**CODE: 17CA02201**

B. Tech I Year II Semester (R17) Supplementary Examinations, July/August - 2018

# ELECTRICAL CIRCUITS – I

(EEE)

Time: 3 hours Max Marks: 70

## PART – A

**1.** Answer any **TEN** questions (10 x 2 = 20 Marks)

(a) A 100W, 110V and a 50W, 110V lamps are connected in series across 220V DC source. If the resistance of the two lamps are assumed to remain constant, find the voltage across 100W lamp.

(b) State Kirchhoff's voltage law

(c) In a given R-L series circuit, given, R=3.5Ω and L=0.1H. Find the impedance if supply frequency is 50Hz.

(d) A series LC circuit has L=0.1μH, C= 2500μF. Find the resonant frequency.

(e) State Thevenin's theorem.

(f) A coil takes 5A, when connected to 100V ac supply and consumes 250W. Determine the power factor.

(g) State maximum power transfer theorem.

(h) Define form factor and write its value for a sine wave.

(i) Define Ohm's law. Mention its disadvantages.

(j) An AC voltage is expressed as e = 300 sin 314t. Find peak voltage and frequency.

(k) Define quality factor and magnification factor.

(l) Define tie set and cut set matrices.

## PART - B

Answer all **FIVE** units (5 x 10 = 50 Marks)

### UNIT-I

**2.** (a) The total current drawn by a circuit consisting of 3 resistors, connected in parallel, is 12A. The voltage drop across the first resistor is 12V, the value of second resistor is 3 ohm and the power dissipation of the third resistor is 24W. What are the resistances of first and third resistances?

(b) Three resistances r, 2r and 3r are connected in delta. Determine the resistance for an equivalent star connection.

OR

**3.** (a) A star network in which N is star point made up as follows. AN=70Ω, BN=100Ω, CN=90Ω. Find an equivalent delta network.

(b) Explain dependent and independent sources.

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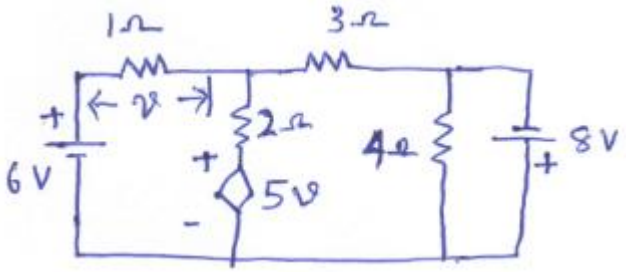
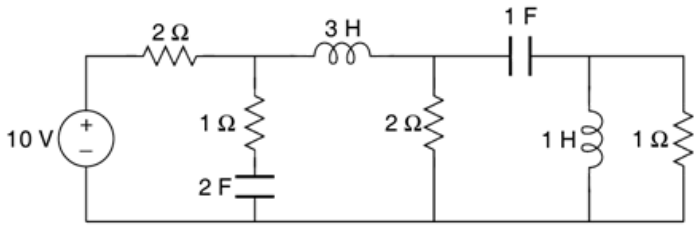
## UNIT-II

**4.** Find the voltage across 1Ω resistor and current through 2Ω resistor for the circuit shown in Fig. using nodal method.




OR

**5.** (a) Find the dual of the network given in Fig.




(b) Explain super mesh analysis with a suitable example.

## UNIT-III

**6.** (a) Two impedances (6+j4) and (3+j5) are connected in parallel across a 230V, 50Hz supply. Calculate the branch currents, total current drawn from the supply, power factor and the total power consumed.

(b) Explain real, reactive and complex power.

OR

**7.** (a) Define RMS and average value of alternating quantities, and derive the form factor of a sinusoidal waveform.

(b) A coil having resistance of 5Ω and inductance of 30mH is connected in series with a capacitor of 150 μF across a 230V, 50Hz supply. Calculate the current and power factor of the circuit.

## UNIT-IV

**8.** (a) Explain the current locus of an RL series circuit.

(b) A 20 ohm resistor is connected in series with another coil of inductance L and resistance R , a capacitor and an ammeter across a 25V variable frequency supply. When the frequency is 400 Hz, The current is at its maximum value of 0.5 A and the potential difference between capacitor is 150V. Calculate the capacitance of the capacitor.

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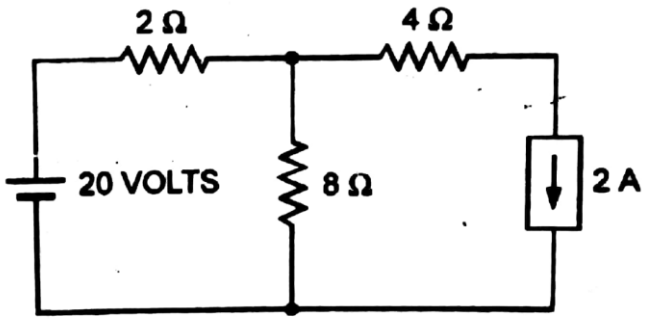
OR

**9.** (a) Compare series and parallel resonance.

(b) Explain the current locus of an RC series circuit.

**UNIT-V**

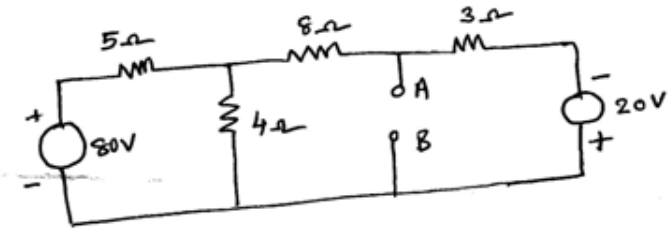
**10.** (a) Calculate the current in 8 ohm resistor using super position theorem for the network shown in fig.




(b) State and explain maximum power transfer theorem.

OR

**11** (a) Verify the Thevenin's theorem for the network shown in fig




(b) Explain the application of Millman's theorem.

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