Code No: **20EE3T02** **R20**

II B. TECH I SEMESTER REGULAR EXAMINATIONS, MARCH - 2022
ELECTRICAL CIRCUIT ANALYSIS
(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours **Max. Marks: 70**

Note: Answer **ONE** question from each unit **(5 × 14 = 70 Marks)**

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UNIT-I

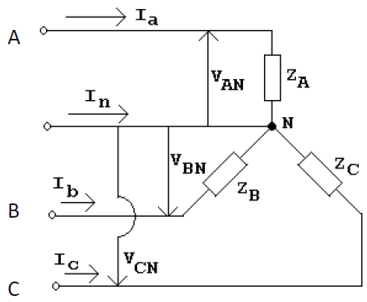
1. a) Draw phasor diagram of currents for a balanced delta-connected supply system and establish relation between line currents and phase currents. [7M]

   b) A balanced three phase load of 20+j10 Ω per phase is connected in delta across 440V, 3 phase supply. Determine line currents, phase currents & Total active power. Also draw the phasor diagram. [7M]

(OR)

2. a) Draw phasor diagram of currents for a balanced star-connected supply system and establish relation between line currents and phase currents. [7M]

   b) The unbalanced star connected load shown in figure has balanced voltages of 100 V with ABC sequence. Calculate the line currents and neutral currents. Take $Z_A = 15\Omega$, $Z_B = (10 + j5)\Omega$, $Z_C = (6-j8)\Omega$. [7M]



UNIT-II

3. a) Discuss the transient analysis of RLC series circuit excited by DC voltage. [7M]

   b) In a series RLC circuit L=0.3 H, and C=4 F. A DC voltage of 50 V is applied at t=0. Obtain an expression for current *i* (t) in the circuit, when (i) R= 5 ohms (ii) R= 6 ohms [7M]

(OR)

4. a) Explain the geometrical interpretation of initial conditions and their derivatives [7M]

   b) In a series RLC circuit, R=6 ohms, L=2 H, C=2 F. A DC voltage of 50 V is applied at t=0. Obtain the expression for *i(t)* using differential equation approach. [7M]

UNIT-III

5. a) Derive the expression for transient response in series R-L-C circuit for AC excitation. Obtain the solution using Laplace transforms. [6M]

   b) A series RL circuit in which R = 50 ohm and L = 0.2H has a sinusoidal voltage as source V = 150 sin (500t + Φ) volts applied at a time when Φ = 0. Find the complete current. [8M]
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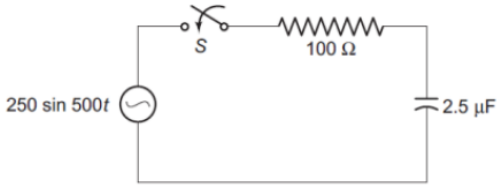
(OR)

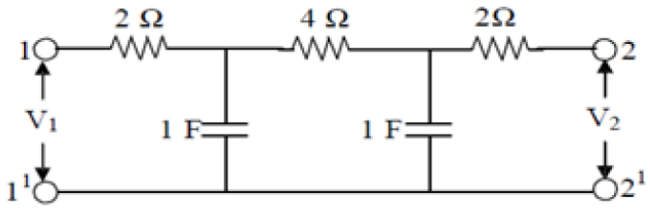
6. a) Distinguish between classical and Laplace transform method of solution of a network [5M]

   b) A series *R*–*C* circuit with *R* = 100 ohms and C = 2.5 μF as shown in below Figure, has a sinusoidal voltage 250 sin 500*t*. Find the current using Laplace transforms assuming that there is no initial charge on the capacitor. [9M]



UNIT-IV

7. a) Derive ABCD Parameters for the network shown in figure as a cascade connection of two identical networks [7M]

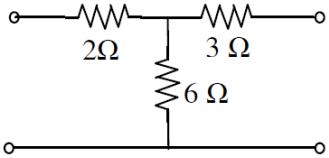


   b) Derive the condition of symmetry and reciprocity for ABCD parameters of given two port network [7M]

(OR)

8. a) Express hybrid parameters as a function of transmission parameters. [7M]

   b) Find the hybrid parameters of the network shown in Figure. [7M]



UNIT-V

9. a) Obtain the Cauer form I realization of F(S)=2(S+1)(S+3)/S(S+2) [7M]

   b) State and explain the properties of L-C immittance functions, deriving necessary expressions. [7M]

(OR)

10. a) Determine the Foster I form of realization of the RC impedance function. [7M]

$$Z(s) = \frac{(S+1)(S+3)}{S(S+2)(S+4)}$$

   b) Diagnose whether the following impedance function represents a RL or RC network and find its Cauer form. [7M]

$$Z(s) = \frac{(s+4)(s+6)}{(s+3)(s+5)}$$

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