

Subject Code:24EE11RC03

R-24

Reg No:

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GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)

(Affiliated to Andhra University, Visakhapatnam)

I B.Tech. - II Semester Regular Examinations, June / July – 2025

ELECTRICAL CIRCUIT-1

(Common to <<branches>>)

1. All questions carry equal marks
2. Must answer all parts of the question at one place

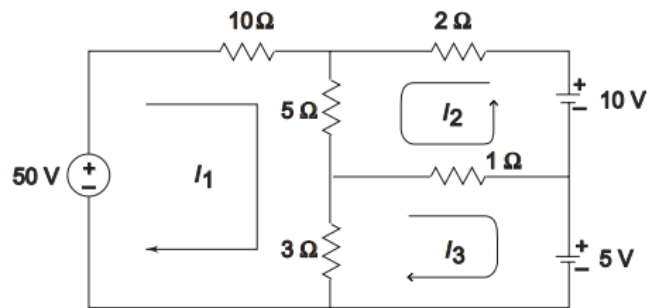
Time: 3Hrs.

Max Marks: 70

UNIT-I

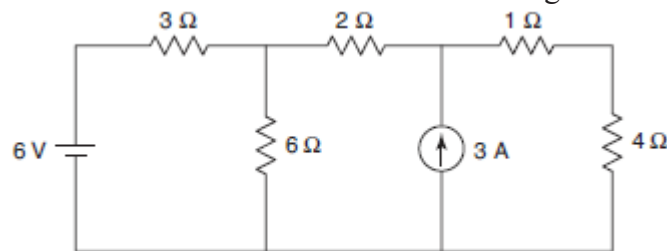
1. a Determine the mesh current I_1 in the circuit shown in Figure

[7 M]



- b Find the voltage across the 4Ω resistor shown in network of Figure

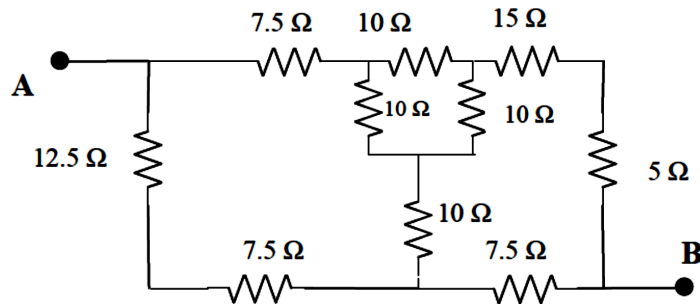
[7 M]



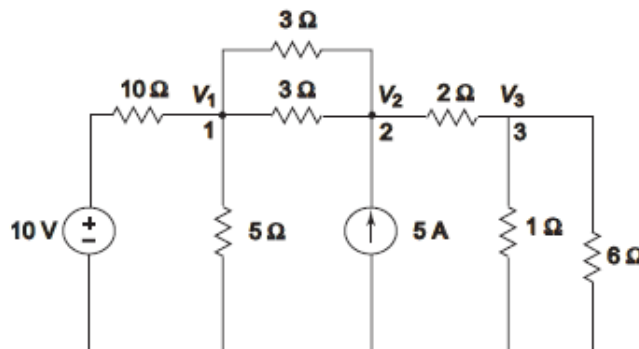
OR

- 2.a Find the equivalent resistance between the terminals A and B of the network shown in Figure by using star/delta transformation

[7 M]

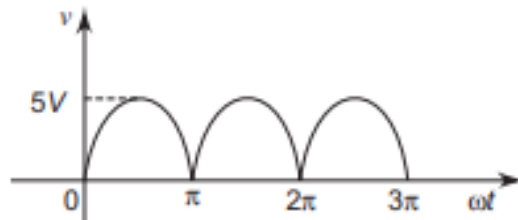


- b Determine the voltages at each node for the circuit shown in Figure [7 M]



UNIT-II

- 3.a Find the average and RMS value of the full wave rectified sine wave shown in Figure. [7 M]



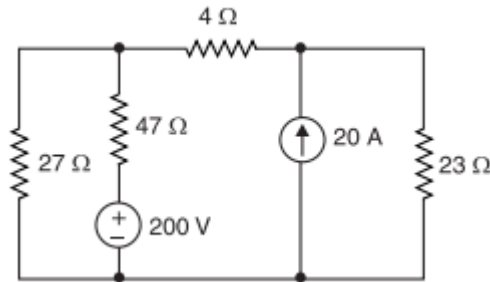
- b Two impedances $Z_1 = 30 \angle 45^\circ \Omega$ and $Z_2 = 45 \angle 30^\circ \Omega$ are connected in parallel across a single phase 230 V, 50 Hz supply. Calculate (a) Current drawn by each branch (b) total current (c) overall power factor. [7 M]

OR

- 4.a Define the terms Average Value, RMS value, Form factor and Peak factor of an AC sinusoidal signal. [7 M]
- b A connected load of $(8+j6) \Omega$ is connected to a 1-phase, 50Hz, 230V supply. Calculate [7 M]
- Current
 - Power factor
 - Reactive Power and
 - Total volt-ampere

UNIT-III

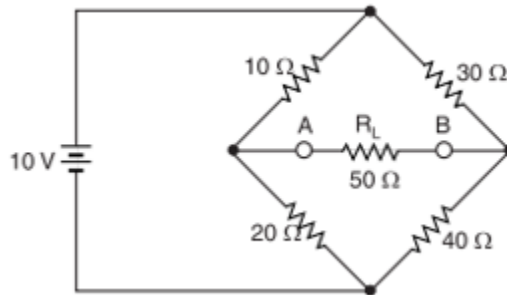
- 5.a Using superposition theorem, find the current in $23\ \Omega$ resistor in the circuit shown in Figure. [7 M]



- b Explain the compensation theorem with suitable example. [7 M]

OR

- 6.a Find the current flowing through the $50\ \Omega$ resistor using thevenin's theorem [7 M]



- b Explain the maximum power transfer theorem with suitable example [7 M]

UNIT-IV

- 7.a For a series R-L-C circuit derive resonance frequency and show that current is maximum at resonance. [7 M]

- b Show that the locus of current of a series circuit consisting of resistance and inductance with resistance varies and inductive reactance fixed, when supplied by a constant ac voltage source, lies on a circular path. [7 M]

OR

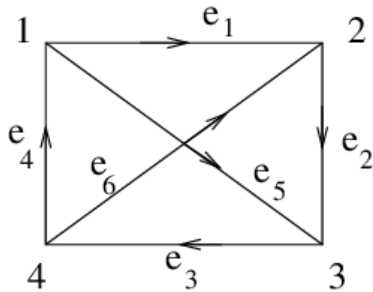
- 8.a Define the terms Resonance frequency, Bandwidth and Quality factor with reference to a series resonance circuit and write the relation among the three. [7 M]

- b Explain and draw the locus diagram of current in a series RC circuit when R is varying and C is fixed.

UNIT-V

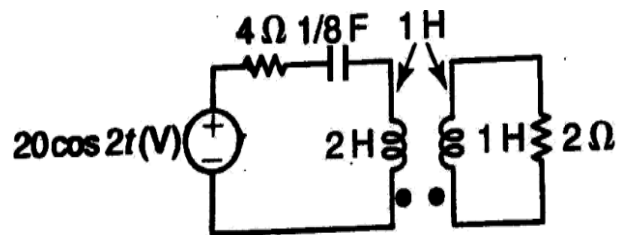
- 9.a The number of turns in two coupled coils are 600 and 1700, respectively. When a current of 6A flows in coil 2, the total flux in this coil is 0.8 mWb, and the flux linking the first coil is 0.5mWb. Calculate self-inductance of two coils (L_1 & L_2), Mutual inductance (M) and Coefficient of coupling (K). [7 M]

- b For the given network graph, write down the basic Tie-set matrix taking a tree of branches e_1, e_3, e_5 . [7 M]



OR

- 10.a Determine the coefficient of coupling and write the loop equations for the circuit shown below. [7 M]



- b The graph of a network is shown in figure. Write the Cutset matrix. Consider branches (4), (5) and (6) as tree branches. [7 M]

