Code No: R2021023 **R20** SET - 1

II B. Tech I Semester Supplementary Examinations, July-2023
ELECTRICAL CIRCUIT ANALYSIS - II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions, each Question from each unit
All Questions carry **Equal** Marks
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UNIT-I

1 a) Derive the relation between line and phase quantities in Delta connected system and also draw its phase diagrams. [7M]

b) A balanced, 3-phase star system consists of a load of 150 kW with a leading current of 100 A. [7M]
Find the circuit constants of the load per phase when a supply of 1100 V, 50 Hz is given to the system.

OR

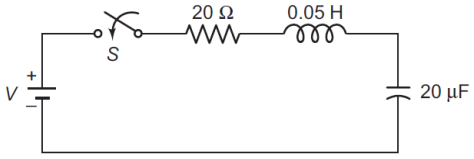
2 a) Derive the necessary expressions for unbalanced delta connected load with neat diagrams. [7M]

b) A 400-V, 50-Hz, 3-phase supply of phase sequence *ABC* is applied to a delta-connected load consisting of 100 ohms between lines *A* and *B*, 318 mH inductance between lines *B* and *C*, and 31 μ F capacitance between lines *C* and *A*. Determine phase and line currents. [7M]

UNIT-II

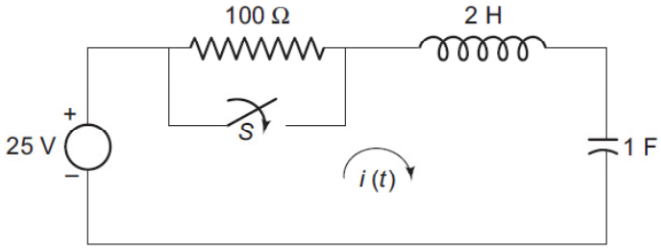
3 a) Explain the initial conditions of R, L and C elements with necessary diagrams and expressions. [7M]

b) The circuit shown in Fig. consists of resistance, inductance and capacitance in series with a 200 V constant source when the switch is closed at $t = 0$. Find the current transient. Using differential equations. [7M]



OR

4 Find the transition current $i(t)$ for the network shown in Fig. At $t = 0$, the switch is closed. Find the voltage across inductor and capacitor and also find time taken at which $V_1 = V_c$? [14M]



Using Laplace transforms

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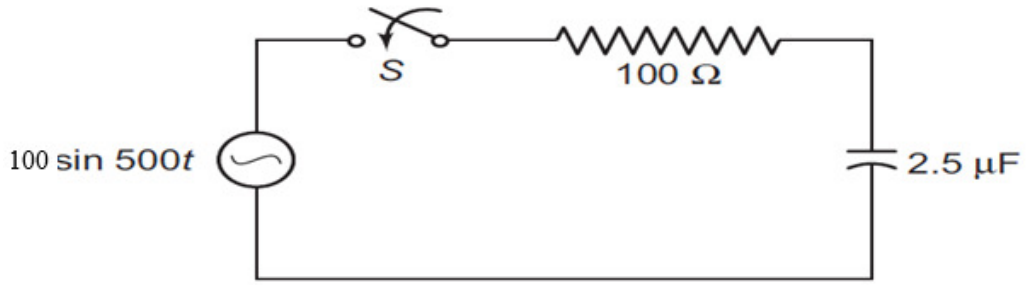
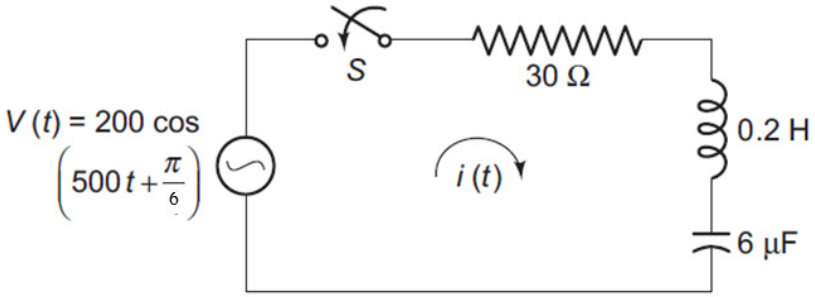
UNIT-III

5 A series *R-C* circuit with *R* = 100 ohms and C = 2.5 μF as shown in figure has a sinusoidal voltage 100 sin 500*t*. Find the current assuming that there is no initial charge on the capacitor. Using differential equations. [14M]



OR

6 In the circuit shown in figure, determine the complete solution for the current, when the switch is closed at t = 0, applied voltage is $v(t) = 200\,\mathrm{Cos}\left(500 + \frac{\pi}{6}\right)$, resistance R =30 ohms, Inductance L = 0.2 H and Capacitance C = 6μF. [14M]

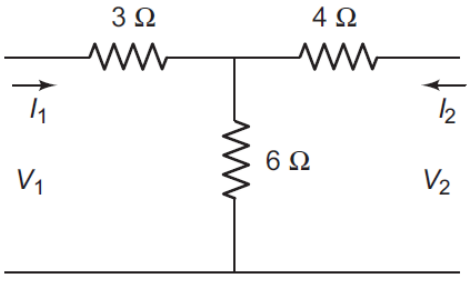


Using Laplace transforms

UNIT-IV

7 a Obtain relationships between Y -parameters interms of Z- parameters. [7M]

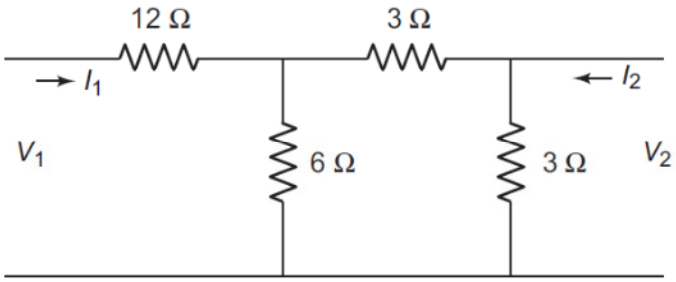
b Determine the transmission parameters of the network shown in figure. [7M]



OR

8 a) Verify the condition for reciprocity and symmetry of Y-parameters. [7M]

b) Determine the h- parameters of the network shown in figure [7M]



UNIT-V

9 a) Explain the need of filters. [7M]

b) Design an *m*-derived low-pass filter having cut-off frequency of 1 kHz, resonant frequency 1500 Hz, and design impedance 750 ohms. [7M]

OR

10 a) Describe band elimination filter with necessary diagrams and expressions. [7M]

b) Draw the circuit diagram of series RL circuit that acts as a high pass filter. (i) Write an expression for the circuit transfer function and (ii) find the value of R and L that will yield a high pass filter with a cutoff frequency of 10 kHz. [7M]