**CODE: 17CA02201**

B. Tech I Year II Semester (R17) Regular Examinations, May/June - 2018

# ELECTRICAL CIRCUITS-I

## (EEE)

Time: 3 hours Max Marks: 70

### PART – A

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

(a) Three resistors are connected in series across a 12V battery. The first resistor has the value of 1Ω, second has a voltage drop of 4V, and third has a power dissipation of 12W. Find two possible values of circuit current.

(b) State Kirchhoff's current law

(c) In a given R-L series circuit, given, R=80Ω and L=41.3mH, and C= 0.797μF. Find the impedance if supply frequency is 1000Hz.

(d) A series RLC circuit has R=20Ω, L=0.2H, C= 150μF. Find the resonant frequency for 50Hz supply. Find the power factor at resonance.

(e) State Norton's theorem.

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

(g) State super position theorem.

(h) Define power factor and write its value for a resistive load.

(i) Explain the source transformation..

(j) An AC voltage is expressed as e = 200 sin (628t + 600). Find peak voltage, rms value and frequency.

(k) Explain star delta conversion equation.

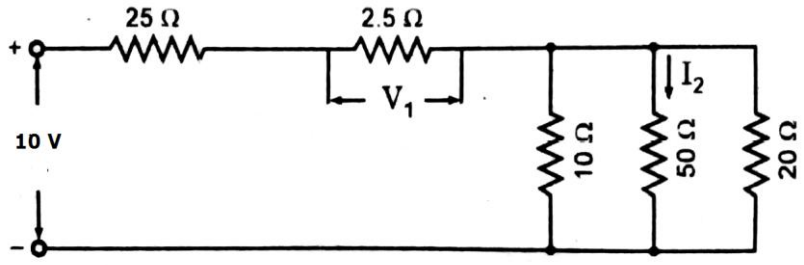
(i) Explain tie set and cut set matrices.

### PART - B

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

**UNIT-I**

**2.** (a) For the total circuit shown find $V_1$ and $I_2$ using series parallel combination.




(b) Explain the voltage and current relationship of R, L and C.

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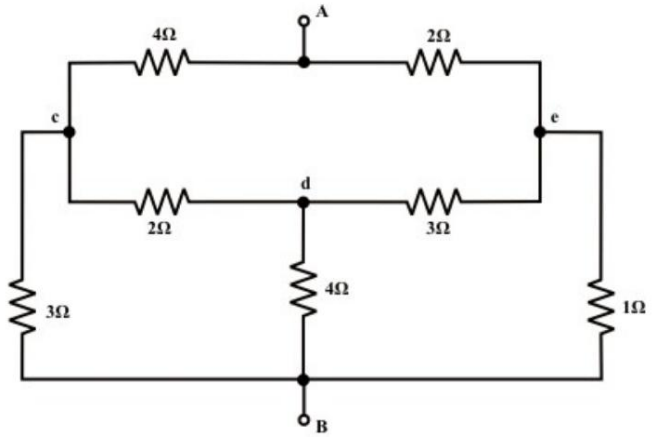
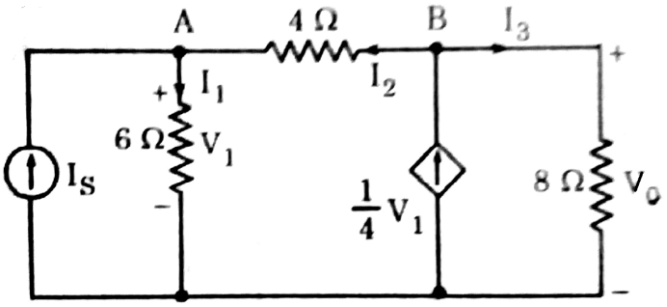
OR

**3.** Determine the equivalent resistance between points A and B for the circuit shown using suitable transformations




**UNIT-II**

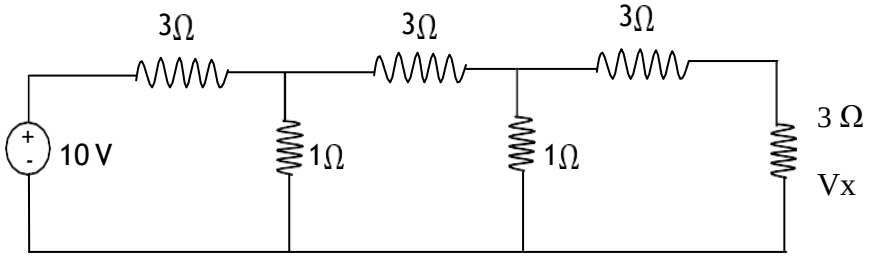
**4.** (a) Using Kirchhoff's current law, find the value of $I_S$ in the circuit shown in fig. Take V0=16V.




(b) Explain the concept of dual circuits with a suitable example.

OR

**5.** Find the voltage Vx using nodal analysis for the network given in Fig.




**UNIT-III**

**6.** (a) A resistance of 24Ω, a capacitor of 150μF and an inductor of 0.16H are connected in series with each other. A supply of 240V, 50Hz is applied to the ends. Calculate i) the current in the circuit ii) the potential difference across each element iii) the frequency to which the supply would need to be changed so that the current would be at unity power factor and iv) find the current at this frequency.

(b) Compare real, reactive and complex power with their units.

Continued in page 3

OR

**7.** (a) A choke coil having a resistance of 10Ω and inductance of 0.05 H is connected in series with condenser of 100μF.The whole circuit has been connected to 200V, 50Hz supply. Calculate (i) impedance (ii) current, (iii) power factor (iv) power input (v) apparent and reactive power of the circuit.

(b) Explain RMS, average and peak values if ac quantities.

**UNIT-IV**

**8.** (a) Explain the current loci of an RL and RC series circuit

(b) An inductive circuit of resistance 2Ω and inductance 0.014H is connected to a 250V, 50Hz supply. Which capacitance if placed in parallel will produce resonance?

OR

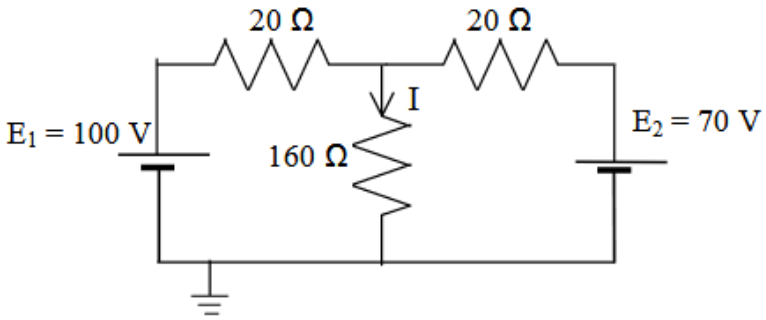
**9.** (a) Compare the impedance, current, power factor, resonant frequency and band width of series and parallel resonances

(b) Explain the quality factor (Q) and magnification factor for anti resonance and tank circuits.

**UNIT-V**

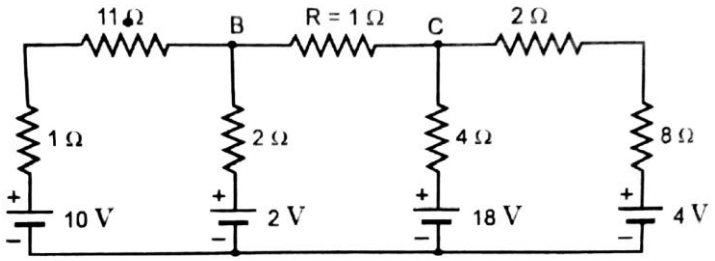
**10.** (a) State and explain super position theorem with any example.

(b) Find I using Millman's theorem for the network shown




OR

**11** State Thevenin's theorem. Obtain Thevenin's equivalent circuit for the network and and find current through R shown, at terminals BC of fig.

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