UNIT – I

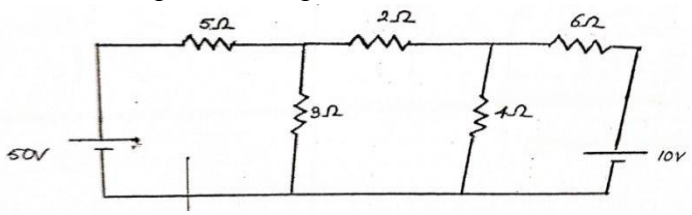
DC CIRCUITS

PART – A (2-MARKS)

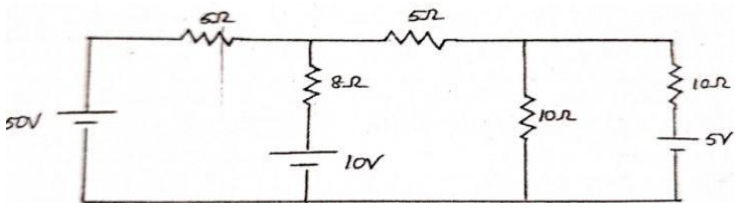
1. State Ohm's law.
2. What do you mean by an electric network and an electric circuit
3. State Kirchhoff's voltage law.
4. State Kirchhoff's Current law.
5. Explain the voltage and current relationship for passive elements.
6. Name the four different types of dependent sources in electric circuits
7. Write the formula for capacitor connected in series and parallel.
8. write the formula for delta to star connected
9. Differentiate active and passive elements.
10. Define the following terms i) resistor ii) inductor iii) capacitor

PART – B

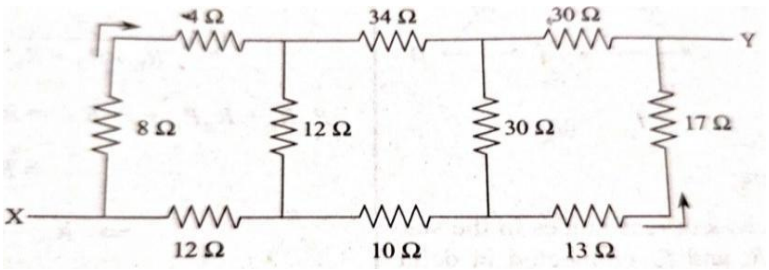
1. Derive the expression for i) star to delta transformation ii) delta to star transformation
2. a) Give a detailed comparison of series and parallel circuits
   b) Explain in detail about voltage and current division rule.
3. Determine the power dissipation in the 4 ohm resistor of the circuit show in figure



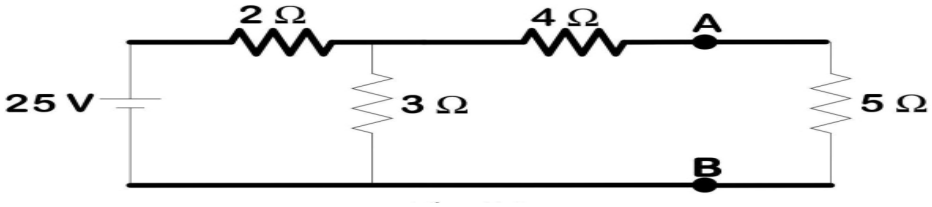
4. Find the current in each branch using nodal analysis



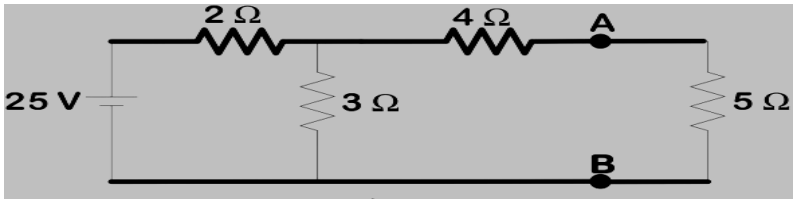
5. Find the equivalent resistances between the terminal X and Y



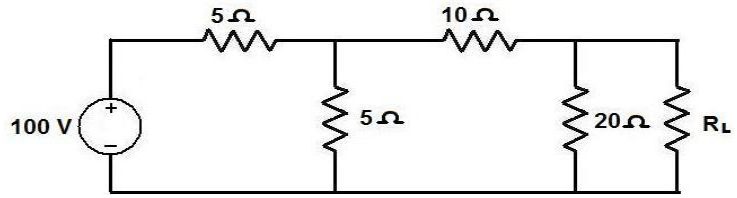
6. Determine Thevenin's equivalent circuit across the terminals AB for the circuit shown in figure below.



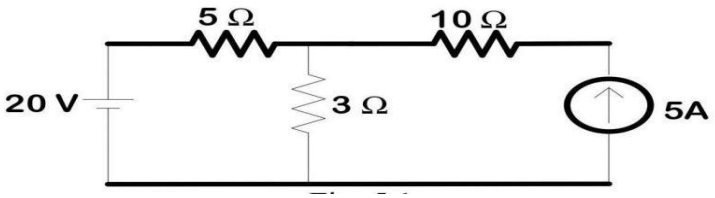
7. Using Norton's theorem, find current through 5 ohm resistance shown in figure



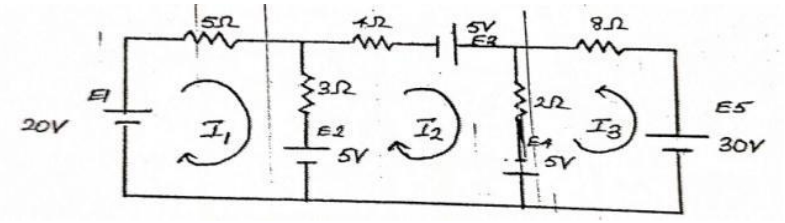
8. Find the value of R_L so that maximum power is delivered to the load Resistance shown in figure.



9. Solve the current in 3ohm resistor by using super position theorem as shown in figure.



10. Determine the current supplied by the each battery in the circuit shown in figure using mesh analysis



UNIT –II

AC Circuits

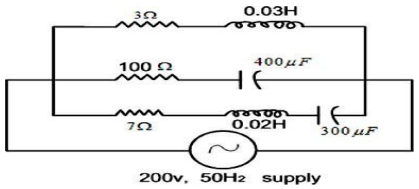
PART – A (2-MARKS)

1. Define the term RMS value?
2. Define the terms average value and form factor?
3. Define phase and phase difference?
4. Define power factor. Also write the expression for power factor in terms of resistance and impedance?
5. Write an expression for impedance of series RLC circuit?

6. What is the relation between real power, reactive power and apparent power?
7. Define impedance and admittance?
8. What is Resonance?
9. What is resonant frequency?
10. Define frequency and Time period of an alternating quantity?

PART – B(Essay type questions)

1. a) Explain in detail about average value, RMS value, peak factor and form factor with Mathematical expressions for sinusoidal wave?
   b) Calculate the rms value, average value, peak factor and form factor of sinusoidal voltage of maximum value of 100v
2. a) A resistance of 10 ohm and inductances of 0.1H are connected in series across Supply of 220v, 50 Hz determine a) the impedance b) current c) power Factor d) Phase angle
   b) Derive the expression for the impedance of an ac circuit consisting of a Resistance(R) and and Inductance (L) connected in series
3. a) Explain in detail about active power, reactive power, apparent power and power factor?
   b) A sinusoidal 50Hz voltage of 200v supplies the three parallel circuits as shown in fig. Find



the Current in each circuit and the total current is 29A.Also determining power factor of the circuit.

4. a) Explain the phase relation in pure resistor, inductor and capacitor?
   b) A choke coil takes a current of 2.5A when connected across 250v, 50Hz mains and consumes 40 watts find (i) power factor (ii) resistance of the coil (iii) inductance of the coil
5. A coil has a resistance of 20 ohm and inductance of 0.05H is connected in Parallel with a Capacitor of 50μf.if this parallel combination is connected across 200v, 50 Hz supply. Calculate i) line current ii) power factor iii) impedance iv) Power consumed
6. A resistor and capacitor connected in series across a 150v ac supply. When frequency is 40 Hz, the current is 5A, and when the frequency is 50Hz, the current is 6A.find the a) Resistance and b) Capacitance of the circuit.
7. a) A pure inductance coil having a inductance of 8H is connected in series with a capacitor of 50μf capacitances across 230v 50 Hz 1Ø ac supply. Find a) net reactance b) circuit current c) pf of the circuit.
   b) Explain about impedance, admittance, conductance and susceptance?
8. a) Define the series resonance and derive the expression for series resonance frequency?
   b) Compute quality factor of series RLC circuits with RC=10Ω, L=0.04H & C=1μF.Also find BW, f_r, f_1 & f_2
9. Explain about bandwidth & Q-factor for the series resonant circuits?

UNIT –III

D.C GENERATORS

PART – A (2-MARKS)

1. What is the basic principle of a dc generator?
2. Define Fleming right hand rule.

3. What is the function of commutator in a dc generator?

4. Define the term "critical speed" in dc shunt generator.

5. Write down the e.m.f equation of a dc generator

6. Calculate the e.m.f generated by a 4-pole wave wound generator having 65 slots with 12 conductors per slot when driven at 1200 rpm. The flux per pole is 0.02 Wb.

7. Draw the circuit diagram of any two types of DC generators

8. Give application of all types of DC generators?

9. What is the basic difference between dc generator and dc motor?

PART – B (Essay type questions)

1) a) Explain the constructional details of a D.C generator?

2) a) Derive expression for generated E.M.f of a D.C generator?
b) Calculate the emf generated by 4 pole lap wound armature with 60 slots and 10 conductors per slot when driven at 1500 rpm. The flux per pole is 0.04wb?

3. What is the principle of operation of DC generator?

4. Explain the different types of generator with necessary equations?

5. Explain the load characteristics of D.C generator?

6. a) Explain about applications of D.C generators
b) A 6 pole wave connected armature has 300 conductors are produces flux of 0.02wb.The generated emf is 600V.Find the speed of the generator?

7. a) An 8 pole dc shunt generator with 800 wave connected armature conductors is running at 600rpm and supplying a load of 12 ohm resistance at 60V terminal voltage. The armature resistance is 0.25 ohm and field resistance is 250 ohm. Find armature current, induced emf and flux per pole?
b) A 4 pole lap wound DC generator has useful flux per pole of 70mwb.The armature winding consists of 220 turns each having resistance of 0.004ohm.Calculate the terminal voltage when running at 900rpm with armature current of 50A?

8. a) Explain the characteristics of self excited generators?
b) Explain about separately excited generators

UNIT –IV

D.C MOTORS

PART – A (2-MARKS)

1. What is working principle of DC motor?

2. What is back emf in d.c. motor?

3. What are the various methods of controlling speed?

4. What is the need for starter in a DC motor?

5. What are the applications of DC series motor?

6. What are the different types of tests done on DC motor?

7. State Fleming left hand rule?

8. Write the condition for maximum efficiency of a dc motor?

9. List out the losses in dc motors?

PART – B (Essay type questions)

1 a) Explain the working principle of D.C motor?

b) Explain various types of D.C motors.

2. What are the different speed control methods of DC motor and explain each of them?
3. Explain the characteristics of D.C motor?
4. a) Derive the expression for electromagnetic torque?
   b) Write any four applications of dc motors?
5. Explain the working of 3 point starter with neat sketch.
6. Explain methods of speed control of D.C shunt motor?
7. Explain Swinburne's test for finding the efficiency of D.C machine.
8. a)Explain different losses occur in D.C machine?
   b) Explain the power stages of dc motor?
9. a) Derive the condition for maximum efficiency of a dc motor?
   b). Explain the constructional details of a D.C Motor?

UNIT_V

PART – A (2-MARKS)

1. Can DC be applied to transformers?
2. How does a Transformer work
3. Distinguish between core and shell type transformer?
4. What are isolation transformers?
5. What is voltage transformation ratio or turn ratio?
6. What are the properties of ideal transformer?
7. Does the transformer draw any current any current when secondary is open? Why?
8. What is meant by regulation in a transformer?
9. What is an eddy current loss in a transformer?
10. What is hysteresis loss in transformer?

PART – B

1. a) Explain the working principle of operation of single-phase transformer?
   b)A 50KVA, 2200/440v, 50HZ single phase transformer has primary turns of 200.Determine
   1) Flux in core 2) Secondary turns? 3) Rated Primary current? 4) Rated Secondary current?
2. a) Derive the emf equation of a single-phase transformer?
   b) A 40 KVA, 3300/240V, 50HZ, Single phase transformer has 660 turns on primary. Determine1) The number of turns on the secondary? 2) The maximum value of flux in the core? 3) The approximate value of primary and secondary full load currents?
3. Explain the constructional details and types of single-phase transformers?
4. a) What is the difference between core type and shell type of transformer?
   b) A 5 KVA, 240/2400V, 50HZ single phase transformer has the maximum of flux density as 1.2 tesla. If the emf per turn is 8V.Calculate the number of primary and secondary turns and the primary and secondary current at the full load?

5. a) How to minimize hysteresis and eddy current losses in a transformer?
   b) A 3000/200V, 50HZ, Single phase transformer has a cross sectional area of 150cm^2 for the core. If number of turns on the low voltage winding is 80.determine number of turns on the high voltage winding and maximum value of flux density in the core?

6. Draw the equivalent circuit of a transformer?
7. Derive the expression for voltage regulation of a transformer?
8. Derive the expression for efficiency of a transformer? What is the condition for maximum efficiency and load current at maximum efficiency?
9. 40KVA Transformers have iron loss of 450W and full load copper loss of 850W.If the power factor of the load of 0.8 lagging. Calculate
   1) Full load efficiency? 2) The load at which maximum efficiency occurs?
   3) The maximum efficiency occurs?