

University of Mumbai
Examination 2020

Program: **Electronics and Telecommunication Engineering**

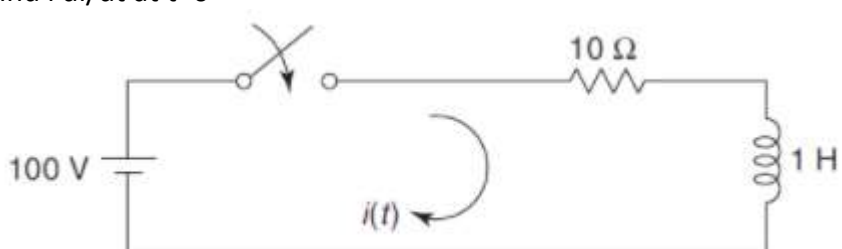
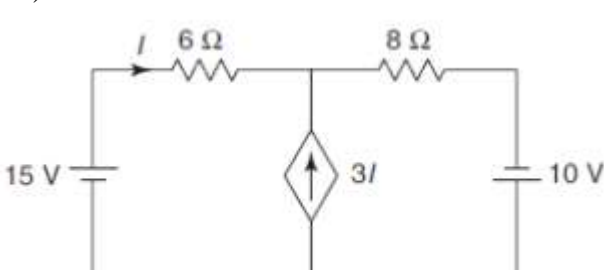
Curriculum Scheme: Rev2019

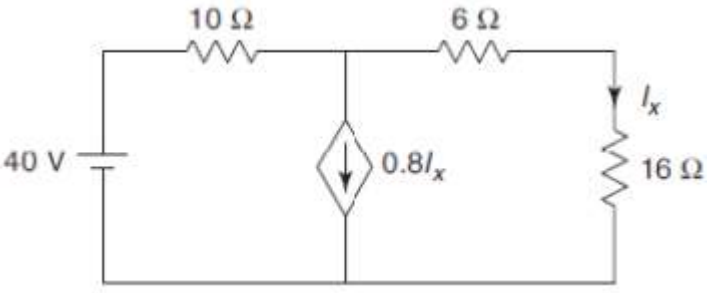
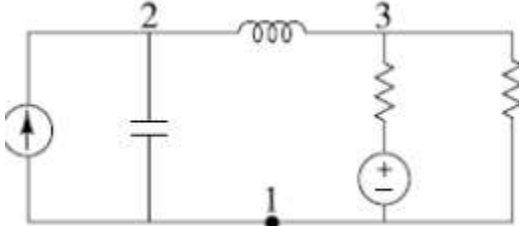
Examination: SE Semester III

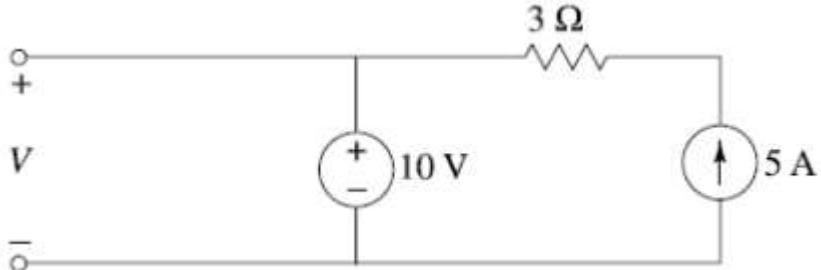
Course Code: ECC304 and Course Name: Network Theory

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The network having admittance function $Y(s)=(4s^2+6s)/(s+1)$
Option A:	RC function
Option B:	LC function
Option C:	RLC function
Option D:	None of the above
2.	In the given network, the switch is closed at $t=0$. With zero current in the inductor, find i di/dt at $t=0^+$
	
Option A:	100 A
Option B:	100 A/s
Option C:	-100 A
Option D:	-100 A/s
3.	Test whether the polynomial $P(s) = s^3 + 4s^2 + 5s + 2$ is Hurwitz and why?
Option A:	Since all quotient terms are positive, P(s) is Hurwitz
Option B:	Since all quotient terms are negative, P(s) is Hurwitz
Option C:	Since all quotient terms are positive, P(s) is not Hurwitz
Option D:	Since all quotient terms are negative, P(s) is not Hurwitz
4.	When using Superposition theorem in the network given here, what will be the current through 6 ohms when only 10 V source is acting? (assuming current is in clockwise direction)
	

Option A:	0.2 A
Option B:	0.26 A
Option C:	0.29 A
Option D:	0.35 A
5.	<p>If the load resistor is 16 ohms, what is the Thevenin's equivalent voltage?</p> 
Option A:	10 V
Option B:	20 V
Option C:	30 V
Option D:	40 V
6.	Which of the following is a property of a tree?
Option A:	There exists only one path between any pair of nodes in a tree
Option B:	A tree contains all nodes of the graph
Option C:	Trees do not contain any loops
Option D:	All of the above
7.	A complete incidence matrix is a rectangular matrix of order $n \times b$. Which of the following is FALSE regarding the matrix?
Option A:	Element value (A_{ij}) is 1, if branch j is incident at node i and is oriented away from node i .
Option B:	Element value (A_{ij}) is -1, if branch j is incident at node i and is oriented away from node i .
Option C:	Element value (A_{ij}) is -1, if branch j is incident at node i and is oriented towards node i .
Option D:	Element value (A_{ij}) is 0, if branch j is not incident at node i .
8.	For a graph having n nodes and b branches, the loop matrix B_a is a rectangular matrix of
Option A:	order b columns and n rows
Option B:	order b columns and as many rows as there are loops.
Option C:	order as many columns as there are loops and n rows
Option D:	None of the Above
9.	How many trees are possible for the graph of the network shown?
	
Option A:	4

Option B:	6
Option C:	5
Option D:	7
10.	When the voltages and currents are to be found out from a given network, this is called as
Option A:	Network Synthesis
Option B:	Network Analysis
Option C:	Network Nomenclature
Option D:	Network Treatment
11.	In maximum power transfer theorem,
Option A:	$R_{TH} = R_L$
Option B:	$V_{TH} = V_L$
Option C:	$I_{TH} = I_L$
Option D:	$R_{TH} = I_L$
12.	The voltage V in the figure is equal to
	
Option A:	10 V
Option B:	15 V
Option C:	5 V
Option D:	20 V
13.	The current in the R-L circuit at a time $t = 0+$ is?
Option A:	V/R
Option B:	R/V
Option C:	V
Option D:	R
14.	If no two branches of the graph cross each other, then the graph is called?
Option A:	directed graph
Option B:	undirected graph
Option C:	planar graph
Option D:	non-planar graph
15.	Laplace transform changes the ____ domain function to the ____ domain function.
Option A:	time, time
Option B:	time, frequency
Option C:	frequency, time
Option D:	frequency, frequency

16.	The resistance element value _____ while going from the time domain to frequency domain.
Option A:	does not change
Option B:	increases
Option C:	decreases
Option D:	increases exponentially
17.	The function $F(s) = s(s+2)/(s+1)(s+3)$ has poles
Option A:	0,-2
Option B:	-1,-3
Option C:	0,2
Option D:	1,3
18.	What is an ideal value of network function at poles?
Option A:	0
Option B:	1
Option C:	Infinity
Option D:	Finite and non-zero
19.	Which among the following represents the precise condition of reciprocity for transmission parameters?
Option A:	$AB - CD = 1$
Option B:	$AD - BC = 1$
Option C:	$AC - BD = 1$
Option D:	$BD - AC = 1$
20.	Which among the following is regarded as short circuit forward transfer admittance?
Option A:	Y11
Option B:	Y12
Option C:	Y21
Option D:	Y22

Q2	Solve any Two Questions out of Three	10 marks each
A	For the network shown in the following figure, find Z and Y-parameters.	

B	<p>Find the current through the 10 ohm resistor for the following network</p>
C	<p>For the following network, write down the tie-set matrix and obtain the network equilibrium equation in matrix form using KVL. Calculate the loop currents and branch currents</p>

Q3	Solve any Two Questions out of Three	10 marks each
A	<p>Find the current $i(t)$ for $t > 0$</p>	
B	<p>Synthesize $Z(s)$ into Forster I and Foster II forms</p> $Z(s) = \frac{s^2 + 12s^2 + 32s}{s^2 + 7s + 6}$	
C	<p>Determine V_2/I_1 and V_2/V_1 for the following network</p>	

