PAPER ID-311976

Roll No:

BTECH
(SEM III) THEORY EXAMINATION 2024-25
NETWORK ANALYSIS AND SYNTHESIS

TIME: 3 HRS **M.MARKS: 70**

Note: Attempt all Sections. In case of any missing data; choose suitably.

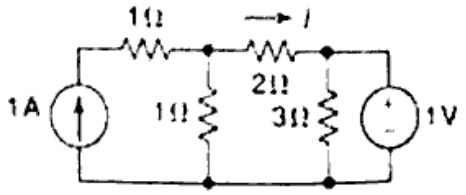
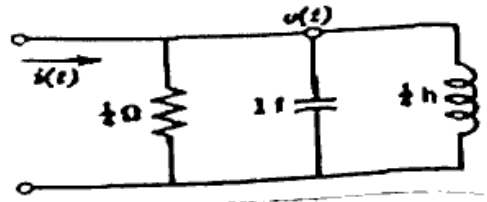
SECTION A

1. Attempt *all* questions in brief. **2 x 07 = 14**

Q no.	Question	CO	Level
a.	Draw the Dual Circuit diagram of Parallel R-C Circuit with Current Source.	CO1	K1
b.	State Maximum Power Transfer Theorem.	CO2	K1
c.	Write the Final Value Theorem with expressions.	CO3	K1
d.	Write the General equations for Y Parameter of two port network.	CO4	K1
e.	Sketch the frequency response curve for First order **High pass filter.**	CO5	K1
f.	Draw the circuit diagram of Practical Current Source.	CO1	K1
g.	Which filter is used in Speaker for Amplification?	CO5	K1

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 21**

a.	Write a short note on Source Transformation Approach with relevant circuit diagram.	CO1	K2
b.	State Superposition Theorem. Find the current 'I' in the circuit shown in figure using the superposition theorem. 	CO2	K3
c.	Using Laplace Transform Approach, Calculate the voltage v(t) for t>0 as shown in figure with zero Initial Conditions, $i(t)=e^{-3t}u(t)$, R=(1/4) Ω, C=1 farad, L=(1/4)henry. 	CO3	K2
d.	Prove that for a symmetric two port network condition is $Z_{11} = Z_{22}$, where Z_{11} and Z_{22} are open Circuit Impedance parameters.	CO4	K3
e.	What is Low Pass Filter? Derive the expression for transfer function of a First order Passive Low pass filter and Sketch its Frequency Response curve.	CO5	K3

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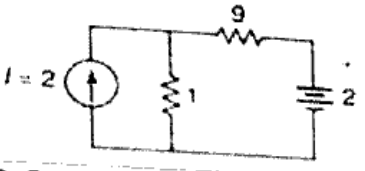
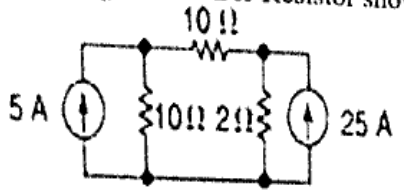
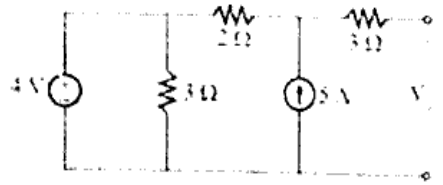
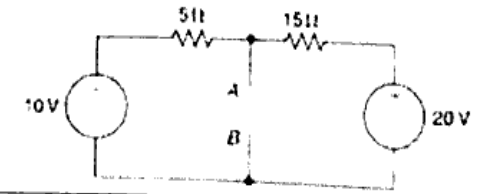
SECTION C

3. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Discuss Super Node condition with circuit diagram. In the circuit shown below, calculate the **current delivered by the battery** and **voltage across 1 Ω**.All resistances are in Ω. 	CO1	K3
b.	Define Super Mesh Condition with circuit diagram. Find the current and voltage across 2 Ω Resistor shown in figure. 	CO1	K3

4. Attempt any *one* part of the following: **07 x 1 = 07**

a.	State **Thevenin's Theorem** with different rules. Also Calculate Thevenin's Resistance R_{th} as shown in given figure. 	CO2	K3
b.	State **Norton's Theorem** with circuit diagram. Also Sketch Norton's equivalent circuit for given figure with AB terminal as Load. 	CO2	K3

7.33 3.75

5. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Find the Laplace transform of the given signal using Laplace Transform properties (i) $y(t)=e^{-3t}u(t)$ and (ii) $y(t)=te^{-4t}u(t)$.	CO3	K3
b.	Determine the Inverse Laplace transform of the following functions using Partial Fraction method: https://www.aktuonline.com (i) $X(s) = \frac{4}{s(s+1)(s+2)}$ (ii) $Y(s) = \frac{2}{(s+1)(s+2)^2}$	CO3	K3

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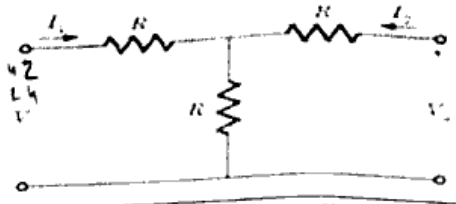
6. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Given R= 2Ω each, Calculate Z Parameter for the two port Network shown in figure. 	CO4	K3
b.	Derive the expressions of overall Z Parameter for **Series** Interconnection of '2' two ports network 'A' and network B.	CO4	K2

7. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Derive the expression for **Resonant frequency, fr** in series R-L-C circuit. Also draw the Phasor diagram for Resonant series R-L-C circuit.	CO5	K2
b.	Explain & derive the expression for transfer function of a Passive Band pass filter. Also, Sketch its Frequency Response curve.	CO5	K2