SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
(AUTONOMOUS)
Siddharth Nagar, Narayanavanam Road – 517583
QUESTION BANK (DESCRIPTIVE)

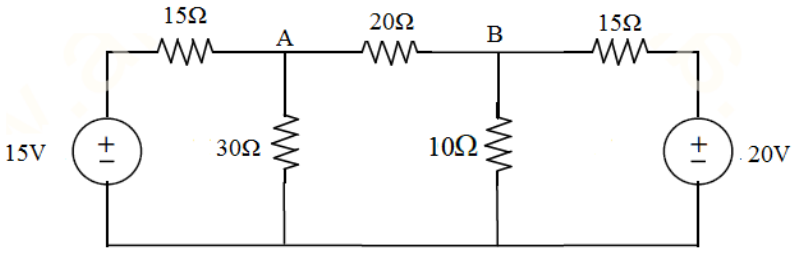
Subject with Code : Basic Electrical Engineering(18EE0239)

Course & Branch: B.Tech–(ECE&CSE)

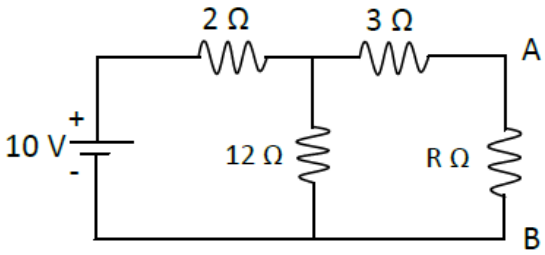
Year & Sem: I-B.Tech& II-Sem **Regulation:** R18

UNIT –I
DC CIRCUITS

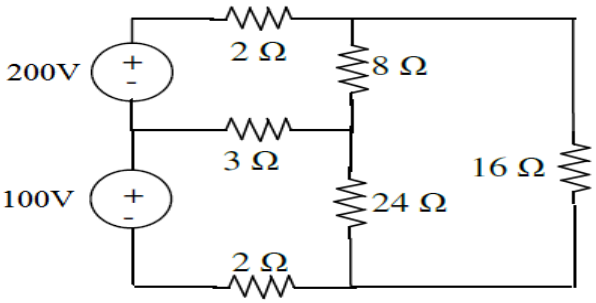
1. (a)State and explain Kirchhoff's laws? [L1][4M]
   (b)Determine the current in branch A-B by using KVL [L4][6M]



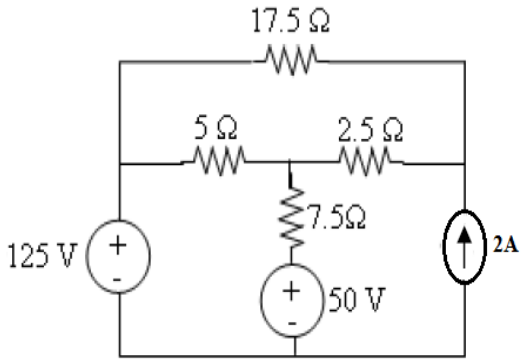
2. a) State and explain Norton's theorem? [L1] [5M]
   b) Draw the Norton's equivalent circuit for the circuit shown in figure. [L4] [5M]



3. Determine the mesh currents for the circuit shown below. [L4] [10M]

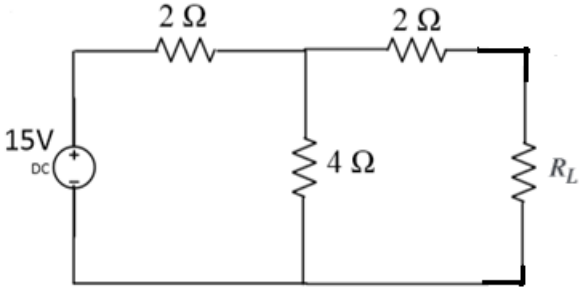


4. Use nodal analysis to find the node voltages for the below circuit. [L4] [10M]



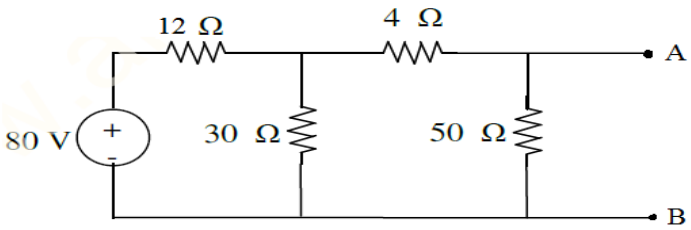
5. a) State and Explain Thevenin's Theorem [L1] [5M]

b) Find load current by using Thevenin's theorem for the following circuit where R_L=3Ω [L4] [6M]



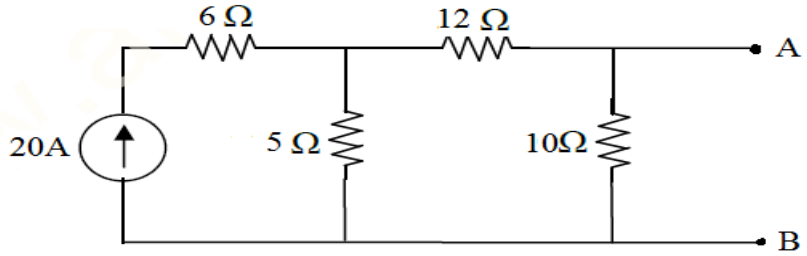
6 a)Derive the time response of RL circuit [L2] [5M]

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



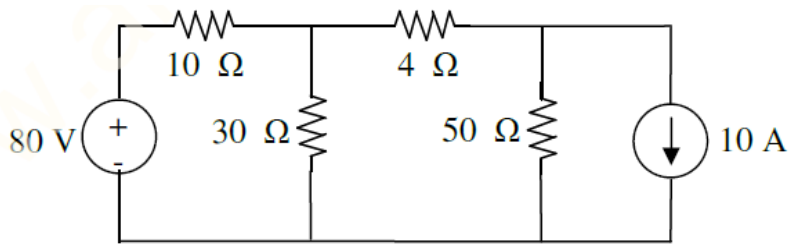
7. a) Derive the time response of RC circuit [L2] [5M]

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



8.a) State and explain Superposition theorem? [L1] [4M]

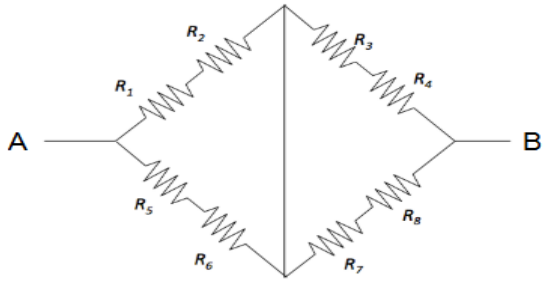
b) Verify Superposition theorem for 4Ω resistor for the following circuit. [L4] [6M]



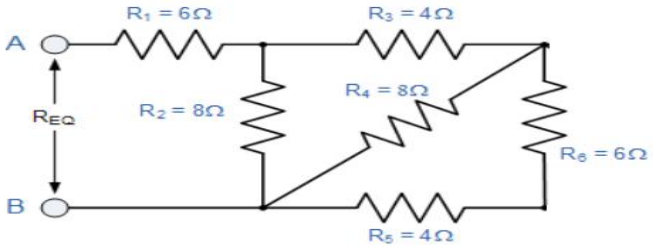
9. a) explain the circuit elements R,L &C. [L1] [4M]

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

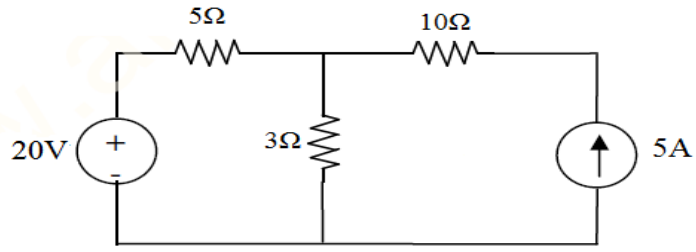
R_1=4Ω, R_2=2Ω, R_3=8Ω, R_4=1Ω, R_5=12Ω, R_6=3Ω, R_7=10Ω & R_8=5Ω



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



10. State and Expalin the Super position theorem. And By using superposition theorem find the current flowing through the 3 ohm resister. [L4] [10M]



11.(a) What is Circuit and Network? [L1][2M]
(b) Define Inductance ? [L1][2M]
(c) Define Capacitor and represent symolically ? [L1][2M]
(d) State Ohm's law and write its expression ? [L1][2M]
(e) A electric kettle takes a current of 12.5A at 240V. What is the resistance of heating Element ? [L1][2M]

UNIT-II

AC 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, current and power factor. Draw the phasor diagram.[L2] [6M]

4. (a)Explain parallal RL and RC circuits with phasor diagrams. [L3][6M]

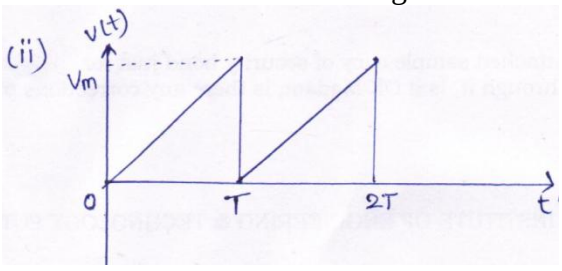
(b) A 120V AC circuit contain 10 Ω resistance and 30 Ω inductive reactance in series. What is average power of this circuit. [L2][4M]

5. (a) Define power factor, apparent power, active power and reactive power [L1] [4M]
(b) Z1 and Z2 are in parallel where currents corresponding impedances are $I_1 = 50\angle 10$ and $I_2 = 20\angle 30$. 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]

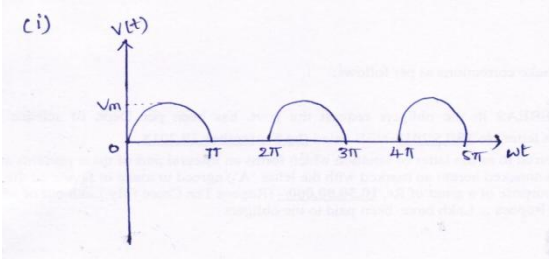


8. (a) Explain the phasor relation for R, L & C elements. [L1][4M]

(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=50 ohms, L= j25 ohms. Determine the value of capacitive reactance and impedance at resonance [L2] [5M]

11. (a) Define Form Factor and Peak Factor? [L1][2M]

(b) Define vector and phasor? [L1][2M]

(c) Define resonance? [L1][2M]

(d) Draw Star and Delta Connections of Three Phase circuit? [L1][2M]

(e) Write Expressions for Voltages and Current in Three Phase balanced system? [L1][2M]

Unit-III

TRANSFORMERS

1.(a) Explain the briefly the construction and working of a single phase transformer [L2][6M]

(b) A 200 KVA, 1100/415V, 50Hz single phase transformer has 80 turns of secondary. Calculate the primary number of turns. [L2][4M]

2.(a)Write a short notes on regulation and Efficiency of the transformer. [L1][5M]

(b)The efficiency of a 200 KVA,1-Φ transformer is 98.7% when operating at full-load,0.8 p.f lagging, the iron loss in the transformer is 200 W. Calculate: (i)Full load copper loss
(ii) Half load copper loss. [L3][5M]

3. (a)Explain the various losses in a transformer. [L1][5M]

(b) a single phase transformer with a ratio of 440/110V takes a no load current of 5A at 0.2 p.f. lagging. If the secondary supplies a current of 120A at a p.f. of 0.8 lagging.find the current taken by the primary. [L3] [5M]

4. (a) Explain BH characteristics. [L1] [5M]

(b) A 100KVA transformer has primary and secondary turns of 400 and 100 respectively. Its primary and secondary resistance and reactance are: R_1=0.3Ω, R_2=0.015Ω, X_1=1.1Ω, X_2=0.055Ω, supply voltage is 2400V.Calculate equivalent resistance and reactance on the primary side. [L2] [5M]

5. (a) Explain about magnetic materials. [L1] [4M]

(b) A 1-Φ,50 HZ transformer has 80 turns on the primary winding and 400 turns on the secondary winding. The net cross sectional area of the core is 200 cm^2.If the primary winding is connected to a 240v,50 HZ supply, determine (i)The emf induced in the secondary winding.

(ii) The maximum value of the flux density in the core. [L2] [6M]

6.(a) Explain about ideal transformer and derive the EMF equation of the transformer. [L2] [6M]

(b) A 10KVA, 2200/220V, 50Hz single phase transformer has a net core area of 300$cm^2$and a maximum flux density of 1.5wb/m^2. Calculate the number of turns in primary and secondary winding. [L2] [6M]

7. Explain the practical transformer on load and draw the phasor diagrams. [L2][10M]

8. Obtain the equivalent circuit of single phase transformer referred to primary and secondary. [L2][10M]

9. What is meant by auto transformer? What are the advantages of Auto transformer when compared to two winding transformer? [L1] [10M]

10. What are three phase transformer connections and explain it? [L2][10M]

11. (a) Define Transformer? [L1][2M]

(b) Write Transformation ratio? [L1][2M]

(c) Why Transformer doesn't work on DC? [L1][2M]

(d) Why Transformer rating will be in kVA? [L1][2M]

(e) What is the condition for maximum efficiency in a Transformer and expression for load current at maximum efficiency? [L1][2M]

Unit-IV

ELECTRICAL MACHINES

1. What is rotating magnetic field? Explain in brief? [L2][10M]
2. Explain the construction of three phase induction motor? [L1][10M]
3. Sketch and explain the torque slip characteristics of 3 phase induction motor? [L2][10M]
4. Explain the construction of three phase alternator? [L1][10M]
5. Explain the construction single phase induction motor [L1][10M]
6. Explain the working principle of single phase induction motor [L2][10M]
7. Explain the construction of DC motor? [L1][10M]
8. Sketch and explain the torque speed characteristics of DC motor? [L2][10M]
9. Explain the various method of speed control of separately excited DC motor? [L2][10M]
10. Explain the working principle of synchronous generator? [L2][10M]
11. (a) Define Torque and slip? [L1][2M]
    (b) Why is an induction motor called a rotating transformer?justify [L1][2M]
    (c) why single phase induction motor is not self starting? [L1][2M]
    (d) What is commutation & commutator? [L1][2M]
    (e) Define Alternator ? [L1][2M]

UNIT -V
ELECTRICAL INSTALLATIONS

1. Explain different types of wiring system. [L2][10M]
2. Explain the following electrical wiring system with necessary diagrams.
   (a) CTS wiring and (b) Concealed wiring [L2][10M]
3. With relevant diagrams explain in detail about various types of fuses used in electrical wiring systems. [L2][10M]
4. Explain briefly about earthing and how it plays an important role in installation. [L2][10M]
5. a) How many types of batteries are there? [L1][5M]
   b) Explain the characteristics of batteries. [L2][5M]
6. Explain different methods used for improvement of power factor. [L2][10M]
7. a) Explain battery backup. [L1][5M]
   b) How many types of cables are there? Explain them with neat sketch. [L1][5M]
8. What is energy consumption and Explain how it is calculated by an example. [L2][10M]
9. a) What is the importance of wiring. [L2][5M]
   b) Explain how wiring system is classified. [L2][5M]
10. Explain about
    a) pvc cables and b) wheather proof cables [L2][10M]
11. (a) Define Switch Gear? [L1][2M]
    (b) Define Battery? [L1][2M]
    (c) Define Energy and write it's expression? [L1][2M]
    (d) Define Fuse and Circuit Breaker? [L1][2M]
    (e) What is Earthing? [L1][2M]