Code: 15A02201 **R15**

B.Tech I Year II Semester (R15) Supplementary Examinations December 2016

ELECTRICAL CIRCUITS - I

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

PART - A

(Compulsory Question)

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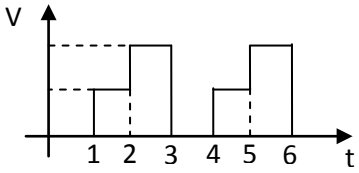
1 Answer the following: (10 X 02 = 20 Marks)

(a) Distinguish between dependent and independent energy sources.

(b) A battery has an internal resistance of 0.5 ohms and open circuit voltage of 12 V. What is the power loss within the battery and the terminal voltage on full load if a resistance of 3 ohms is connected across the terminals of the battery?

(c) Write down the values of average value, R.M.S value, form factor and peak factor of a sinusoidal wave whose frequency is 50 Hz.

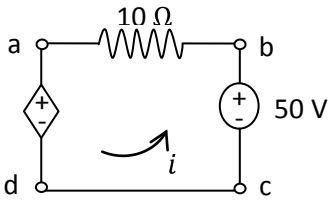
(d) Find the RMS and average values of the waveform shown below.



(e) A resonating series circuit has 10 Ω resistance. If the supply is 10 V, obtain the power at half power frequency.

(f) Define Q factor of parallel resonating circuit.

(g) In the figure shown below find i by KVL. Assume $v_2 = 10$ in the dependent voltage source.



(h) In a two port network, what are called input and output driving point admittances?

(i) Write down the Z parameters in terms of ABCD parameters.

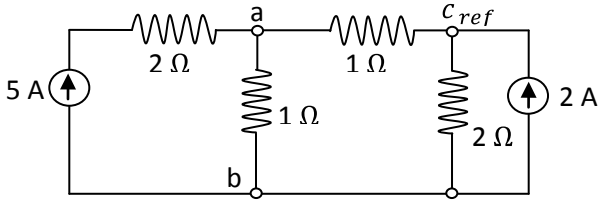
(j) Represent a Two Port Network in T and π sections.

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

2 Using node analysis, find the current flowing through the resistors.



OR

3 A mild steel ring of circumference 50 cm and cross sectional area of 5 cm^2 has a coil of 250 turns wound around it. Calculate: (a) The reluctance. (b) The current required to produce a flux of 700 mWb. The relative permeability μ_r = 380

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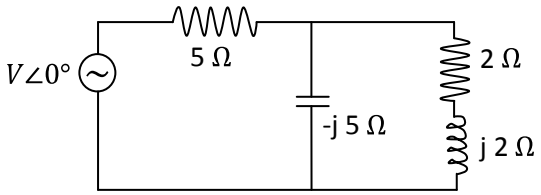
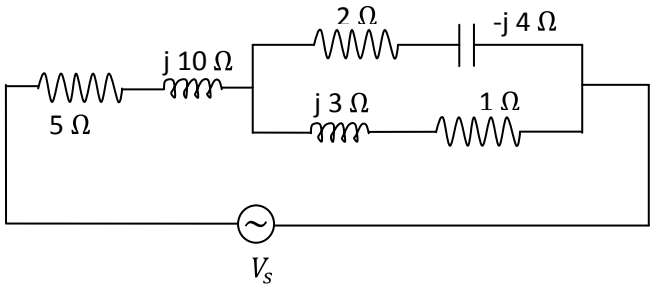
UNIT - II

4 Determine the value of the voltage source and power factor in the given network if it delivers a power of 100 W to the circuit shown below. Find also the reactive power drawn from the source.



OR

5 In the circuit shown below, determine the equivalent impedance.

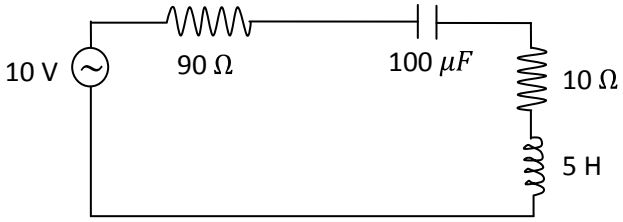


UNIT - III

6 Derive the circle equation for an RL circuit and draw the locus diagram.

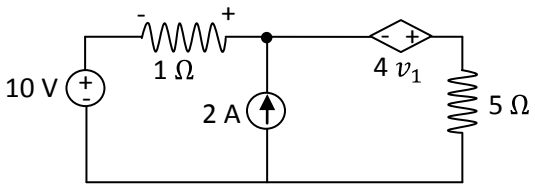
OR

7 For the given circuit, determine the value of Q at resonance and bandwidth.



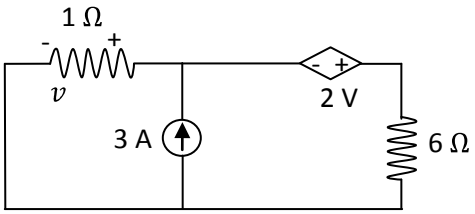
UNIT - IV

8 Find the power loss in 5 Ω resistor by superposition theorem.



OR

9 Find the current in the 6 Ω resistor in the figure below, using Thevenin's theorem. Verify the result using Norton's theorem.



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UNIT - V

10 The following readings are obtained experimentally for an unknown two-port network.

	V_1	V_2	I_1	I_2
Output open	100 V	60 V	10 A	0
Input open	30 V	40 V	0	3 A

Compute the Z parameters.

OR

11 On short circuit test, the currents and voltages were determined experimentally for an unknown two port network as;

$$\left.\begin{aligned} I_1 &= 1\ mA \\ I_2 &= -0.5\ mA \\ V_1 &= 25\ V \end{aligned}\right\}_{at\ V_2=0} \qquad \left.\begin{aligned} I_1 &= -1\ mA \\ I_2 &= -10\ mA \\ V_2 &= 50\ V \end{aligned}\right\}_{at\ V_1=0}$$

Determine the Y parameters and draw the y parameter model.

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