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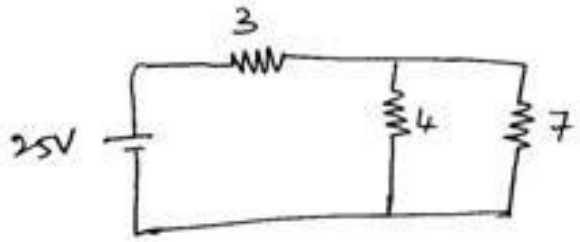
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

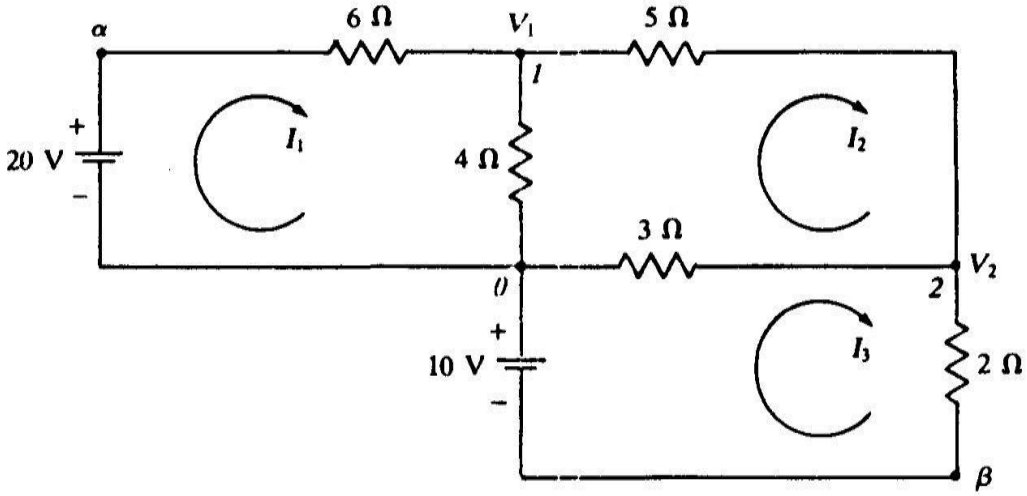
QUESTION BANK

UNIT-I

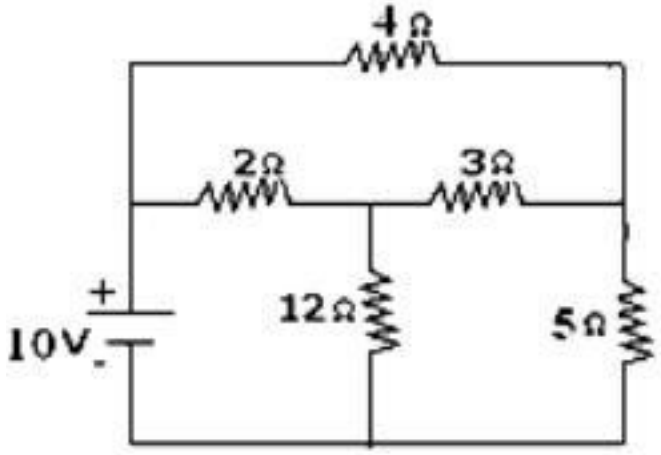
1. a) State and explain Kirchhoff's laws.
   b) For the circuit as shown in following figure, calculate the current in the various branches? (All resistances are in ohms).



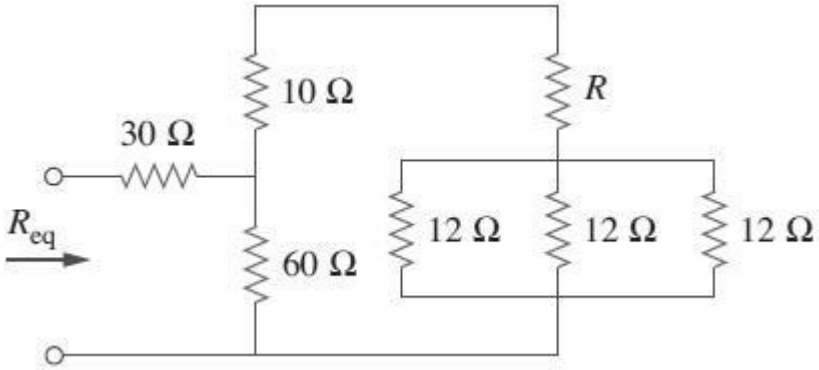
2.a) Explain about different types of sources.
   b) Find the value of current I_1, I_2 and I_3 from the circuit given below figure



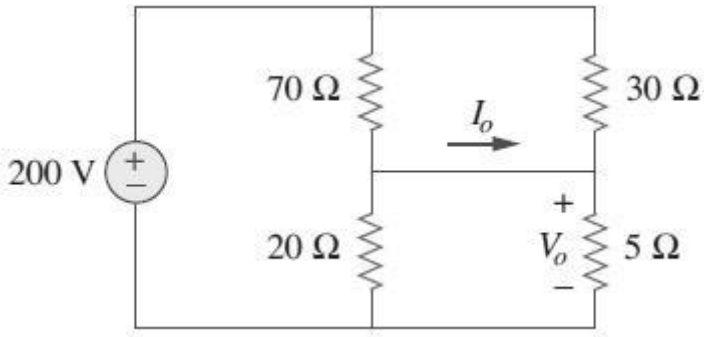
3.Find the current supplied by 10V battery for the following network shown in figure.



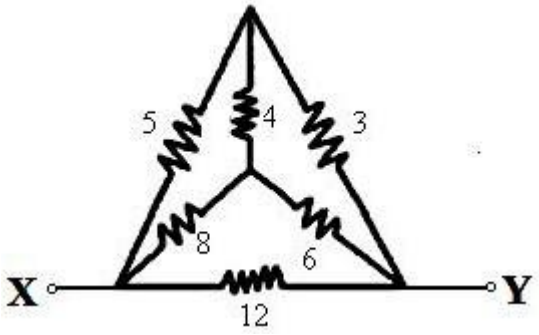
4.a) If Req=50 ohm, in the circuit shown in figure 3 find R?



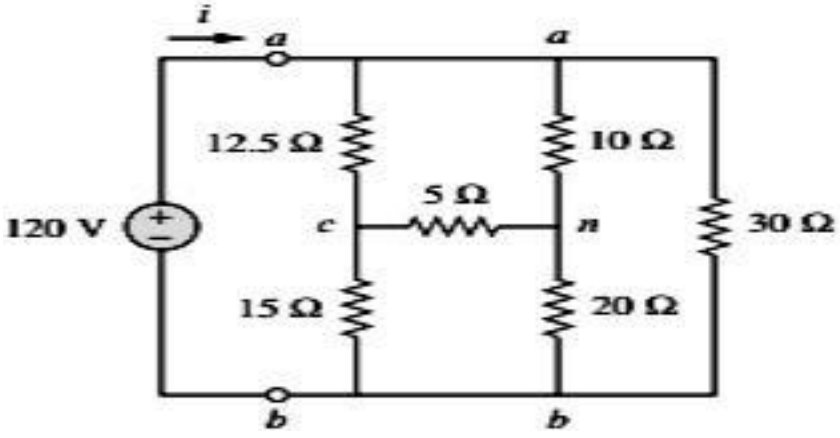
b) Calculate V_o and I_o in the circuit shown in figure



5.Find the equivalent resistance across X, Y terminals of figure below.

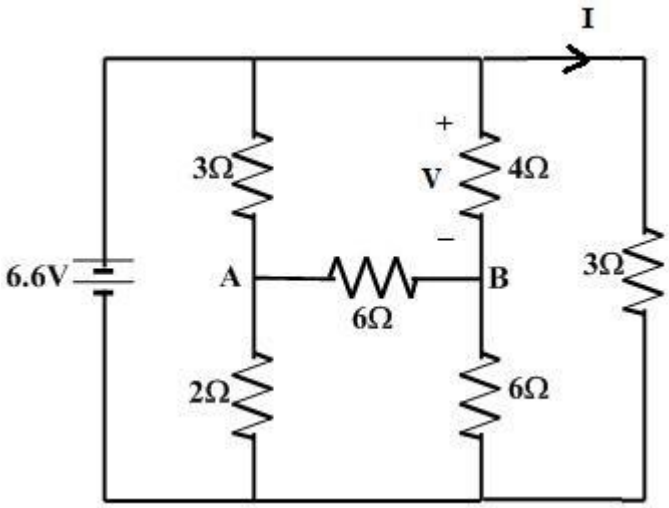


6. Obtain the equivalent resistance for the circuit in figure 1 and u



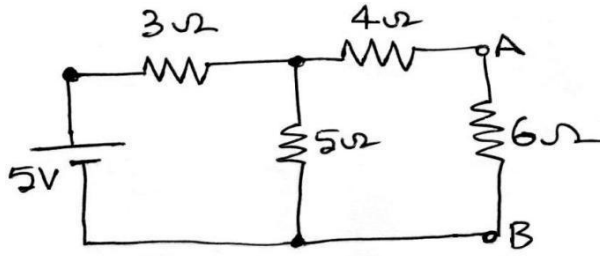
7. Three equal resistors each of R ohms are connected in delta. Derive the value of resistors in equivalent star.

8. Using Mesh analysis, find V and I in the circuit below figure

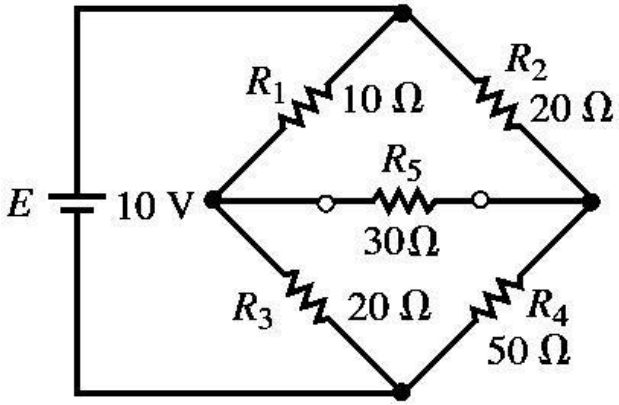


UNIT-II

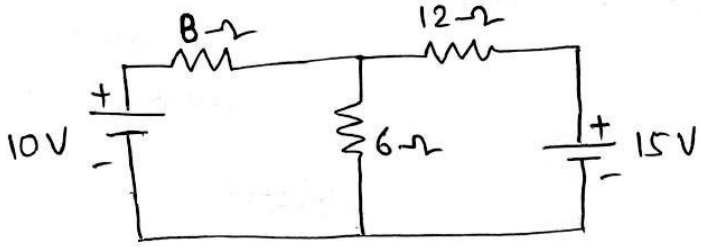
1. a) State and explain Thevenin's theorem.
   b) By using Thevenin's theorem shown in figure, find the current in 6Ω resistor.



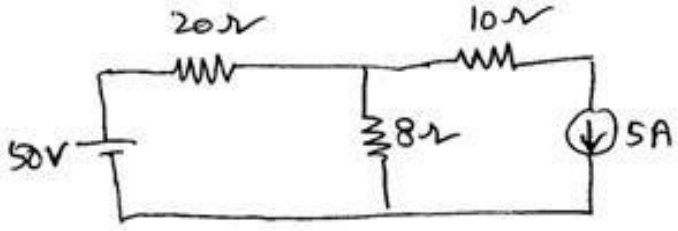
2. Using Thevenin's theorem find current passing through R_5 resistor for the circuit shown



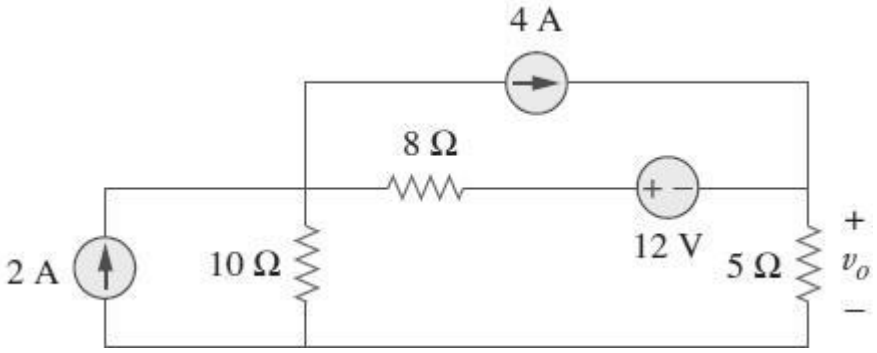
3. a) State and Explain Superposition theorem.
   b) Using superposition theorem, determine the current through 12 ohm resistor shown in following figure.



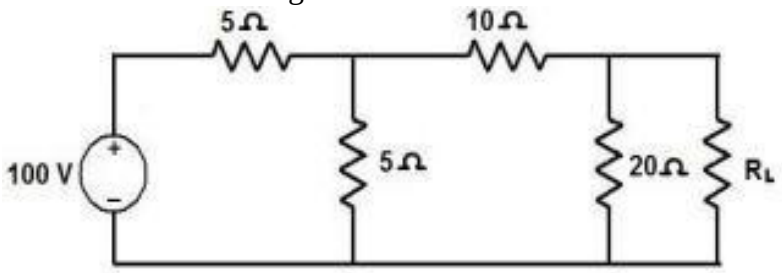
4. a) Using superposition theorem, find the current through the 8 Ω resistor, as shown in below figure .



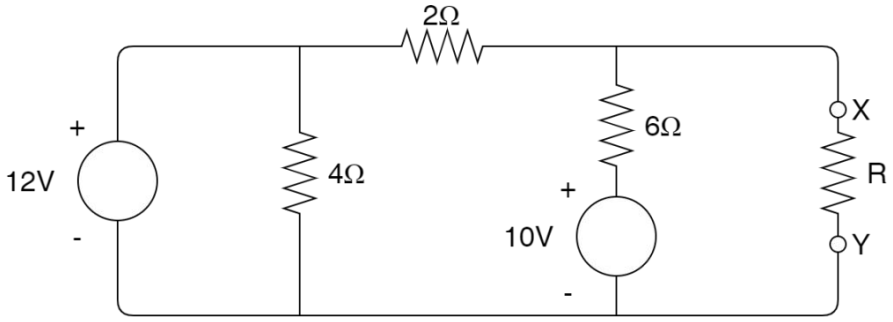
b) Find v_o using superposition theorem in the circuit shown in figure below.



5. Find the value of R_L so that maximum power is delivered to the load resistance and also find the maximum power delivered for the figure shown below.



6. Find the value of R so that maximum power is delivered to the load resistance and also find the maximum power delivered for the figure shown below.



7. Define the following terms:
   i) Cycle
   ii) Frequency
   iii) Time period
   iv) Amplitude
   v) Peak factor
   vi) Form factor of an alternating quantity.

8. Define RMS value and Average value of an alternating quantity. Determine these values for a half wave rectified sine wave.

UNIT-III

1. a) Derive an emf equation of a single-phase transformer.
   b) A 30 KVA single phase transformer has 500 turns on primary and 60 turns on secondary winding. The primary is connected to 300 volt, 50Hz supply. Find the full load primary and secondary currents, secondary emf and the maximum flux in the core. Neglect leakage drop and no-load current.

2. a) How a single phase transformer works? Explain.
   b) A 2200/220 V, 50Hz single phase transformer has emf per turn of approximately 10 V. Caluculate a) the number of primary and secondary turns b) the cross-sectional area of the core if the maximum flux density is limited to 1.5 T.

3. a) Explain working Principle and operation of DC motor.
   b) Derive the Torque equation of DC motor.

4. a) Explain the Constructional details of DC generator.
   b) Explain about the construction of single-phase Transformer.

5. Listout the applications of Induction motor, stepper motor and BLDC motor.

UNIT-IV

1. a) Illustrate the operation Zener diode and explain its V − I characteristics.
   b) Draw the forward and reverse characteristics of a p-n junction diode and explain them.

2. a) Explain the operation of Center-tapped full wave rectifier with relevant waveforms.
   b) Derive expression for ripple factor for a full wave rectifier.

3. a) Explain the operation of Half Wave Rectifier with necessary waveforms.
   b) Compare Half wave rectifier and Full wave rectifier in any four aspects .

4. a) Explain the construction and principle of operation of NPN transistor with neat diagram.
   b) Explain the construction and principle of operation of PNP transistor with neat diagram.

UNIT-V

1. a) Perform the following conversions $(476.64)_{10} = (\ )_2 = (\ )_8$

   b) Convert $(946)_{10}$ into binary and Hexadecimal.

2. Solve for x

   a) $(367)_8=(x)_2$ (ii) $(378.93)_{10} = (x)_8$ (iii) $(B9F.AE)_{16} = (x)_8$ (iv) $(16)_{10} =(x)_8$

   b) Convert $(163.875)_{10}$ to binary, octal and hexadecimal.

3. Solve for X

   i) $(F3A7C2)_{16} = (X)_{10}$

   ii) $(2AC5)_{16} = (X)_2$

   iii) $(0.93)_{10} = (X)_8$

   iv) $(4057.06)_8 = (X)_{10}$

4. a) Explain various number systems and their conversion with examples for each

   b) Explain about BCD, Excess-3 and Gray Codes in detail.

5. Explain about AND, OR, NOT, NAND, NOR and EX-OR gates in detail.

6. Given 2 binary numbers $X= (101010)_2$ and $Y= (111011)_2$. Perform 2's complement subtraction for: i) X-Y ii) Y-X.