SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
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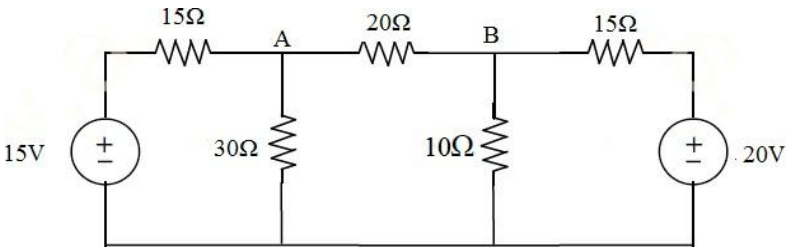
QUESTION BANK (DESCRIPTIVE)

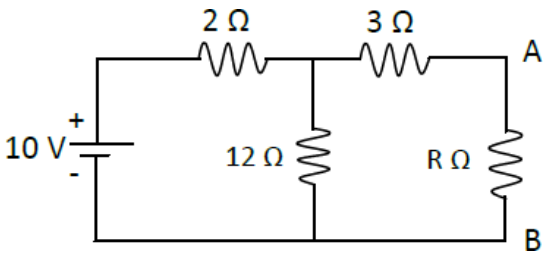
Subject with Code: Basic Electrical Engineering(19EE0239) **Year &Sem:** I -B.Tech& II-Sem
Course & Branch: B.Tech & ECE **Regulation:** R19

UNIT –I
D.C CIRCUITS

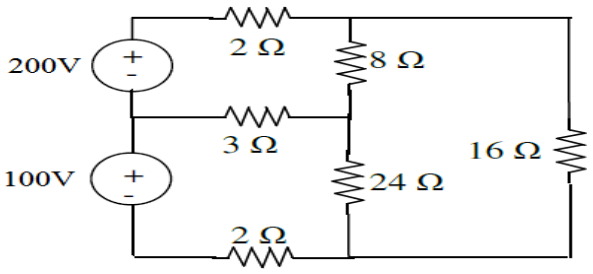
1. (a) State and explain Kirchhoff's laws? [L1] [4M]
   (b) Determine the current in branch A-B by using KVL [L4][6M]



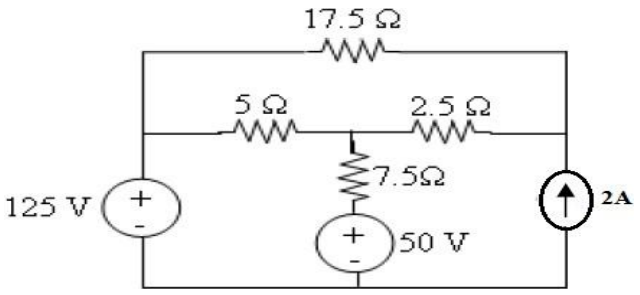
2. (a) State and explain Thevenin's theorem. [L1] [5M]
   (b) Draw the Norton's equivalent circuit for the circuit shown in figure. [L4] [5M]



3. (a) Determine the mesh currents for the circuit shown below. [L4][5M]



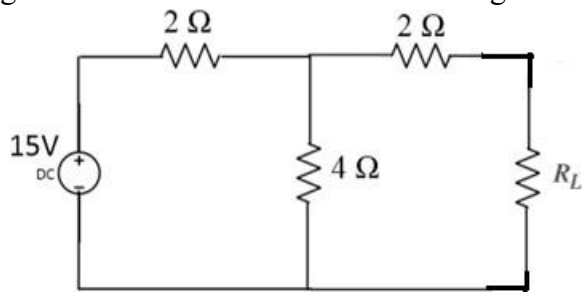
   (b) State &explain Super position theorem. [L1][5M]
4. (a) Use KCL to find node voltages for the circuit shown below. [L4][5M]



(b)Explain about Ideal and Practical Current sources in detail. [L1][5M]

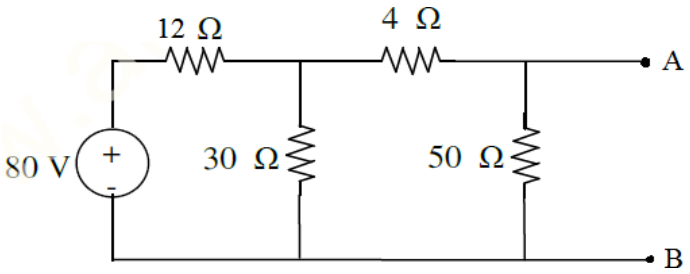
5. (a) State and Prove Maximum Power Transfer Theorem [L1][5M]

(b) Find load current by using Thevenin's theorem for the following circuit where R_L=3Ω. [L4][5M]



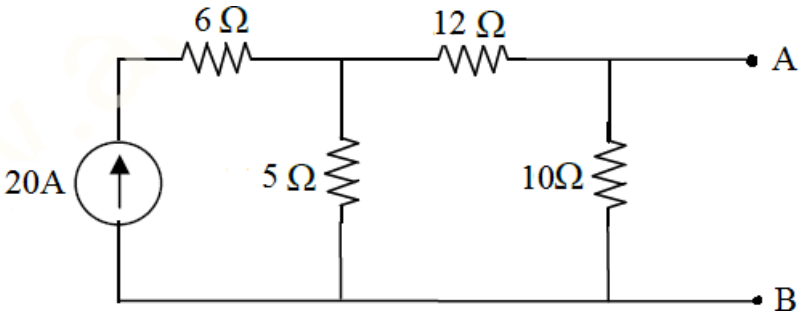
6 (a)Determine the Equivalent Resistance when the resistors are connected in Series & Parallel. [L2][5M]

(b)Find the Thevenin's equivalent for the circuit shown below [L4][5M]



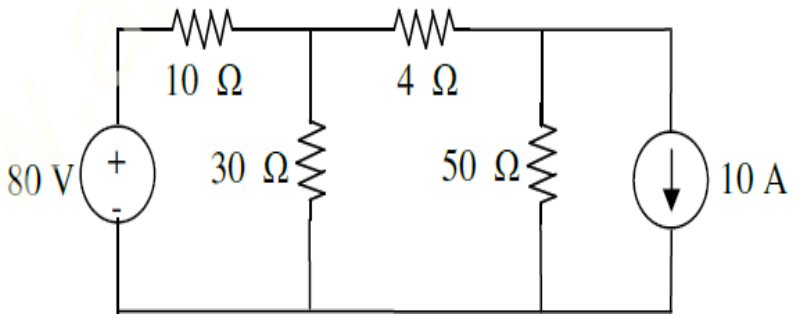
7.(a)Determine the Equivalent Capacitance when the resistors are connected in Series & Parallel. [L2][5M]

(b)Find the Norton's equivalent for the circuit shown below. [L4][5M]



8.(a) State and explain Norton's Theorem? [L1][4M]

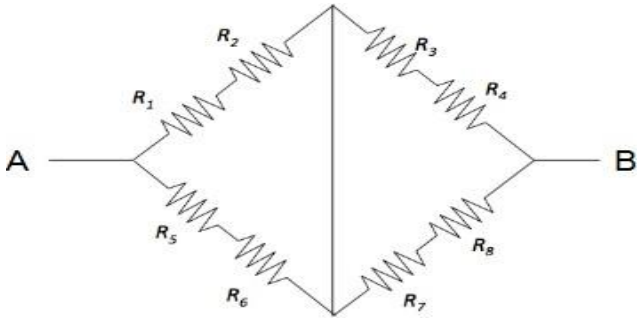
(b) Verify Superposition Theorem for 4Ω resistor for the following circuit. [L4] [6M]



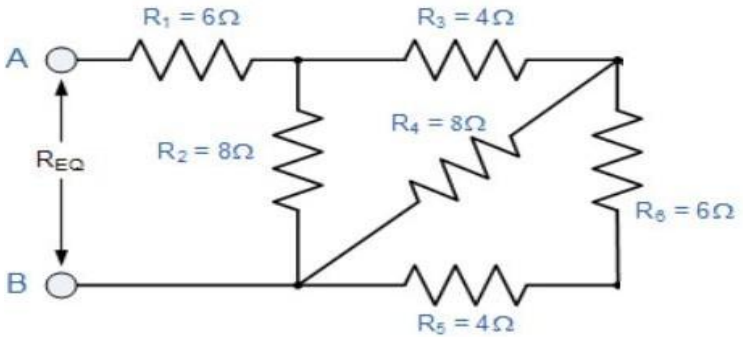
9.(a) Explain about Dependent sources briefly. [L1][4M]

(b) (i) Find the equivalent resistance between AB for the circuit shown bellow. [L3][3M]

R_1=4Ω, R_2=2Ω, R_3=8Ω, R_4=1Ω, R_5=12Ω, R_6=3Ω, R_7=10Ω & R_8=5Ω

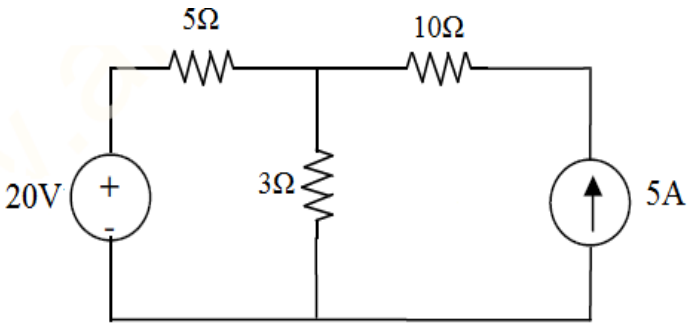


(ii) Find the equivalent resistance for the circuit shown below. [L3][3M]



10. (a) Explain about Energy Sources. [L1][5M]

(b) By using superposition theorem find the current flowing through the 3 ohm resistor. [L4][5M]



UNIT-II

A.C CIRCUITS

1. (a) Derive an expression for RMS values of sine wave form. [L2] [6M]

   (b) An alternating current is expressed as I = 14.14 sin 314t. Determine. [L4] [4M]

   (i) Maximum current (ii) RMS current (iii) Frequency

   (iv) Instantaneous current when t = 0.02msec.

2. Derive an expression for the current and impedance for a series RL and RC circuit excited by a Sinusoidally alternating voltage. Draw the phasor diagrams. [L3] [10M]

3. (a) Define Admittance and impedance [L1][4M]

   (b) The impedances of series circuit are Z1= (6+j8) ohms and Z2 = (8-j6) ohms. If the applied voltage is 120V, find total impedance, curren t and power factor. Draw the phasor diagram. [L2] [6M]

4. Explain about Principle of A.C Voltages. [L2][10M]

5. (a) Define power factor, apparent power, active power and reactive power [L1] [4M]

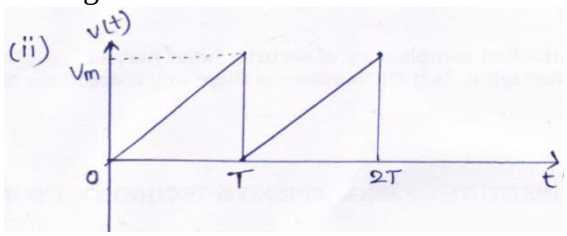
   (b) Z_1 and Z2 are in parallel where currents corresponding impedances are $I_1 = 50\angle 10$ and $I_2 = 20\angle 30^0$. If the applied voltage is $100\angle 15$V, find true power, reactive power and apparent power in each branch. [L2] [6M]

6. (a) Derive an expression for the voltage and impedance for a series RLC circuit excited by a Sinusoidally alternating voltage. [L2] [5M]

   (b) A series circuit consisting of a 10Ω resistor, a 100μF capacitor and a 10 mH inductor is driven by a 50 Hz a.c. voltage source of maximum value 100 volts. Calculate the equivalent impedance, Current in the circuit and the phase angle. [L2] [5M]

7. (a) Derive the voltage and current relations in three phase balanced circuits for delta connection. [L2] [6M]

   (b) Find the rms value for the following waveform [L3] [4M]



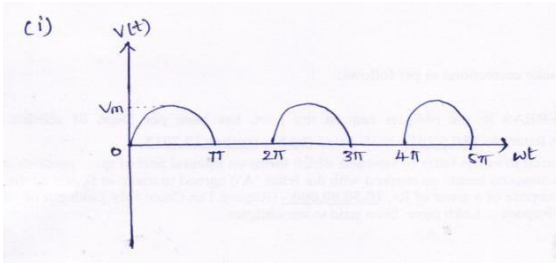
8. (a) Explain the phasor relation for R, L & C elements. [L1][4M]

   (b) A resistor of 50Ω and inductance of 100mH are connected in series across 200V, 50Hz supply. Determine the following [L2] [6M]

   (i) Impedance (ii) current flowing through the circuit (iii) power factor

9. (a) Derive the voltage and current relations in three phase balanced circuits for star connection. [L2] [10M]

   (b) Find the rms value for the following waveforms [L3] [4M]



10. (a) Explain resonance for series RLC circuit and derive the equation for resonant frequency. [L2] [5M]

(b) A series RLC circuit of R=40 Ω, L= 50.07mH and a capacitor is connected across a 400V,50Hz, A.C supply. This RLC combination draws a current of 10A.Calculate

(i) Power factor of the circuit.

(ii) Capacitor value. [L2] [5M]

UNIT-III

DC MACHINES

1. Explain the Constructional details of D.C machine with neat sketch. [L1][10M]

2. Explain about the Working principle of a D.C generator. [L1][10M]

3. (a) Derive the EMF equation of a D.C generator. [L2][5M]

(b) Explain OCC Characteristics of D.C. generator. [L2][5M]

4. (a) The armature of a 6-pole,wave wound D.C generator has 604 conductors. Calculate the generated EMF when the flux per pole is 60mWb and the speed is 250rpm.At what speed, the armature to be driven in order to generate an EMF of 550V,if the flux per pole is reduced to 58mWb. [L4][5M]

(b) Define Torque and derive the expression for torque in a D.C. Motor. [L2] [5M]

5. List the various types of D.C. Generators and Explain in detail. [L2][10M]

6. (a) What are the losses occur in a D.C Generator? [L1][5M]

(b) A 4-pole, 500V, Wave wound D.C shunt motor has 720conductors on its armature. The full-load armature current is 60A and the flux per pole is 0.03Wb armature resistance is 1.2Ω and the brush contact drop is 1V/brush. Calculate the full-load speed. [L4][5M]

7. Explain the working operation of a D.C Motor in detail. [L2][10M]

8.(a) What is the necessity of speed control? [L2] [5M]

(b)How to control the speed of D.C. Shunt motor. Explain it with any one example. [L1] [5M]

9. What are the different types o0f D.C. motors. Explain in detail. [L1] [10M]

10. (a) How to control the speed of D.C. Shunt motor. Explain it with any one example. [L2][5M]

(b)A D.C shunt generator has shunt field winding resistance of 100Ω.It is supplying a load of 5KWat a voltage of 250V.If its armature resistance is 0.22Ω.Calculate the induced emf of the generator.

. [L4][5M]

UNIT-IV

A.C MACHINES

1. Draw the constructional diagram of a single –phase transformer and explain all the parts. [L2][10M]
2. (a) Explain the Working principle of single –phase transformer. [L2][5M]
   (b) Compare Core type &Shell type transformer. [L1][5M]
3. List the types of transformers based on Construction &explain in detail with neat diagrams. [L1][10M]
4. (a) Write the short notes on Voltage Regulation & Efficiency. [L1][5M]
   (b) Derive an EMF equation of a single-phase transformer. [L1][5M]
5. (a) A single-phase transformer has 400 turns on primary winding 1000 turns on secondary winding. If it is operating at 50Hz supply with a maximum flux of 0.045Wb.Find
   (i) Primary &Secondary induced EMF (ii) EMF induced per turn. [L4][5M]
   (b) A230/110V, 1KVA, single –phase transformer is connected to 230V, A.C Supply. Calculate
   (i) Primary current (ii) Secondary current [L4][5M]
6. (a) A single-phase 600/230V,50Hz transformer has a core area of 400cm^2 and a maximum flux density of 1.18Wb/m^2.Calculate the number of turns in Primary& Secondary windings. [L4][5M]
   (b) Explain about Various losses occurs in a transformer. [L1][5M]
7. A 5KVA, 500/250V, 50Hz, single –phase transformer gave the following results: [L4][10M]
   From O.C Test: 500V, 1A, 50W (H.V Side is opened)
   From S.C Test: 25V, 10A, 60W (L.V Side is shorted)
   Determine:
   (i) The Efficiency on Full-load, 0.8 lagging P.F.
   (ii) The Voltage Regulation on Full-load 0.8 lagging P.F.
   (iii) The Efficiency on 60% of Full-load, 0.8 lagging P.F.
   (iv) The Voltage Regulation on Full-load,0.6 leading P.F.
8. (a) What is the Procedure for conducting O.C. test on a single-phase transformer, explain with neat diagram. [L1][5M]
   (b) How Auto transformer works? Explain briefly with neat circuit. [L1][5M]
9. Explain Working Principle of Induction Motor in detail. [L2][5M]
10. (a)Explain Working Principle of 3-Ø Alternator. [L1][5M]
    (b) Explain Salient-Pole type Rotor briefly. [L1][5M

UNIT-V
DOMESTIC WIRING

1.(a) Define Wiring system &List the types of wiring systems. [L1][5M]

(b) What is the Importance of wiring system. [L1][5M]

2.Classify cables based on different aspects. [L2][10M]

3. What is Earthing? Explain Plate Earthing in detail. [L1][5M]

4.With neat diagrams, explain various types of fuses used in electrical wiring systems. [L1][10M]

5. (a) Explain about choice of wiring system. [L1][5M]

(b) Explain about different types of circuit breakers. [L1][5M]

6. Compare Fuse & Circuit breaker based on various aspects. [L1][5M]

7. Explain about : [L1][10M]

(a)PVC cables (b)Weather proof cables (c) VIR cables

8. (a) What is Fuse &explain the principle of operation of Fuse. [L2][5M]

(b) What are the Materials required for Fuse element. [L1][5M]

9. (a)List the advantages & disadvantages of Conduit wiring. [L1][5M]

(b)What is the necessity of Earthing? [L1][5M]

10. Define the following:

(a) What is the difference between wire & cable? [L1][2M]

(b) Fusing Current [L1][2M]

(c) Fusing Factor [L1][2M]

(d) Rated Current [L1][2M]

(e) Fuse Element [L1][2M]

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