U.S.N.										

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

Autonomous Institute Affiliated to VTU

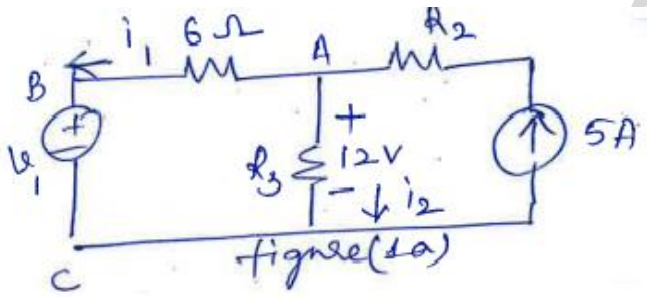
May 2023 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: ECE / ML **Duration: 3 hrs.**
Course Code: 22ES3PCNAL **Max Marks: 100**
Course: Network Analysis **Date: 19.05.2023**

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

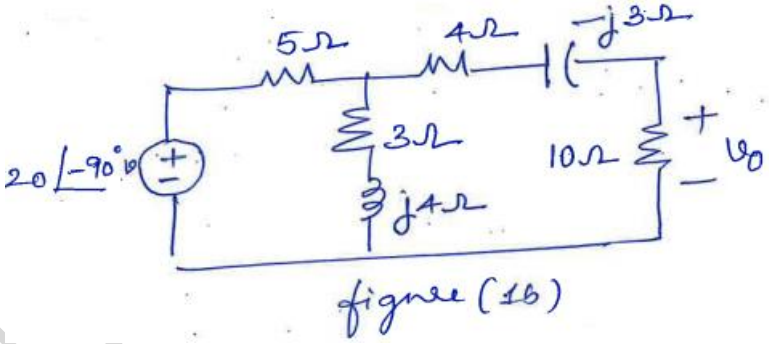
Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1 a) 

10

For the circuit shown in figure(1a) find i_1 and v_1 given $R_3=6\Omega$

b) 

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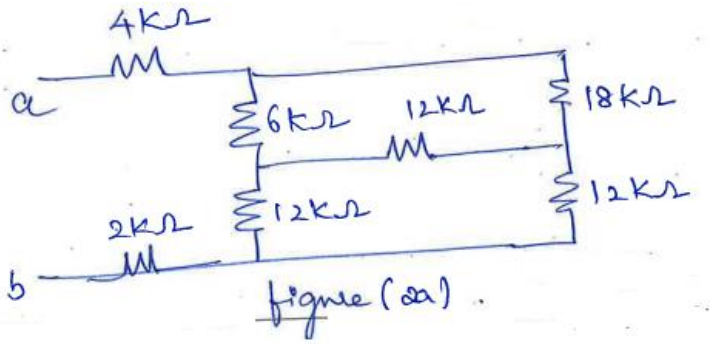
Calculate V_0 in the circuit shown in figure(1b) using source transformation.

OR

2 a) 

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Find the value of resistance between the terminals a-b of the network shown in fig(2a).

b) Draw the network for the following nodal equations in matrix form. **10**

$$\begin{bmatrix} \left(\frac{1}{-j10}+\frac{1}{10}\right) & -\frac{1}{10} \\ -\frac{1}{10} & \left(\frac{1}{5}(1-j)+\frac{1}{10}\right) \end{bmatrix} \begin{bmatrix} V_a \\ V_b \end{bmatrix} = \begin{bmatrix} 10\angle 0^\circ \\ 0 \end{bmatrix}$$

UNIT - II

3 a) State Thevenin's theorem and explain the procedure for finding R_t. **6**

b) Find the Norton equivalent for the circuit of figure(3b). **8**

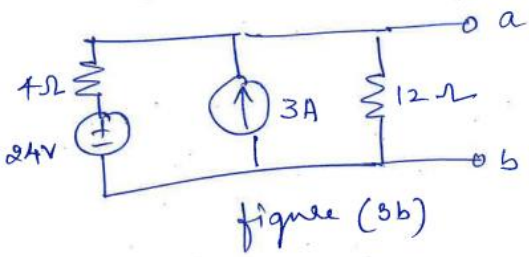
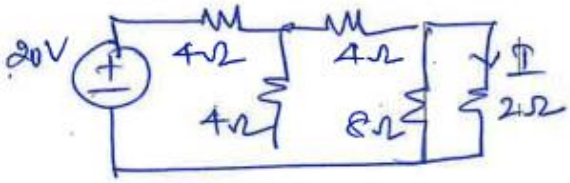


figure (3b)

c) Find the current in 2Ω resistor in figure(3c) and hence prove reciprocity theorem. **6**



UNIT - III

4 a) Two coils one of R1=0.51Ω, L1=32mH the other of R2=1.3Ω, L2=15mH and two capacitance of 25mF and 62mF are all in series with a resistance of 0.24 Ω. Determine the following for the circuit. **8**

i) Resonant frequency
ii) Q of each coil
iii) Q of the circuit
iv) Cut of frequencies

b) Prove that the resonant frequency is the geometric mean of the two half power frequencies. **6**

c) In a series resonant circuit the current is maximum when c=500pf and frequency is 1MHz. If C is changed to 600pf the current decreases by 50%. Find the resistance inductance and quality factor. **6**

UNIT - IV

5 a) Find the laplace transforms of a) unit step function b) decaying exponential **6**

b) Analyze the circuit shown in fig 5.1 to find **8**

i) i(0+) and V(0+)
ii) $\frac{d(i0+)}{dt}$ and $\frac{d(v0+)}{dt}$

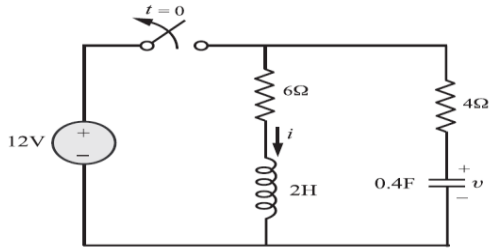


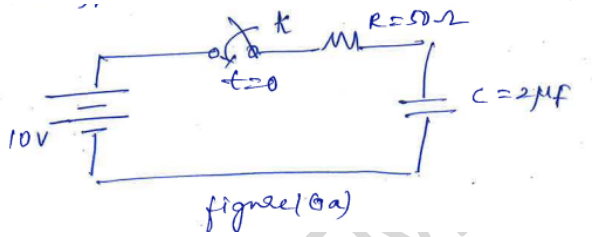
Fig 5.1

c) With necessary proof state initial value theorem. **6**

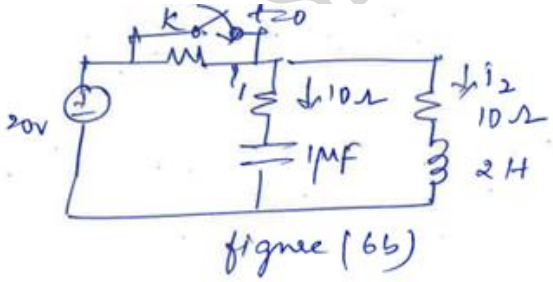
OR

6 a) Mention the necessary procedure to evaluate initial conditions. **6**

b) In figure 6a switch k is closed at t=0: find i(0), di/dt, d^2i/dt^2 at t=0+ **6**



c) In the circuit shown in figure (6b) steady state is reached with switch k open. The switch is closed at t=0. Determine i_1, i_2, di_1/dt and di_2/dt at $t=0^+$. **8**



UNIT - V

7 a) Determine z parameter and use Z parameter relationship to express ABCD parameters in terms of Z parameters **10**

b) Construct a circuit that realize the following Z parameters $Z=\begin{bmatrix}12 & 4\\ 4 & 8\end{bmatrix}$ **10**

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