R18 Regulation *Subject code: 2P3BB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech III Semester Supplementary Examinations, March/April 2023

ELECTRICAL CIRCUIT ANALYSIS

(Electrical and Electronics Engineering)

Maximum Marks: 70 Date:29.03.2023 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

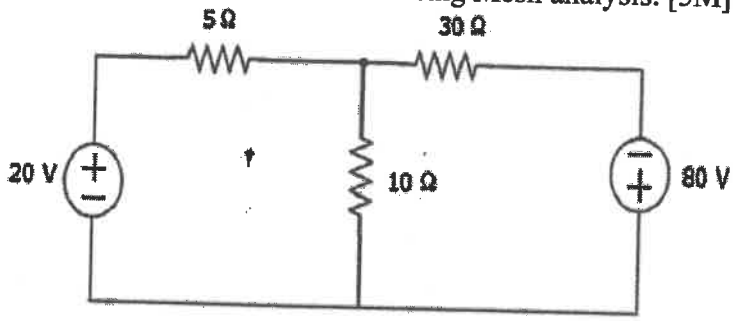
All the following questions carry equal marks (10x2M=20 Marks)

1 Discuss the ideal transformer? Write the expression for turns ratio?
2 Define tree and graph?
3 Define the time constant for series RL circuit?
4 Why transient occurs in electric circuits?
5 What is the Laplace transform of step and exponential functions?
6 Define poles and zeros in a transfer function?
7 What is a driving point in transfer function? Explain.
8 Define the h-parameters.
9 What is the significance of single tuned filters over double tuned filters?
10 Distinguish between the constant "k" and m-derived filters?

Part-B

Answer All the following questions. (5X10M=50Marks)

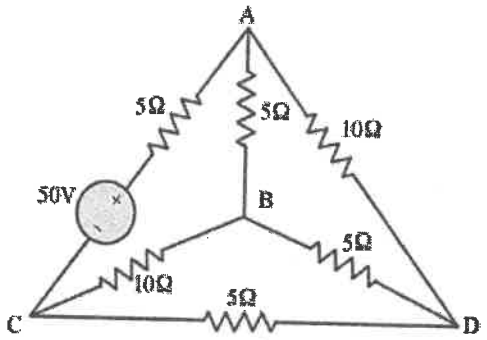
11 A. Find the voltage across 30 Ω resistor using Mesh analysis. [5M]



B. Three coils connected in series-aiding fashion have a total inductance of 250mH. When connected in series opposing configurations, the coils have a total inductance of 150mH.If the inductance of one coil (L1) is three time the other. Find L1, L2 and M? What is the coupling co-efficient? [5M]

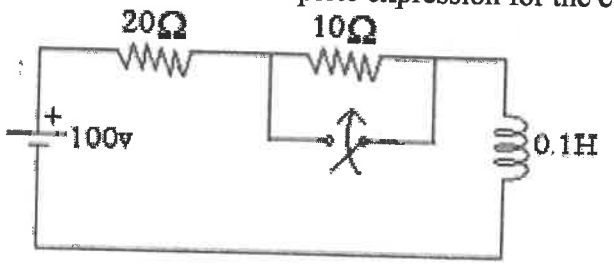
OR

12 For the network shown in Fig. write a tie-set schedule and then find all the branch currents and voltages. [10M]



13 A. Derive the expressions for the transient current of RL series circuit when excited by a dc voltage. [5M]

B. A dc voltage of 100V is applied in the circuit shown in figure below and the switch is kept open. The switch K is closed at t = 0. Find the complete expression for the current. [5M]

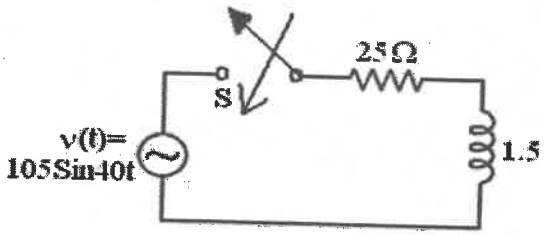


OR

14 A. Derive the expression for the transient response in an RLC series circuit excited by a DC source. [5M]

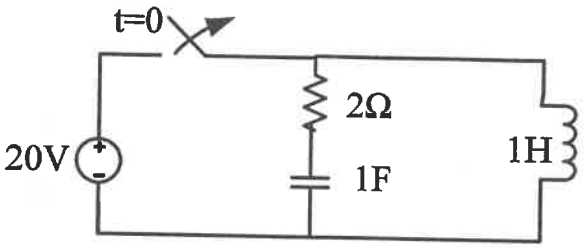
B. A constant voltage is applied to a series RL circuit at t = 0. The voltage across the inductor at t = 3.46 ms is 20 V and 5 V at t = 25 ms. Obtain R if L = 2H. [5M]

15 A sinusoidal voltage of 105 Sin(40t) is applied to a series circuit of R = 25 and L = 1.5H at t = 0 (shown in Figure), by Laplace transform method. Determine the current i(t) for all t = 0. Assume zero initial conditions. [10M]



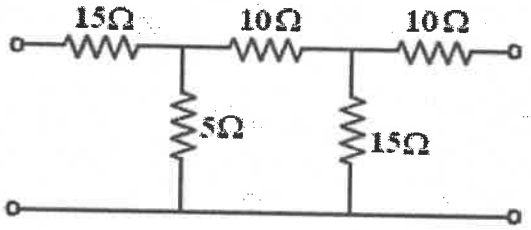
OR

16 A. For the circuit shown in Fig, determine the current delivered by the source when the switch is closed at t=0, using Laplace transformation. Assume there is no initial charge on the capacitor and no initial current though the inductor. [6M]



B. A coil of inductance 5 mH and resistance 10 Ω is connected in parallel with a 250 nF capacitor across a 50 V variable-frequency supply. Determine (a) the resonant frequency, (b) the dynamic resistance, (c) the current at resonance. [4M]

17 A. Derive the relation between ABCD and 'Z'-parameters. [5M]
B. Obtain 'Z' – parameters for the given network shown in below figure. [5M]



[5+5]

OR

18 A. A two-port network has the following parameters: Z11 = 4 Ω, Z12 = 1 Ω, Z21 = 3 Ω and Z22 = 3 Ω. Calculate short circuit parameters. [5M]
B. Explain in detail about the interconnection two-port networks? [5M]

19 A. List out the types of filters? And sketch the band pass filter? [5M]
B. Discuss in detail about the design considerations of m-derived high pass filters in both T-type and π type sections? [5M]

OR

20 A. Write a short-notes on composite filter design? [5M]
B. Discuss in detail about the design considerations of constant "k" low pass and high pass filters? [5M]