Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Third Semester – Regular & Supplementary) Examinations, November 2025

23BECPC23003– NETWORK THEORY

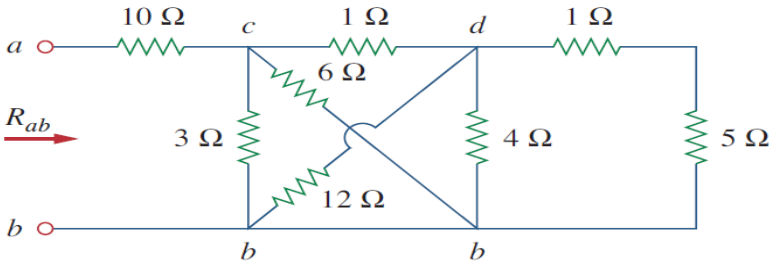
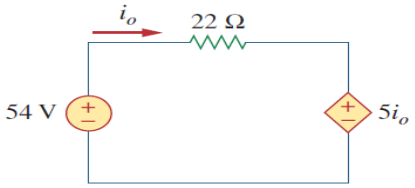
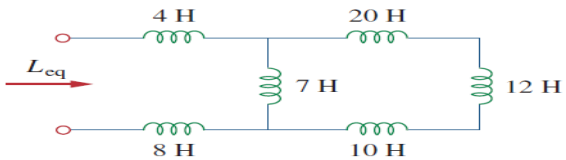
(ECE&EE-VLSI)

Time: 3 hrs Maximum: 70 Marks

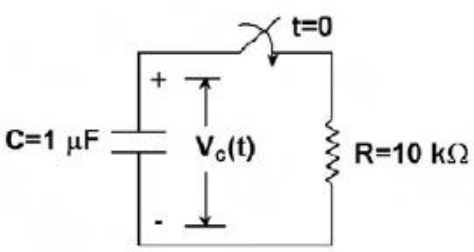
Answer ALL questions

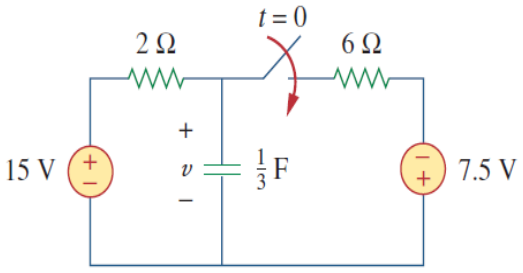
(The figures in the right-hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	For the circuit shown in figure find the value of equivalent resistance Rab. 	CO1	K3
b.	Determine i_o for the circuit given below. 	CO1	K3
c.	Explain about Tellegens's theorem with an example.	CO1	K2
d.	For the circuit shown in figure find the value of equivalent inductance L_{eq} . 	CO3	K3
e.	Define transient response with an example.	C04	K1

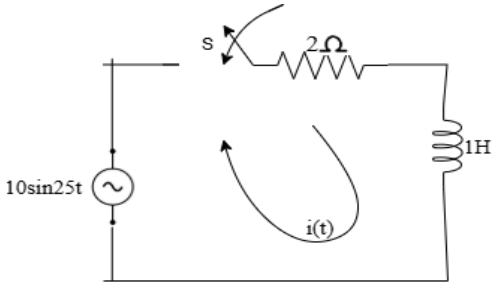
PART – B **(10 x 5 = 50 Marks)**

		Marks	CO #	Blooms Level
Answer ***ALL*** the questions				
2. a.	The capacitor shown in figure initially charged to 5V. The switch closes at time t=0 sec. Find the voltage across the capacitor at t=10msec. 	3	CO4	K3
b.	For the circuit shown in figure find $v_C(t)$ for $t \geq 0$ and $i_c(t)$ for $t \geq 0$.	7	CO4	K3

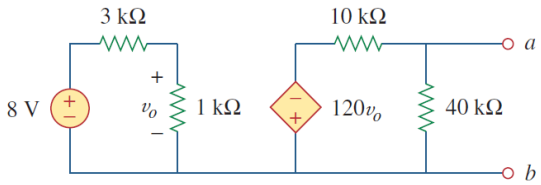


(OR)

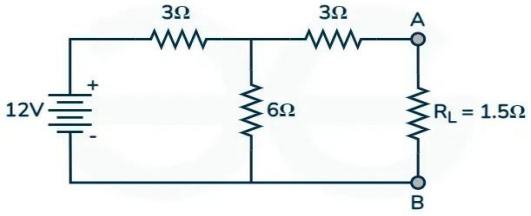
c.	Derive the expression for voltage in a RC-Series circuit with dc excitation.	5	CO4	K2
d.	The sine wave (10sin25t) V is applied to an RL circuit given below when the switch is closed at t=0. Determine the current i(t).	5	CO4	K3



3.a.	Find the maximum power that can be delivered to the load if it is connected in between terminal a and b as shown in figure.	5	CO1	K3

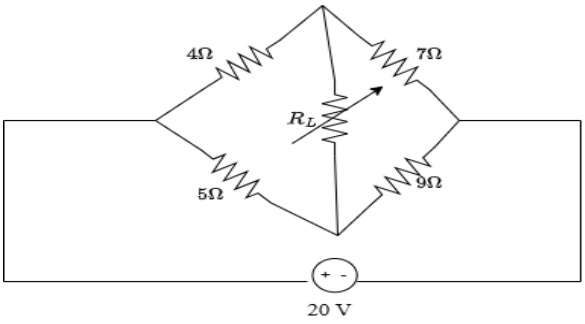


b.	Find the current flowing through R_L for the circuit given below using Nortons theorem.	5	CO1	K3

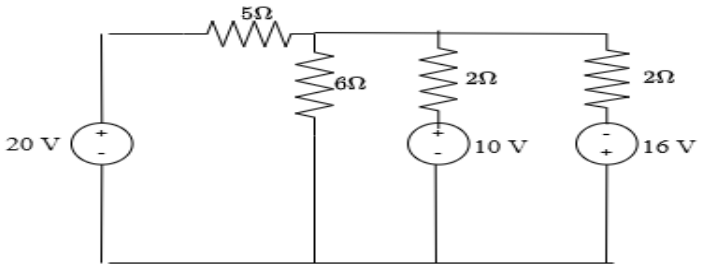


(OR)

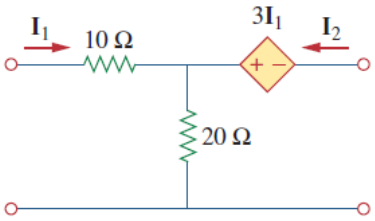
c.	For the circuit shown below find the value of R_L such that maximum power is transferred across it and also find the value of P_{Max}.	5	CO1	K3



d.	Find the current though 6**Ω** resistor using Milliman's theorem.	5	CO1	K3

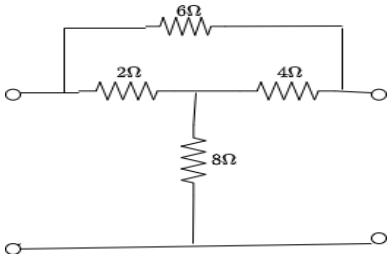


4.a.	Draw h-parameter model of a transistor including early effect and also find out h-parameters.	5	C05	K3
b.	Determine ABCD-parameters for the two-port network shown in figure.	5	CO5	K3



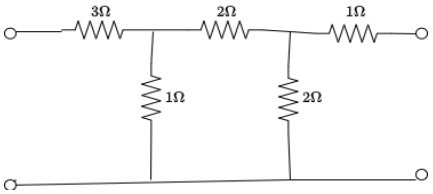
(OR)

c. For the given network, find the two port Z parameters.



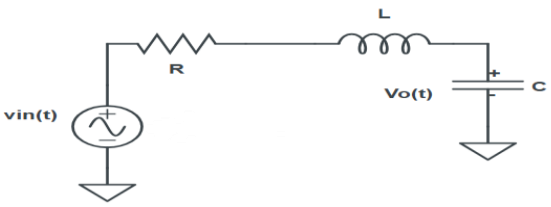
5 CO5 K3

d. For the given network, find the two port Y parameters.



5 CO5 K3

5.a. Find the transfer function of the RLC series circuit shown in figure and also find out the expressions of poles.



4 CO6 K3

b. Define pole of a transfer function. for the given transfer function $\frac{k\omega_n^2}{(s^2+2\delta\omega_n s+1)}$ draw pole zero plot for different values of damping ratio (δ) using s-plane.

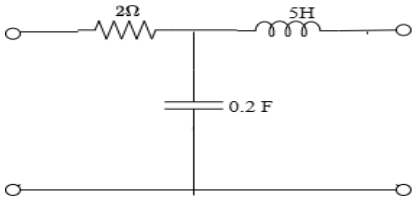
6 CO6 K3

(OR)

c. The transfer function of the system is given as, G(S)=$\frac{3(S+4)}{S(S+2)(S+8)}$. Determine the time domain behaviour from the pole-zero plot.

6 CO6 K3

d. For the given two port network, determine the open circuit voltage transformation ratio ($^{V_2}/_{V_1}$) and current transformation ratio ($^{I_2}/_{I_1}$).



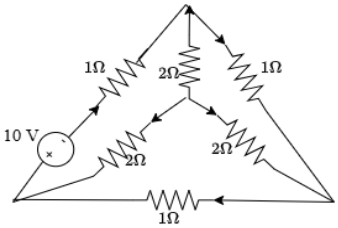
4 CO6 K3

6.a. Derive the expression of bandwidth of a series RLC circuit under Resonance and also discuss how band width depends on quality factor?

10 CO3 K2

(OR)

c. From the electrical network given, draw the graph and form the tie-set matrix.



5 CO2 K3

d. For a series RLC circuit having an inductance of 10mH and resistance of 2**Ω**, what is the value of capacitance that will produce resonance? Also find the current at resonance frequency and the maximum instantaneous energy stored in the inductor at resonance assuming the supply to be 230V at 10,000 Hz.

5 CO3 K3

--- End of Paper ---