


VIT

Vellore Institute of Technology

Final Assessment Test – November 2025

Course: BECE203L - Circuit Theory

Class NBR(s): 2719

Time: Three Hours

Slot: C2+TC2+TCC2

Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

COs	CO Statements
CO1	Apply the knowledge of various circuit analysis techniques such as mesh analysis, nodal analysis, and network theorems to investigate the given network.
CO2	Analyse the resonance and transient response of the first order, second order circuits.
CO3	Able to solve the networks using graphical approach.
CO4	Design and analyse two-port networks, passive filters and attenuators.
CO5	Able to analyse the given network by transforming from time domain to S domain.
CO6	Analyse the given network using Fourier series and transforming from time domain to frequency domain.

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

 Answer ALL Questions

(10 X 10 = 100 Marks)

1. Use Mesh analysis to find out the I_o in the circuit of Fig. 1.

CO3 BL1

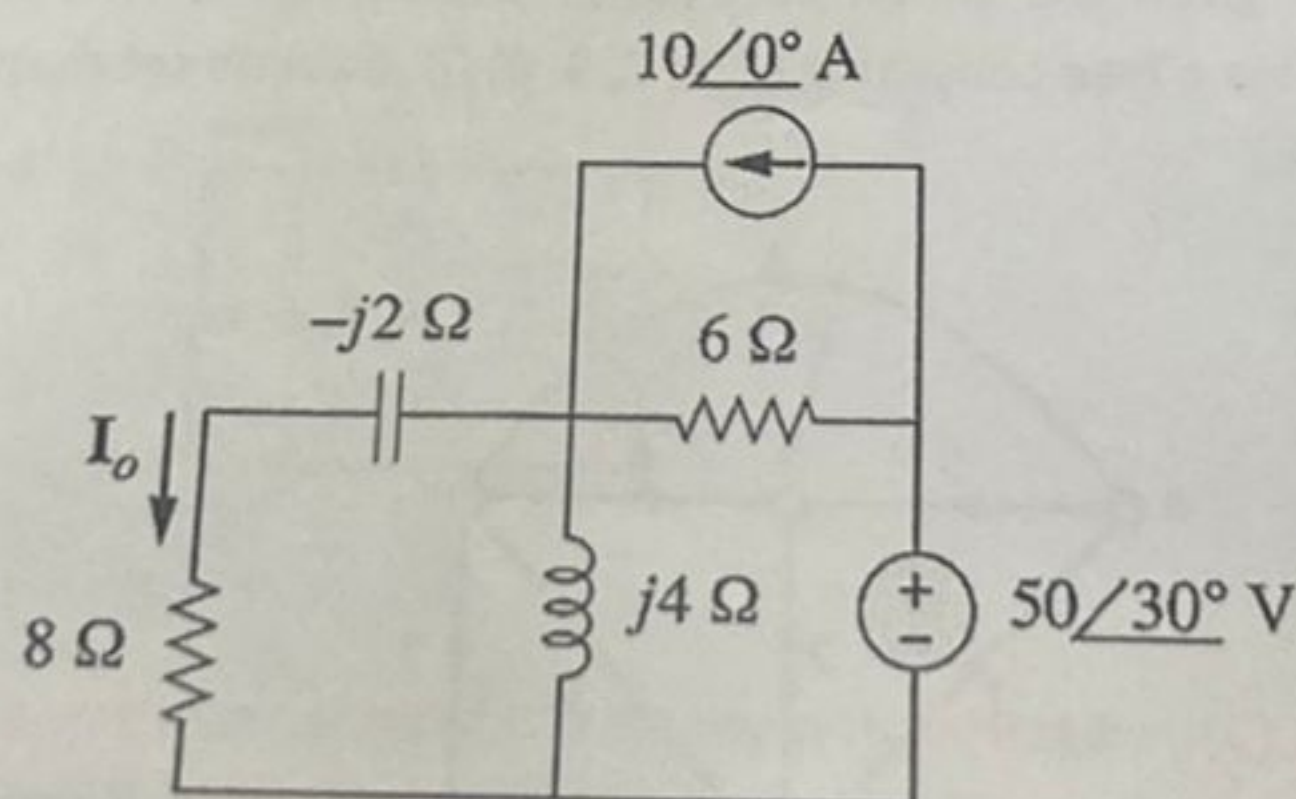


Fig. 1

2. Solve for I_x in the circuit of Fig. 2 using the Superposition principle.

CO3 BL2

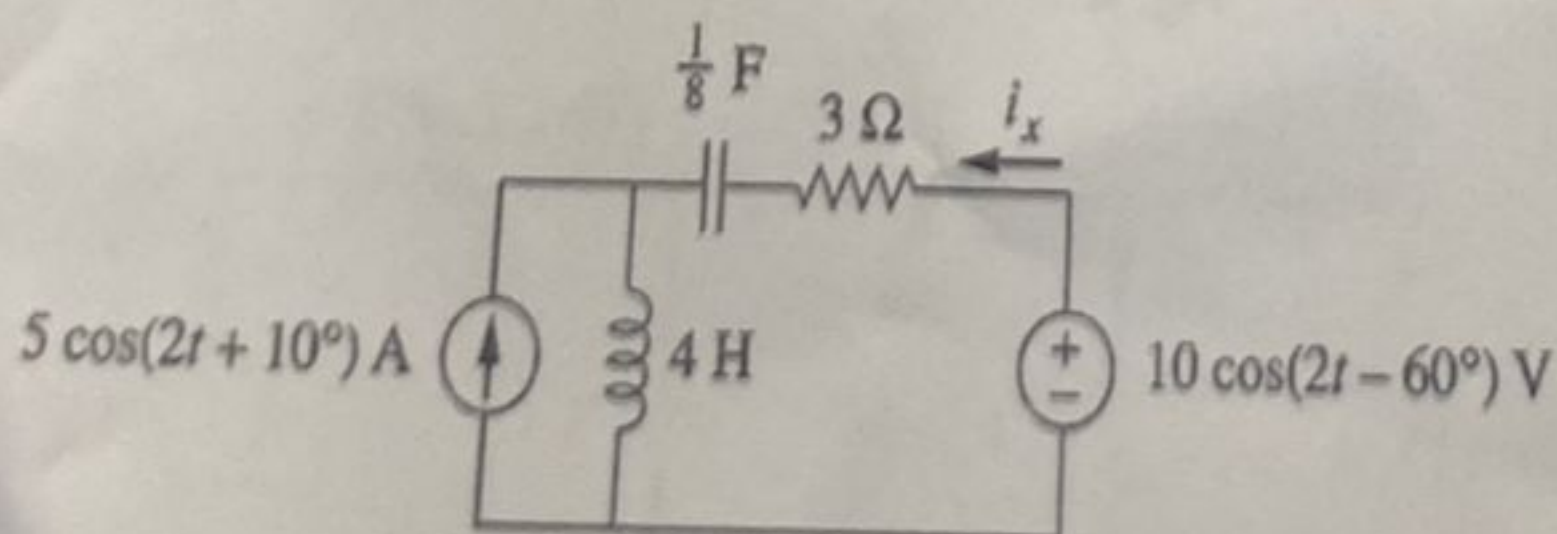


Fig. 2

5. Determine the Thevenin's equivalent at the output port of the circuit in Fig.5

CO2 BL4

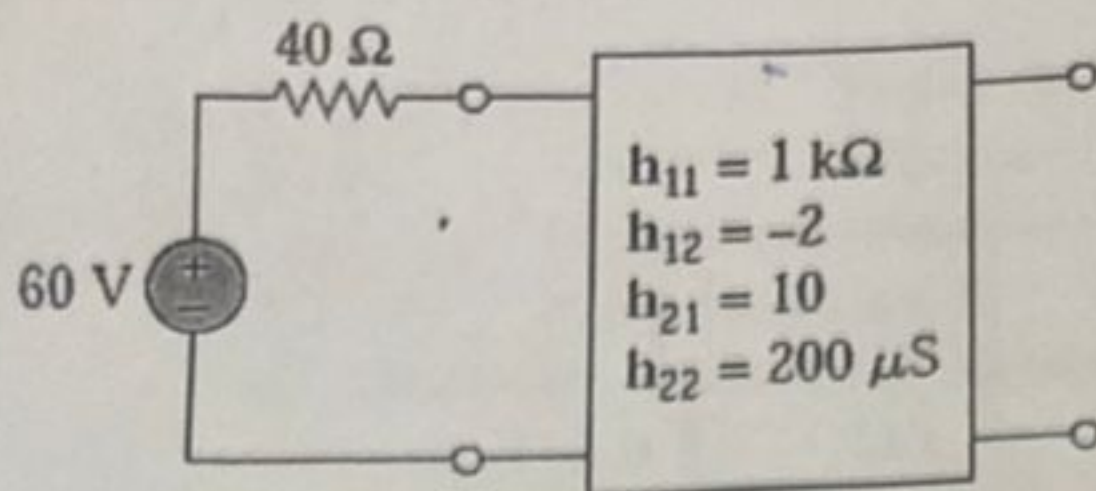


Fig.5

6. Obtain the transfer function of the filter shown in Fig. 6. Identify the type of the filter. Find the DC gain and cut-off frequency of the filter.

CO3 BL4

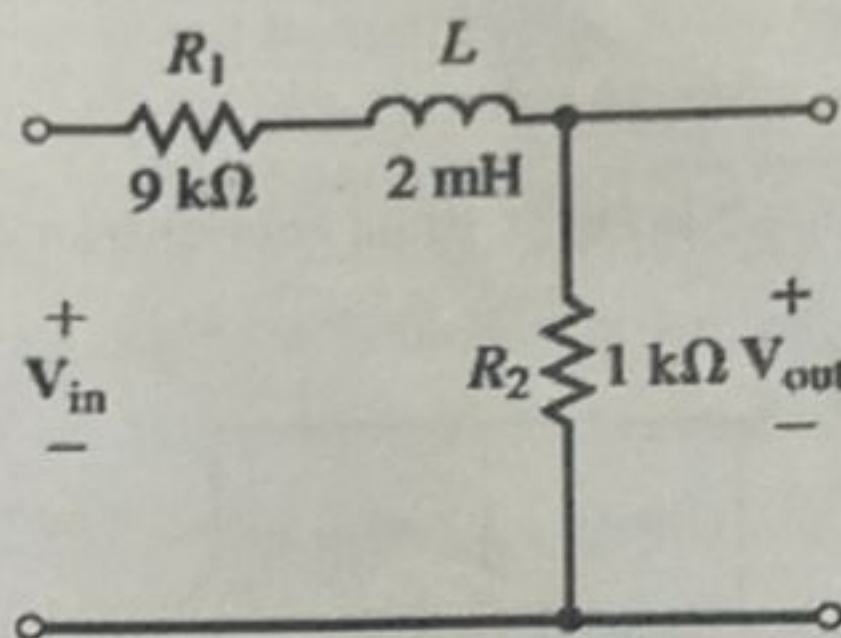


Fig.6

7. For the circuit in the Fig.7 find $\frac{I_1(s)}{V_s(s)}$

CO2 BL6

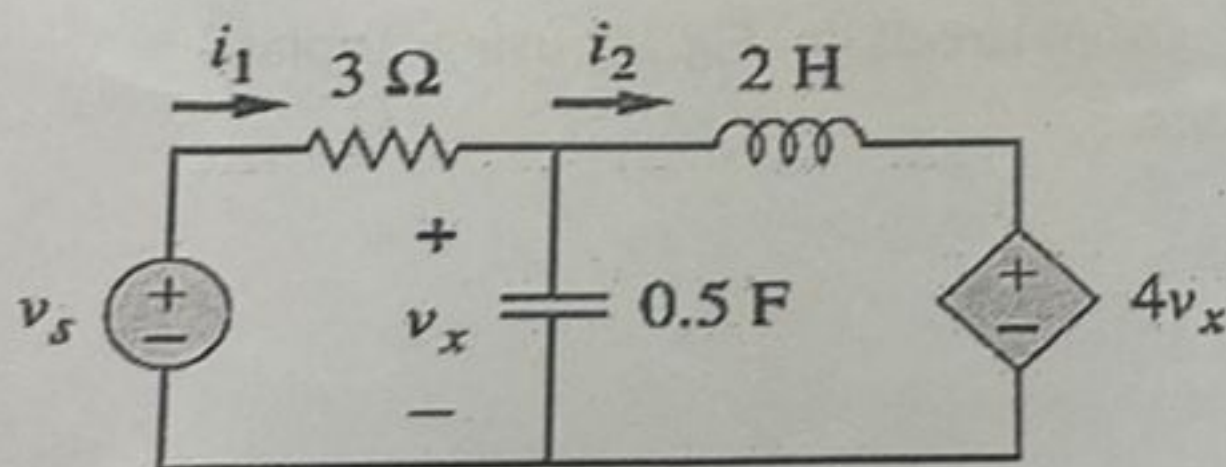


Fig.7

8. Determine the first three terms of the steady state voltage $v_o(t)$ in the Fig.8. If the input voltage is a periodic signal in the form of

CO2 BL6

$$v(t) = \frac{1}{2} + \sum_{n=1}^{\infty} \frac{1}{n\pi} (\cos n\pi - 1) \sin nt \text{ V}$$

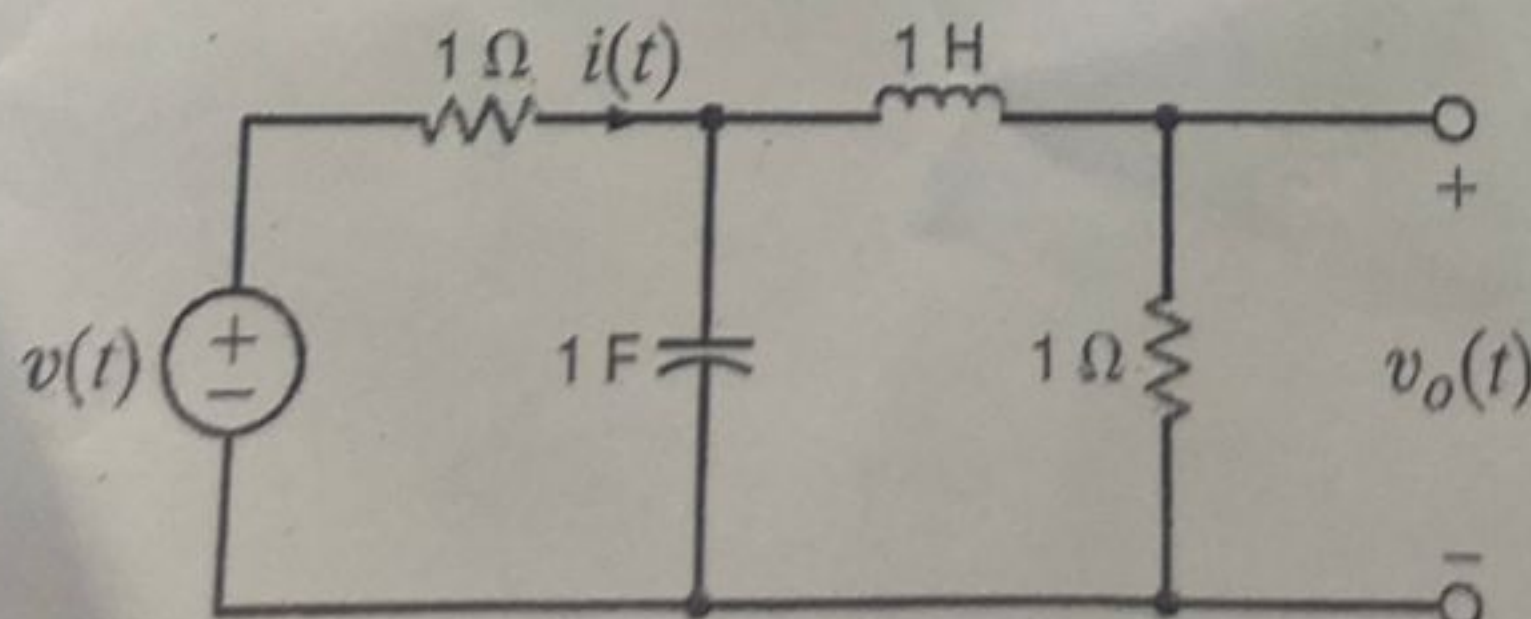


Fig.8

- 3.(a) Examine the capacitor voltage $v(t)$ for both $t < 0$ and $t > 0$ of the circuit is shown in Fig. 3a. Also calculate the $v(t)$ at $t = 0.5s$.

CO2 BL2

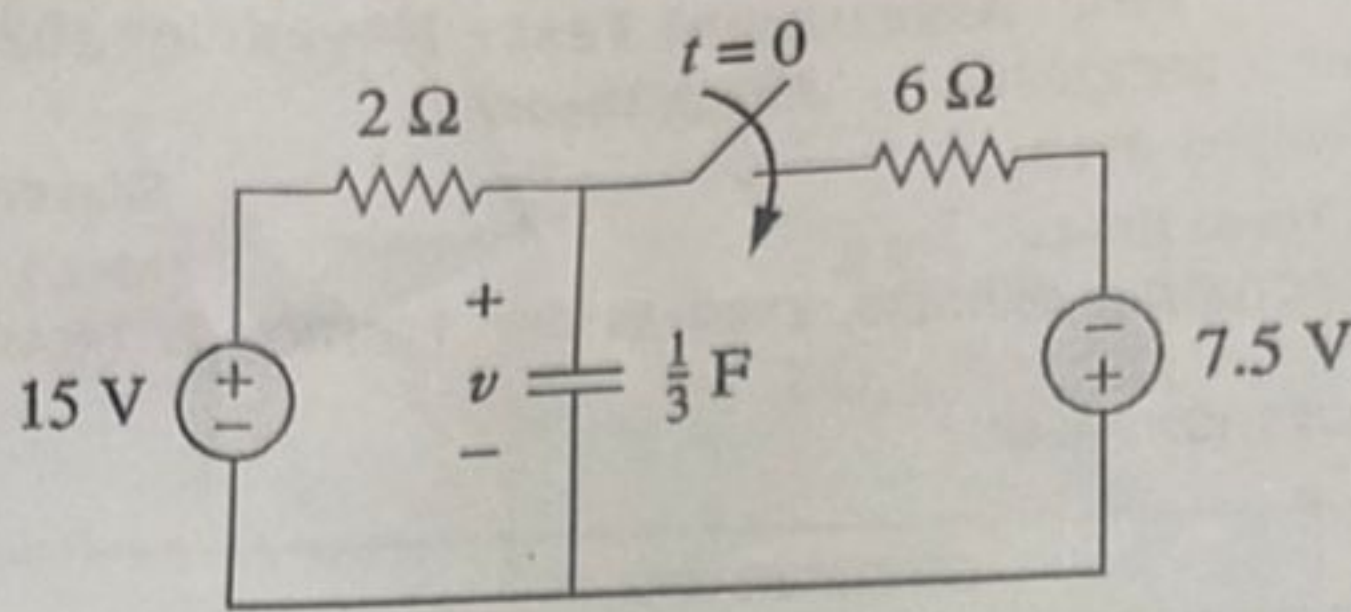


Fig. 3a

OR

- 3.(b) Find i and v_x in the circuit in Fig. 3b. Assume $i(0) = 5$ A.

CO2 BL2

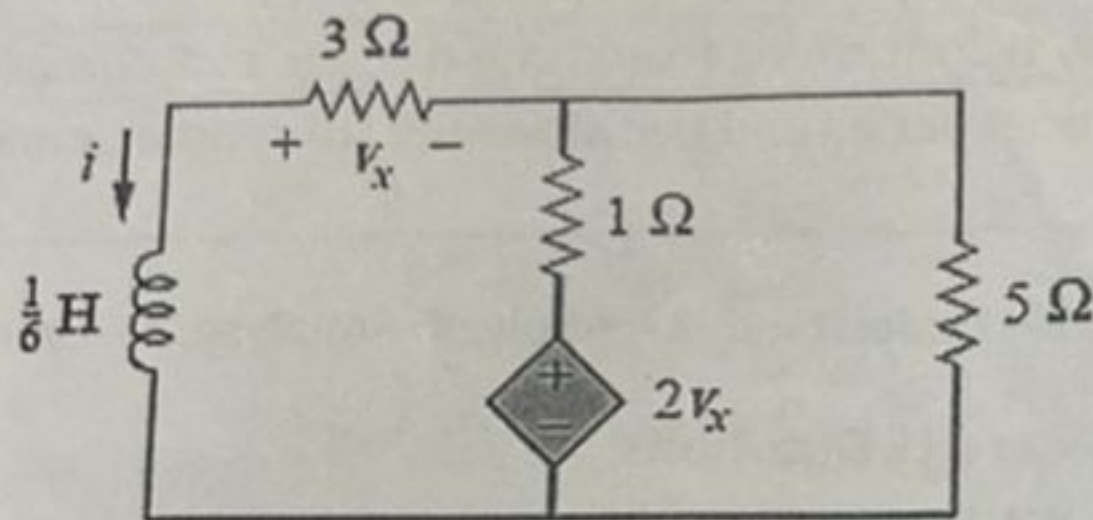


Fig.3b

4. A network graph for given the circuit diagram as shown Fig. 4. Find the incidence matrix and for a tree consisting of (1, 2, 3, 4) (i) draw tie set matrix (ii) draw cut-set matrix.

CO3 BL3

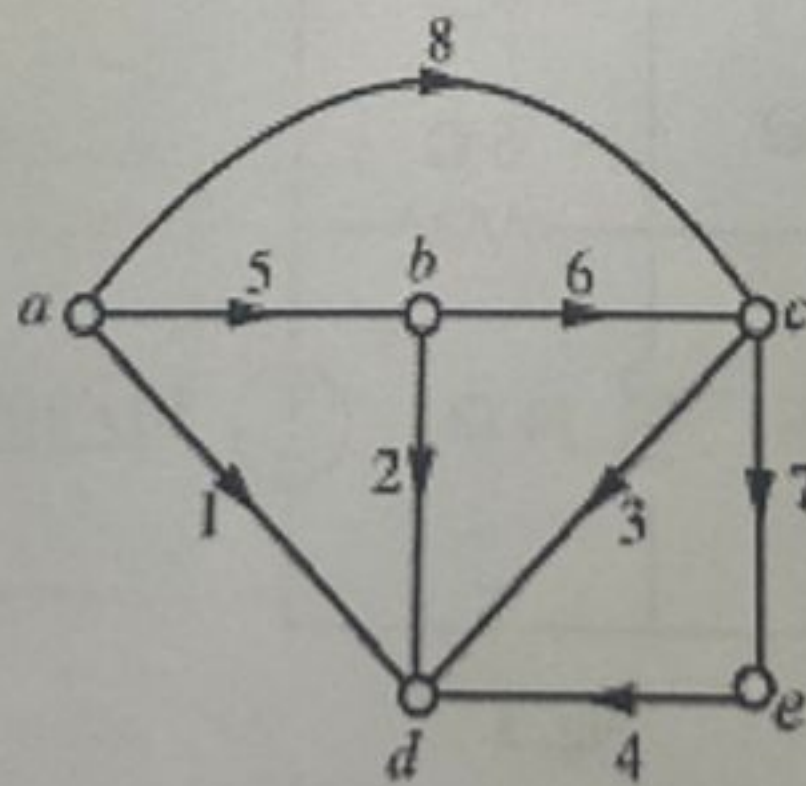


Fig. 4

- 9.a) In the circuit of Fig.9a, let $i_s(t) = 4\delta(t)$ A. Find $V_o(\omega)$ using Fourier transform.

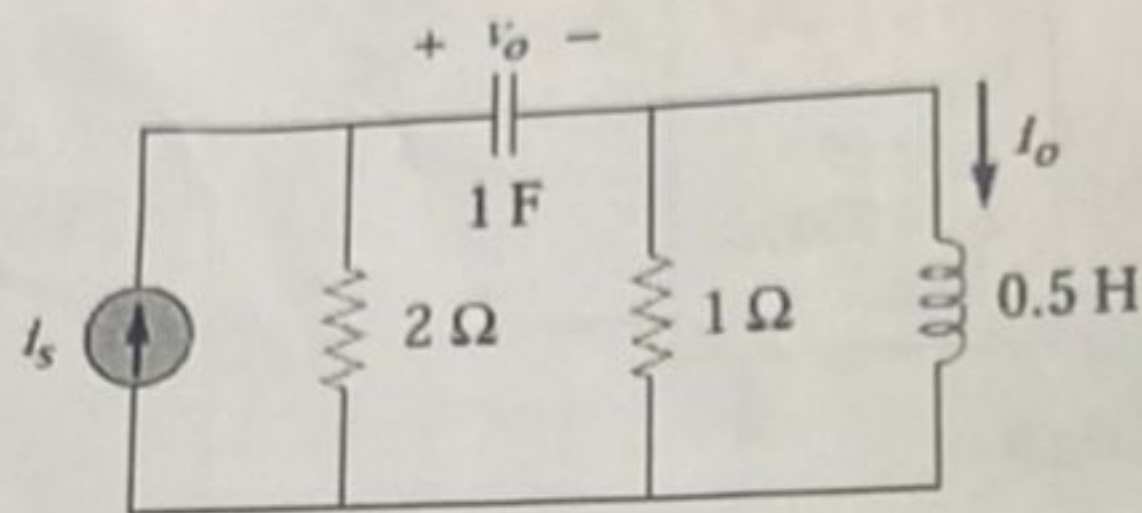


Fig.9a

OR

- 9.b) Determine $v(t)$ in the circuit shown in Fig.9b using Fourier transform.

CO3 BL7

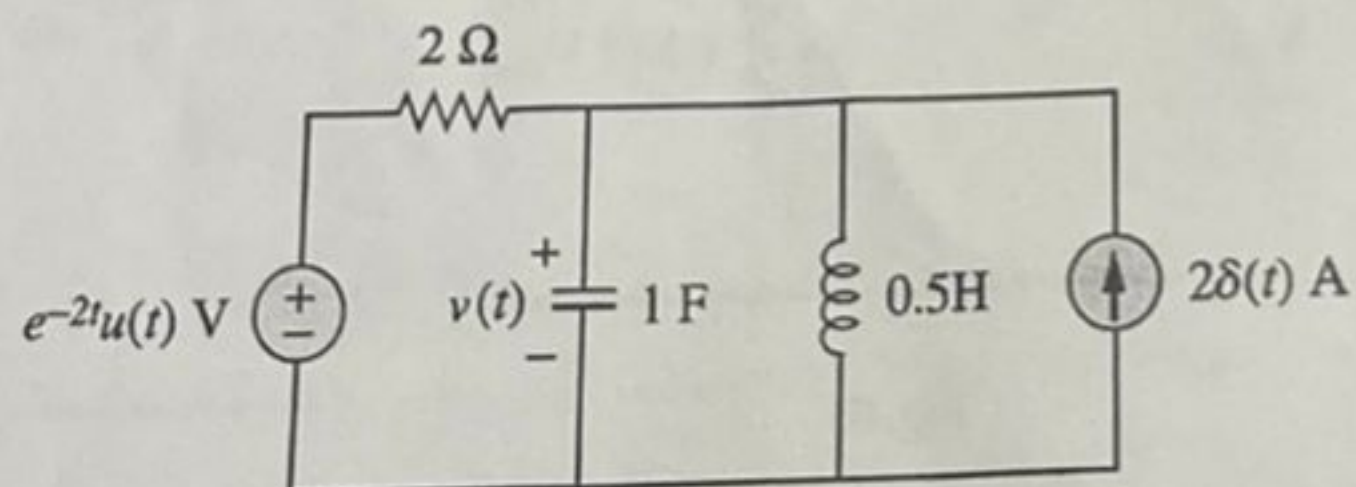


Fig.9b

10. Determine $V_o(t)$ for the following given circuit in Fig.10 using Laplas transform. Assume zero initial conditions.

CO2 BL6

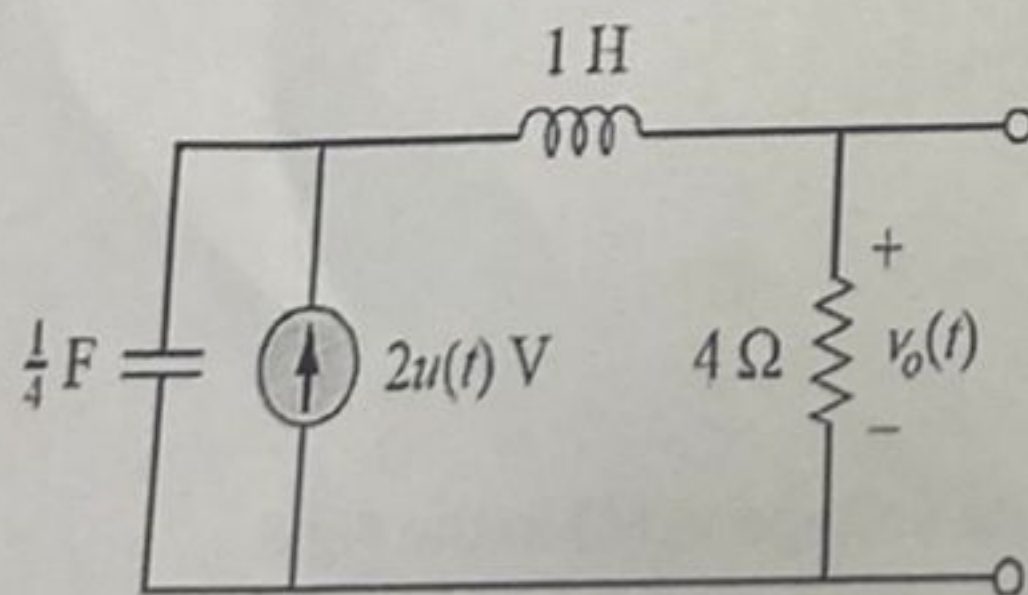


Fig.10

X/K/TY