Code No: **R201213** **R20** **SET - 1**

I B. Tech II Semester Supplementary Examinations, January/February - 2023

NETWORK ANALYSIS

(Common to ECE, EIE, ECT)

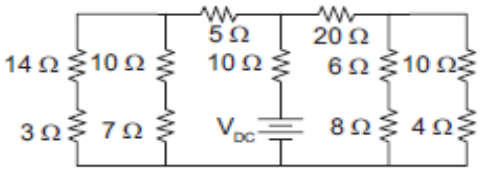
Time: 3 hours Max. Marks: 70

Answer any FIVE Questions ONE Question from Each Unit
All Questions Carry Equal Marks

~~~~~~

UNIT-I

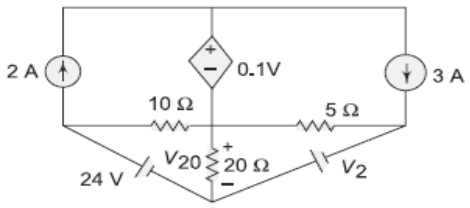
1 The power dissipated in the 4Ω resistor is 1W for the following circuit. Find the power dissipated in the 3Ω resistor, power delivered by the DC source and the value of source voltage. [14M]



(OR)

2 a) Explain the following terms w.r.t network topology: [7M]
i) Tree and Co-Tree ii) Twigs and Links iii) Incidence matrix and its properties.

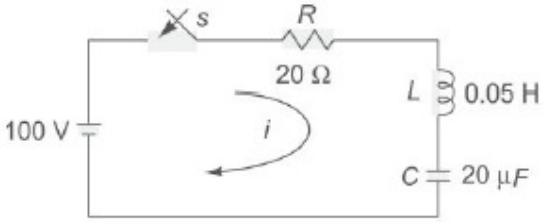
b) For the following circuit, find the value of V_2 that will cause the voltage across 20 Ω to be zero by using mesh analysis [7M]



UNIT-II

3 a) Explain about steady state and transient response of the circuit. [7M]

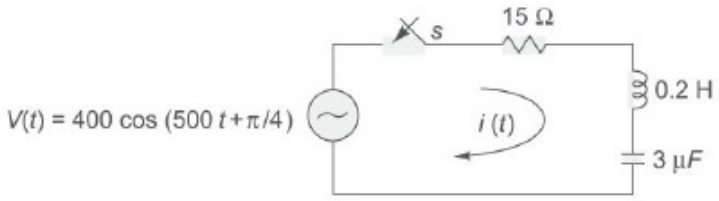
b) The circuit shown in the figure below consists of resistance, inductance, and capacitance in series with a 100 V constant source when the switch is closed at t = 0. Find the current transient. [7M]



(OR)

|'''|'|'|''|''||'|||
~~~~~~

4 For the circuit shown below determine the complete solution for the current, when the switch is closed at t = 0. [14M]



UNIT-III

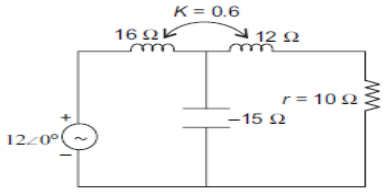
5 a) Explain the following terminologies w.r.t alternating quantities: [7M]
i)Time period and Frequency ii) Phase difference
iii)Average Value and RMS value iv) Form factor and Peak factor

b) A series circuit consisting of a 25 Ω resistor, 64 mH inductor and an 80 μF capacitor is connected to a 110-V, 50-Hz single-phase supply. Calculate the current and voltage across each element and the overall power factor of the circuit. [7M]

(OR)

6 a) If the two coils of self-inductances L_1 and L_2 are connected in series opposing connection with a mutual inductance M then prove that the total inductance is equal to $L_{eqv} = (L_1 + L_2 - 2M)$. [7M]

b) Find the voltage drop across the resistance 'r' for the network shown below: [7M]



UNIT-IV

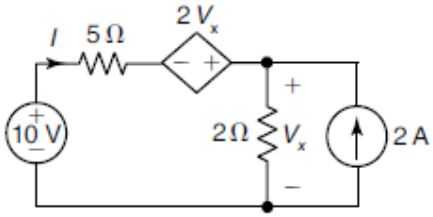
7 a) Compare the properties of series and parallel resonance. [4M]

b) Explain why the shape of a resonance curve depends on Q of the coil. [3M]

c) A series RLC circuit consists of a resistance of 1 kΩ, an inductance of 10 mH and a capacitance of 100 μF. For a supply voltage of 120 V, determine the following: [7M]
(i) resonant frequency, (ii) maximum current in the circuit,
(iii) Q factor of the circuit and (iv) half-power frequencies.

(OR)

8 Find the current I in the following circuit using Superposition theorem: [14M]



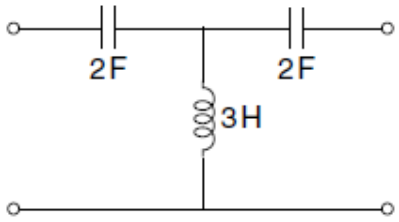
|'''|'|'|''|''||'|||

Code No: **R201213** **R20** **SET - 1**

UNIT-V

9 a) Establish relationship between impedance and admittance matrix of a two-port network with required explanation. [7M]

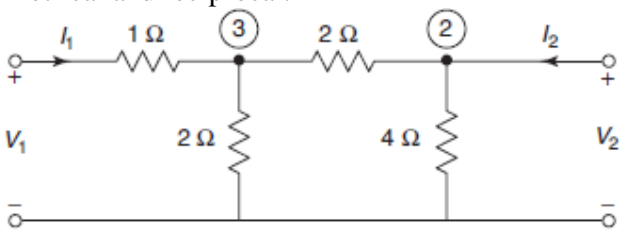
b) For the given circuit, find A, B, C and D parameters. [7M]



(OR)

10 a) Explain the conditions that need to be satisfied for making the 2 two port networks to be connected in series and parallel. [7M]

b) Determine Y - parameters for the network shown and also find whether the network is symmetrical and reciprocal. [7M]



*****

|'''|'|'|''|''||'|||