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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 70060

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. / FEB. 2025

Second Semester

Electronics and Communication Engineering
U19EC201 - ELECTRIC CIRCUIT THEORY

(Common to BME)

(Regulation 2019)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Compare Nodal analysis with Mesh analysis.	2	K2	CO1
2.	Define: Node , Tree & branch.	2	K1	CO1
3.	Recall the statement of Norton's theorem.	2	K1	CO2
4.	What are the limitations of Reciprocity theorem?	2	K1	CO2
5.	A circuit has the resonant frequency of 80Hz and lower half-power frequency of 40Hz. Find its bandwidth.	2	K1	CO3
6.	State dot rule for coupled coils.	2	K1	CO3
7.	Define time constant of series RL and RC circuit.	2	K1	CO4
8.	In the series RLC circuit, recall the condition for critical damping?	2	K1	CO4
9.	Define driving point impedance.	2	K1	CO5
10.	The z-parameters of a two port network are $Z_{11}=40\Omega$, $Z_{22}=50\Omega$ and $Z_{12}=Z_{21}=20\Omega$. Find its equivalent T network.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

- | Q.No. | Questions | Marks | KL | CO |
|--------|--|-------|----|-----|
| 11. a) | By inspection method, interpret the mesh-current equations and also find the mesh currents for the circuit shown in Fig.1. | 13 | K3 | CO1 |

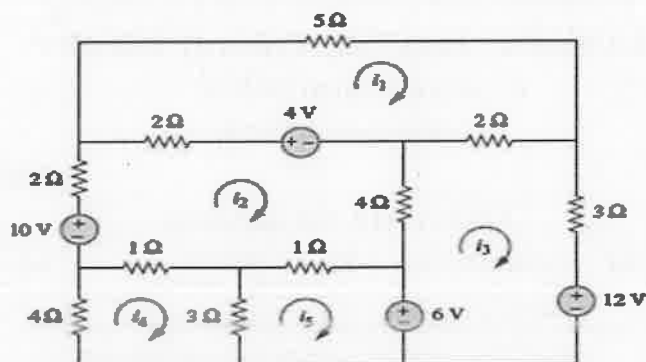


Fig.1

(OR)

- | | | | | |
|----|---|----|----|-----|
| b) | Apply Kirchoff's current law, determine nodal voltage for the circuit shown in Fig.2. | 13 | K3 | CO1 |
|----|---|----|----|-----|

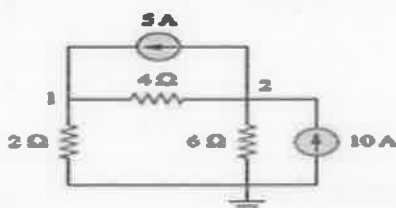


Fig.2

- | | | | | |
|--------|--|----|----|-----|
| 12. a) | Determine Thevenin equivalent of the circuit in figure 3 across the terminals a-b. | 13 | K3 | CO2 |
|--------|--|----|----|-----|

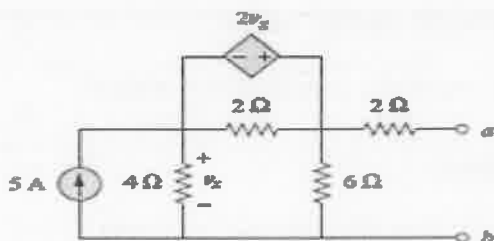


Fig.3

(OR)

- b) Make use of superposition theorem to find V in the circuit of Fig. 4. 13 K3 CO2

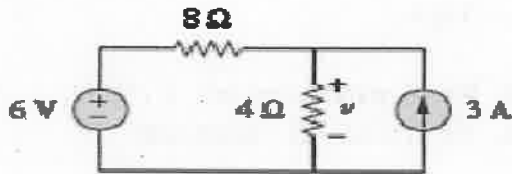


Fig.4

13. a) A series RLC series circuit consists of $R=800\Omega$, $L=80\text{mH}$ and $C=8$ pico-farad. The applied voltage across the circuit is 100V. Determine
- resonant Frequency of the circuit
 - Q-factor of the circuit at the resonant frequency
 - bandwidth of the resonant circuit
 - frequencies at which the half power points occur.

(OR)

- b) Consider the single tuned circuit shown in fig.5 and determine
- resonant frequency (f_r)
 - the output voltage at resonance
 - the maximum output voltage, Assume $R_s \gg \omega_r L_1$ and $K=0.9$

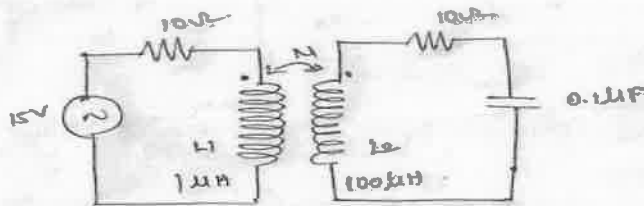


Fig.5

14. a) Derive the transient response of series RL circuit with excitation by step signal. 13 K2 CO4

(OR)

- b) In the circuit shown in Fig. 6, switch 's' is in position 1 till steady state conditions are reached and then moved to 2 at $t=0$. Find the energy dissipated in the two resistors. Show that this is equal to the energy stored in the capacitor before moving the switch. 13 K3 CO4

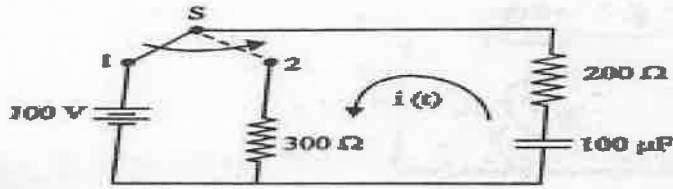


Fig.6

15. a) For a two-port network, the Z parameters are $Z_{11}=50\Omega$, $Z_{22}=30\Omega$, $Z_{12}=Z_{21}=25\Omega$. Determine its equivalent 'Y' parameters. 13 K3 CO5

(OR)

- b) Find the transmission parameters for the two-port network shown Fig.7. 13 K3 CO5

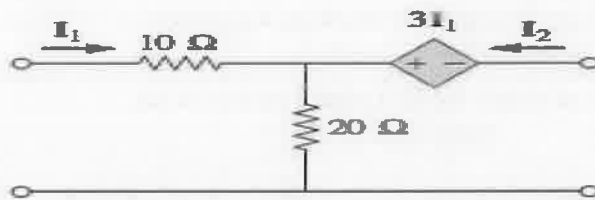


Fig.7

PART - C

(1 x 15 = 15Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	i. Illustrate maximum power transfer theorem with example.	5	K3	CO1
	ii. For the circuit shown in Fig.8 find i_1 to i_4 using mesh analysis.	10		

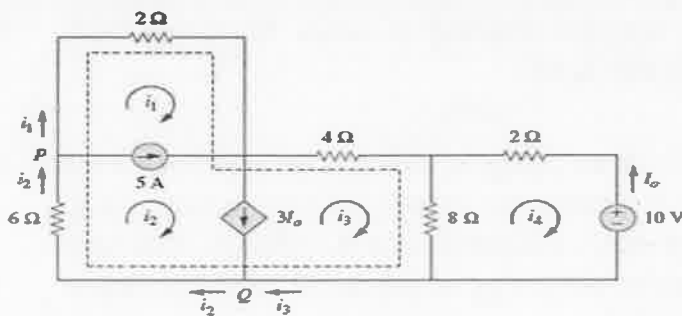


Fig.8

(OR)

- b) i. Explain voltage – current source transformation with neat circuit representation. 5 K2 CO2
- ii. Determine the current I_o in the circuit shown in Fig.9 using Norton's theorem. 10

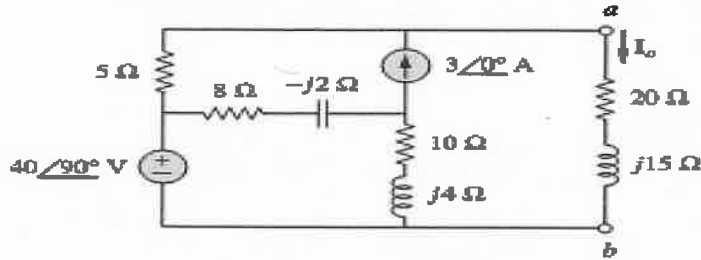


Fig.9