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: Electrical & Electronics Engineering　　　　Duration: 3 hrs.
Course Code: 22EE3PCECT　　　　　　　　　　　　Max Marks: 100
Course: ELECTRICAL CIRCUIT THEORY　　　　　　Date: 17.05.2023
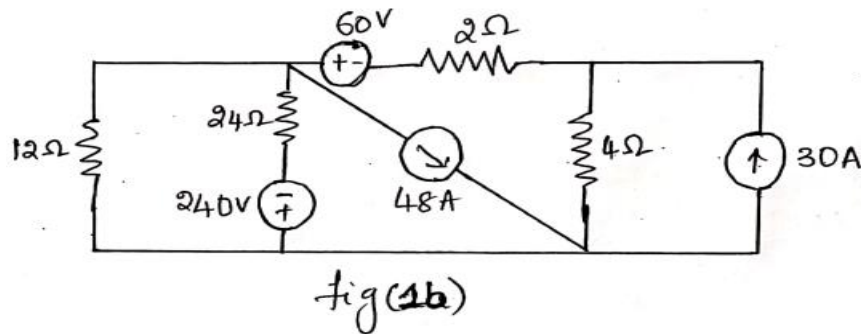
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
　　　　　　　 2. Missing data, if any, may be suitably assumed.

UNIT - I

1　a)　Explain about circuit elements.　　　　　　　　　　　　　　　　　　　**04**

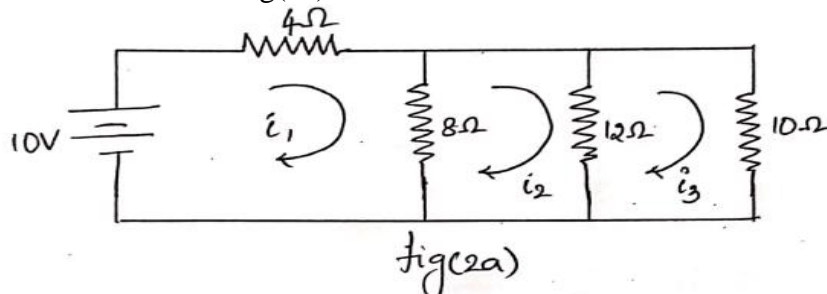　　b)　Determine the current in 12Ω resistor shown in fig(1b) using source transformation method.　　　　**08**

fig(1b)

　　c)　The network shown in the fig(1c) consists of two star connected circuits in parallel. Obtain the single delta connected equivalent.　　　　**08**
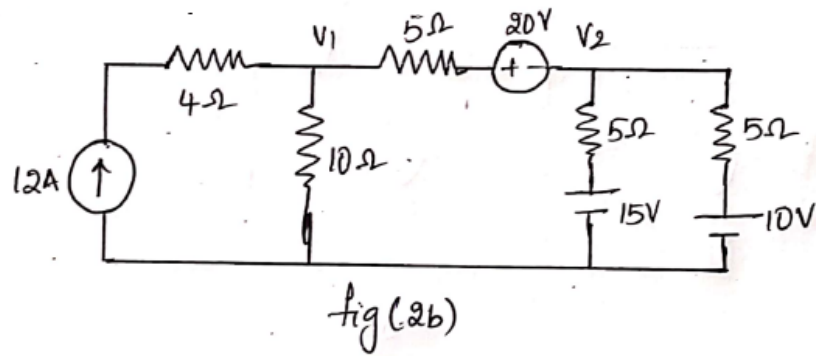

fig(1c)
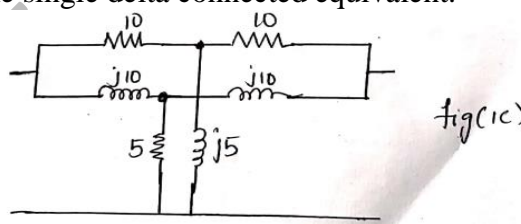
OR

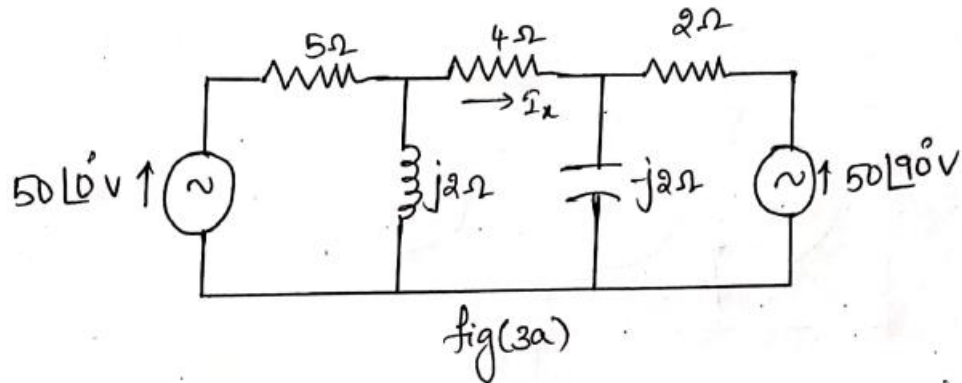2　a)　Find the output power from the voltage source using mesh current analysis, for the circuit shown in fig(2a)　　　　**10**

fig(2a)

b) using node voltage analysis, find the voltages V_1 and V_2 of the circuit shown in fig(2b) **10**
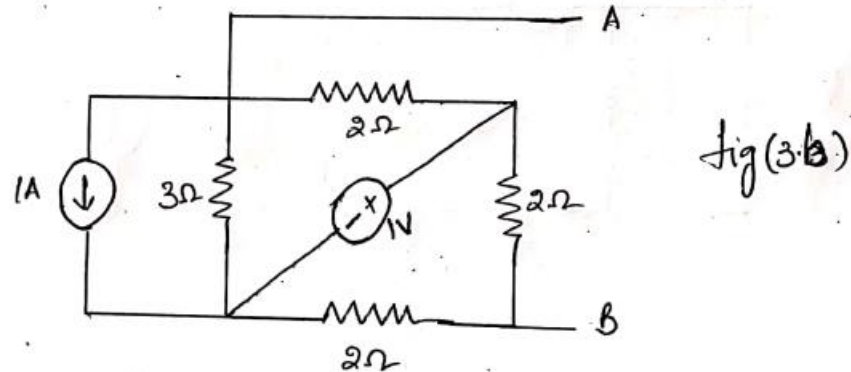

fig (2b)

UNIT - II

3   a)   In the circuit shown in fig(3a), find I_x using Superposition theorem.   **09**

fig(3a)

b)   Determine the current through 1Ω resistor connected across AB in the network shown in fig(3b) using Norton's theorem.   **11**

fig (3.b)

UNIT - III

4   a)   Prove that $f_r = \sqrt{f_1 f_2}$ in a series resonant RLC circuit.   **05**

b)   Derive expression for f_r in a parallel resonant RLC circuit? and compare series and parallel resonant circuits.   **08**

c)   A series RLC circuit has R=10Ω, L=0.1H and C=100μF is connected across a 200V, variable frequency source. Find (a) The Resonant frequency, (b) Impedance at this frequency, (c) the voltage drop across inductance and capacitance at the frequency, (d) Quality factor, (e) Bandwidth.   **07**

5   a)   Derive expression for current flowing through inductor in a DC excited RL   **10**
         series circuit. And also derive expressions for voltage and power across R and
         L with required plots.

    b)   Switch 'K' is closed at t=0 in the network shown in Fig.5.b with capacitor   **10**
         uncharged. Determine i, di/dt, d²i/dt² at t = 0₊.
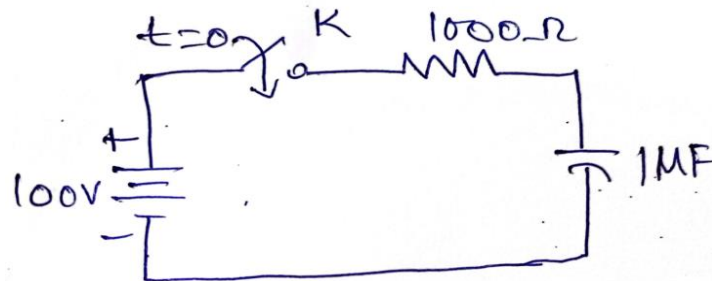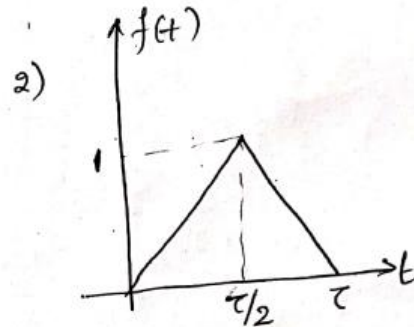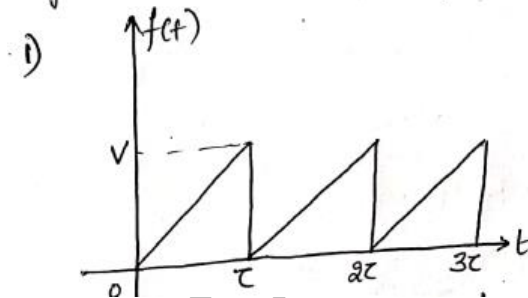

Fig. 5.b

UNIT - IV

6   a)   State and prove initial and final value theorem in Laplace transformation.   **10**
    b)   Write time domain equations and find laplace transform for the following   **10**
         signals shown in fig(6b)

UNIT - V

7   a)   Define and explain Z parameters and ABCD parameters.   **10**
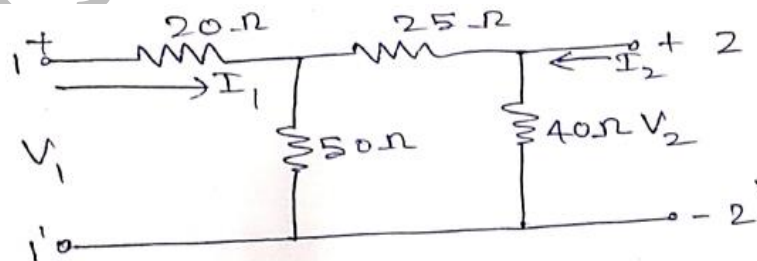   b)   Determine 'Y' parameter of the network shown in Fig.7. b.   **10**

Fig. 7.b

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