

Code: 23EC3201

**I B.Tech - II Semester – Supplementary Examinations  
DECEMBER 2025**

**NETWORK ANALYSIS  
(ELECTRONICS & COMMUNICATION ENGINEERING)**

Duration: 3 hours

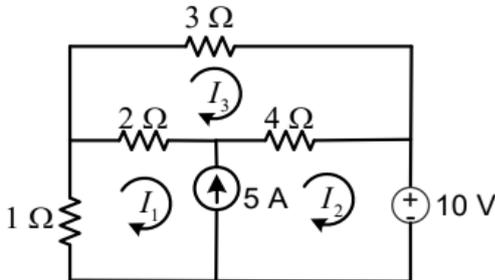
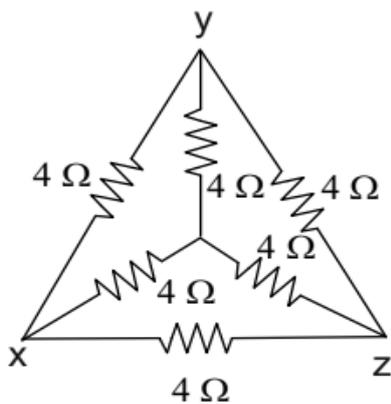
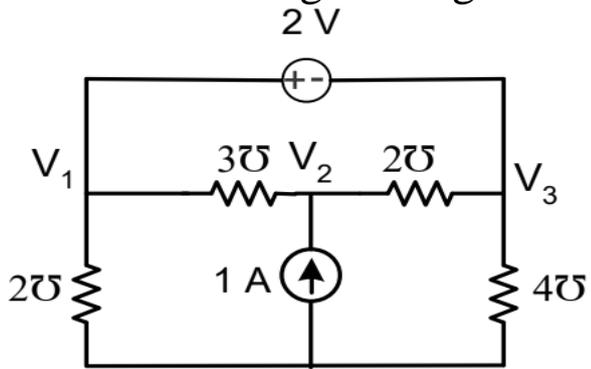
Max. Marks: 70

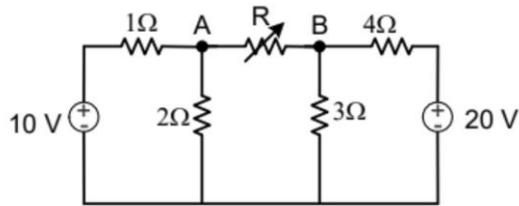
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- Note: 1. This question paper contains two Parts A and B.  
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.  
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.  
4. All parts of Question paper must be answered in one place.
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**PART – A**

1.a)	State Ohm's law.
1.b)	Explain Kirchoff's voltage law with example.
1.c)	State Reciprocity theorem.
1.d)	State Nortons theorem.
1.e)	Find $V_o$ using source Transformation <div style="text-align: center;"> </div>
1.f)	In a series RLC circuit, $R=20k\Omega$ , $L = 10H$ , $C=200\mu F$ . Find the resonant frequency.
1.g)	What are the conditions to be fulfilled for Symmetry of a two-port network.
1.h)	Give the comparison between Series and Parallel resonance.
1.i)	Write the time constant of a series RC circuit.
1.j)	List the applications of h and T-Parameters.

## PART – B

			Max. Marks
<b>UNIT-I</b>			
2	a)	Determine all the loop currents using Mesh analysis 	5 M
	b)	For the circuit shown in Figure determine the equivalent resistance between any two terminals 	5 M
<b>OR</b>			
3	a)	Determine all the node voltages using nodal analysis 	5 M
	b)	Explain Supermesh concept with an example	5 M
<b>UNIT-II</b>			
4		Find the value of R, for which the power transferred across AB of the circuit shown in Figure is maximum and the maximum power is transferred.	10 M



**OR**

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|---|----|--|-----|
| 5 | a) | State and explain Thevenin's theorem.    | 5 M |
|   | b) | State and explain Superposition theorem. | 5 M |

**UNIT-III**

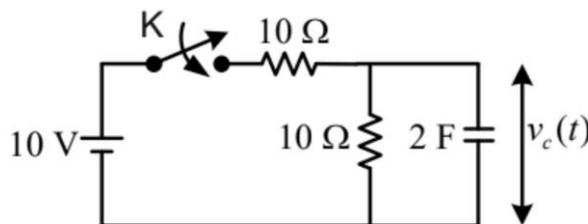
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|---|--|------|
| 6 | Two coils with a coefficient of coupling of 0.4 between them are connected in series so as to magnetize in (a) same direction, and (b) opposite direction. The total inductance in the same direction is 1.8 H and in the opposite direction is 0.8H. Find the self-inductance of the coils. | 10 M |
|---|--|------|

**OR**

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|---|---|------|
| 7 | An RLC series circuit with a resistance of 100Ω, inductance of 0.2H and a capacitance of 40μF is supplied with a 100V supply at variable frequency. Find the following parameters for the series resonant circuit.<br>a frequency at which resonance takes place.<br>(ii) current<br>(iii) power<br>( iv) power factor<br>( v) Quality factor<br>(g) half-power frequencies | 10 M |
|---|---|------|

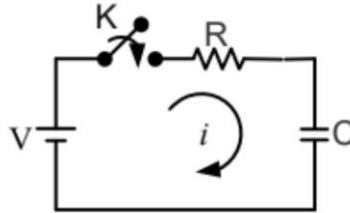
**UNIT-IV**

- |   |    |  |     |
|---|----|--|-----|
| 8 | a) | Explain the procedure for obtaining the transient response using Laplace transform.                          | 5 M |
|   | b) | The switch in the network shown in Figure is closed at $t = 0$ . Determine the voltage across the capacitor. | 5 M |

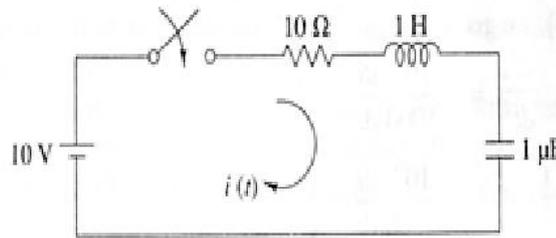


**OR**

9	<p>a) Consider an R-C series circuit as shown figure. Let us assume that the capacitor and inductor are initially uncharged, that is, at <math>t=0</math>, there is no charge on L or C. Develop an expression for current in the circuit when switch K is closed at <math>t = 0</math>.</p>	5 M
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	<p>b) For the circuit shown in figure, Analyse the circuit after switch is closed and find the transient current for <math>t &gt; 0</math>.</p>	5 M
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**UNIT-V**

10	<p>a) Following short circuit currents and voltages are obtained experimentally for a two port network: Determine Y parameters i) With output short circuited <math>I_1 = 5\text{mA}</math> ; <math>I_2 = -0.3\text{mA}</math> and <math>V_1 = 25\text{ V}</math> ii) With input short circuited <math>I_1 = -5\text{mA}</math>; <math>I_2 = 10\text{mA}</math> and <math>V_2 = 30\text{ V}</math>.</p>	5 M
	<p>b) The following are the hybrid parameters for a network. Determine the Y parameters for the network.</p> $\begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix} = \begin{bmatrix} 5 & 2 \\ 3 & 6 \end{bmatrix}$	5 M

**OR**

11	<p>For the network shown in Fig., Find Z and Y parameters.</p>	10 M
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