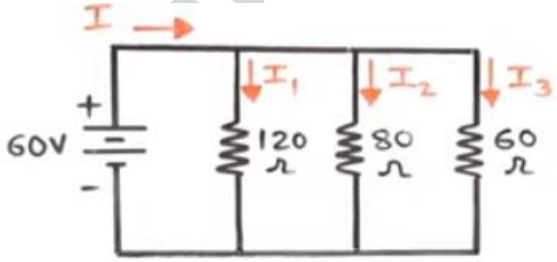
2 a) Determine the 'v_x ' using source transformation method. **07**



b) Find all the loop currents using super mesh analysis **07**



c) Find KCL for the circuit shown below **06**

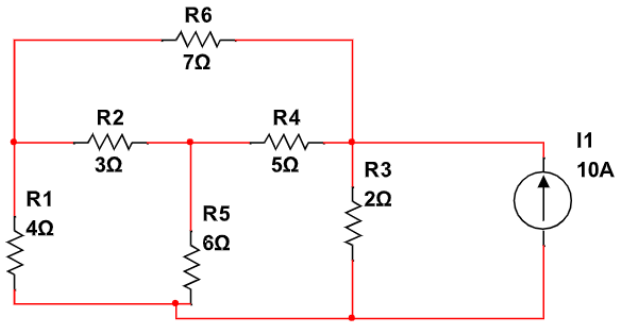


UNIT - II

3 a) Given below is Reduced Incidence matrix, draw the oriented graph from the incidence matrix **04**

$$[A_r] = \begin{bmatrix} 1 & 1 & 0 & 0 & 1 \\ 0 & -1 & 1 & 0 & 0 \\ -1 & 0 & -1 & -1 & 0 \end{bmatrix}$$

b) For the network shown below, draw the graph, select a tree, write the tie set schedule and obtain the KVL equations. **08**

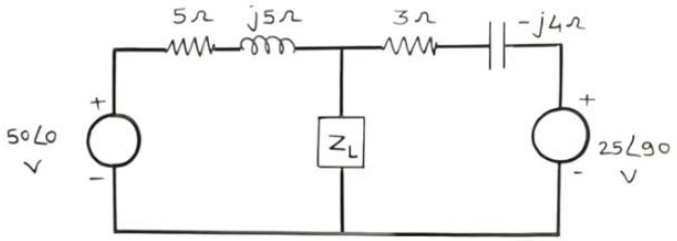


c) Three Impedance Z_1, Z_2 & Z_3 are connected in series across, 250v,50Hz supply. If Z_1=20 Ω, Z_2=8+j10 Ω, Z_3=15-j5 Ω. Determine **08**

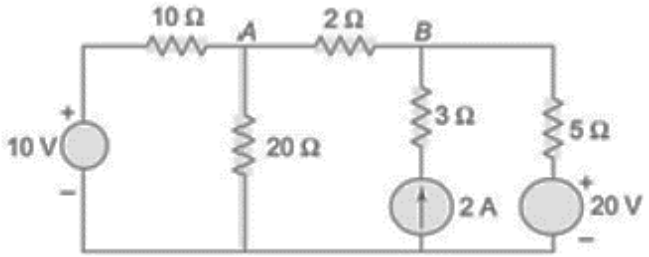
1. Current through the circuit.
2. Power factor of the circuit.
3. Voltage across each impedance.

UNIT - III

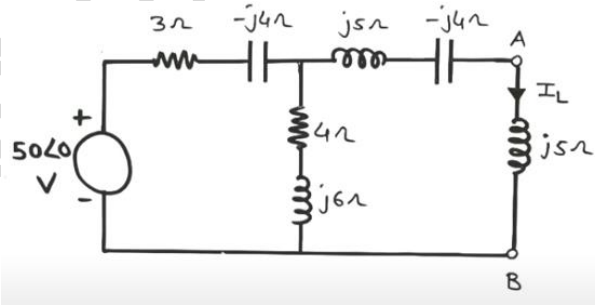
4 a) In the circuit shown below find the load impedance Z_L that will draw maximum power. Also find the value of that maximum power. **07**



b) Find the voltage across the 2ohm resistor in circuit shown below by using the superposition theorem. **06**



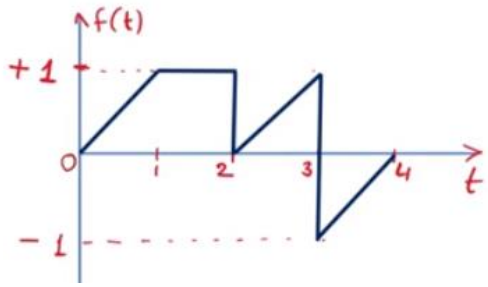
c) Obtain the Thevenin's equivalent circuit between the terminals A & B for the circuit shown below and also find the load current passing through 'j5Ω'. **07**



UNIT - IV

5 a) State and prove Initial and Final value theorem. **05**

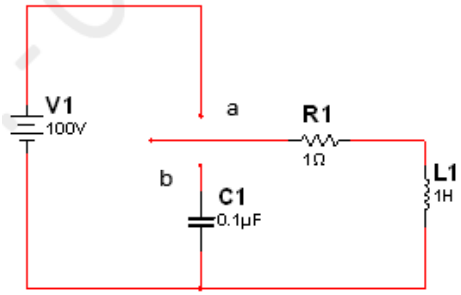
b) Find the Laplace Transform for the given waveforms. **08**



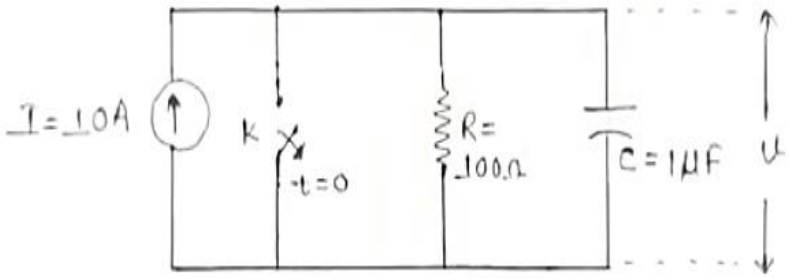
c) Solve for f (0) and f (∞), If **F(s)=** $4e^{-2s}$ **(s+50) / s** **07**

OR

6 a) The switch S is moved from 'a' to 'b' at t = 0. Find the values of i, di/dt, d^2i/dt^2 at t =0^+ if R= 1Ω, L = 1H, C = 0.1μF and V=100V. Assume steady state is achieved when S is at 'a'. **07**



b) In the given network the switch 'k' is closed at t=0 with capacitor uncharged. Find v, dv/dt, d^2v/dt^2 at t = 0^+ . **07**



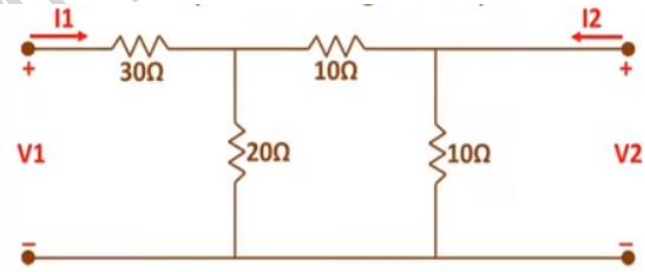
c) Find the Laplace transform of the following functions **06**

i) X(t) = 5u($\frac{t}{3}$)

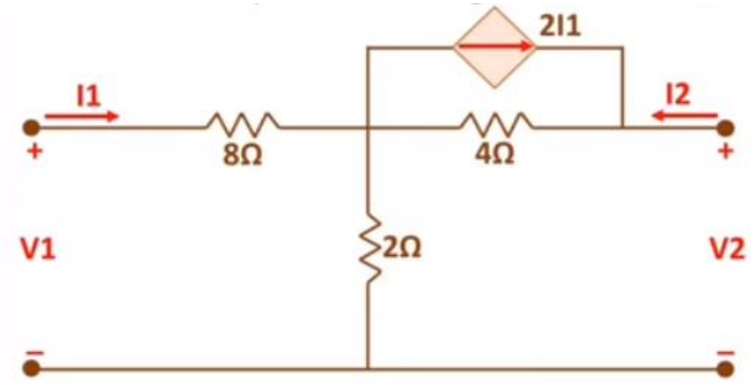
ii) X(t) = 2tu(t) - 4$\frac{d\delta(t)}{dx}$

UNIT - V

7 a) Find the 'ABCD' parameter for the two-port network shown **08**



b) Determine Z parameters of a two-port network and hence find Y-parameter. **12**



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