SIDDARTH INSTITUTE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

(Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu)
(Accredited by NBA (EEE, MECH, ECE & CSE) & NAAC with 'A' Grade)
Siddharth Nagar, Narayanavanam Road, PUTTUR-517 583

QUESTION BANK (DESCRIPTIVE)

Subject with Code:Principles of Electrical Engineering(20EE0250)

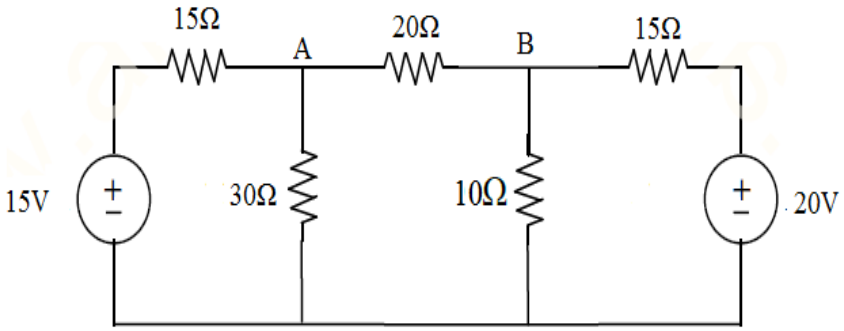
Year & Sem: I B.Tech & I-Sem

Course & Branch: B.Tech & CSE(CSE,CAD,CIA,CSM,CCC,CIC)

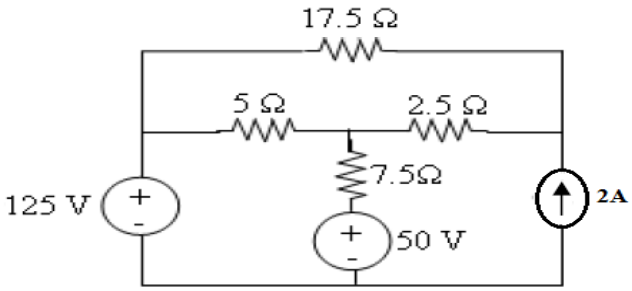
Regulation: R20

UNIT –I
D.C CIRCUITS

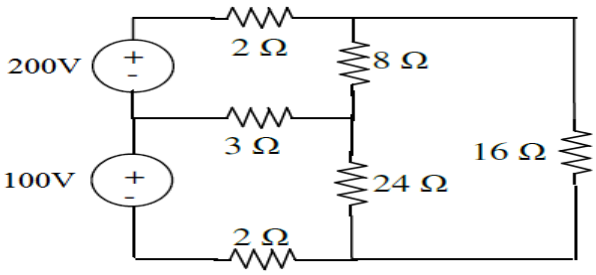
1. (a) Explain about Electrical circuit elements. [L1][CO1][6M
   (b) Explain about Energy Sources. [L1][CO1][6M]
2. (a) State and Explain about the ohm's law [L1][CO1][4M]
   (b) State and explain Kirchhoff's laws? [L1][CO1] [6M]
3. (a) Determine the current in branch A-B by using KVL [L4][CO1] [6M]



(b) Use KCL to find node voltages for the circuit shown below. [L4][CO1][6M]



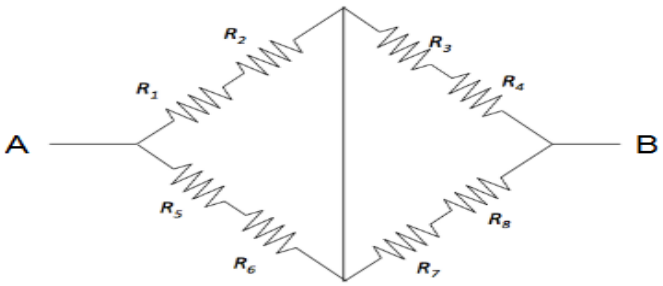
4. (a) Determine the mesh currents for the circuit shown below. [L4][CO1][6M]



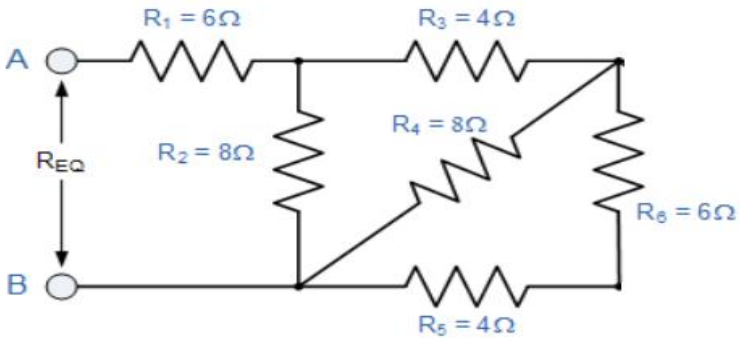
(b) Determine the Equivalent Resistance when the resistors are connected in Series & Parallel. [L2][CO1][6M]

5. (a) Find the equivalent resistance between AB for the circuit shown bellow. [L3][CO1][6M]

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



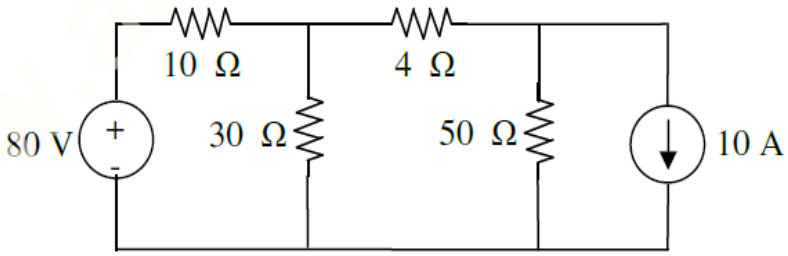
(b) Find the equivalent resistance for the circuit shown below. [L3][CO1][6M]



6. (a) Determine the Equivalent Capacitance when the Capacitors are connected in Series & Parallel. [L2][CO1][10M]

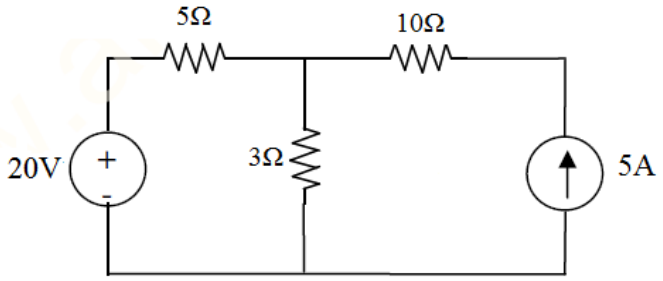
(b) State the Super position theorem. [L1][CO2][2M]

7. (a) Verify Superposition Theorem for 4Ω resistor for the following circuit. [L4][CO2][6M]



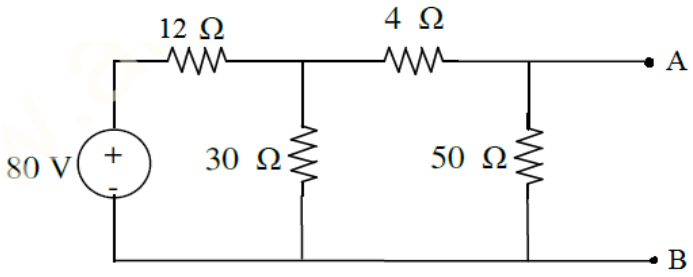
(b) By using superposition theorem find the current flowing through the 3 ohm resistor.

[L4][CO2][6M]

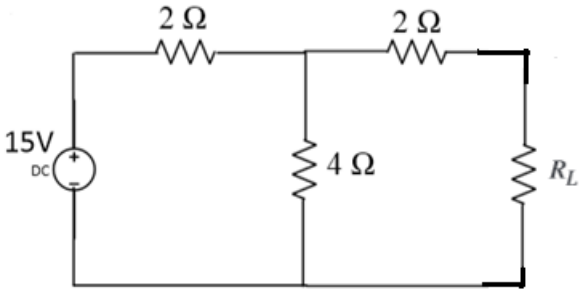


8. (a) State and explain Thevenin's theorem. [L1][CO1][6M]

(b)Find the Thevenin's equivalent for the circuit shown below [L4][CO2][6M]

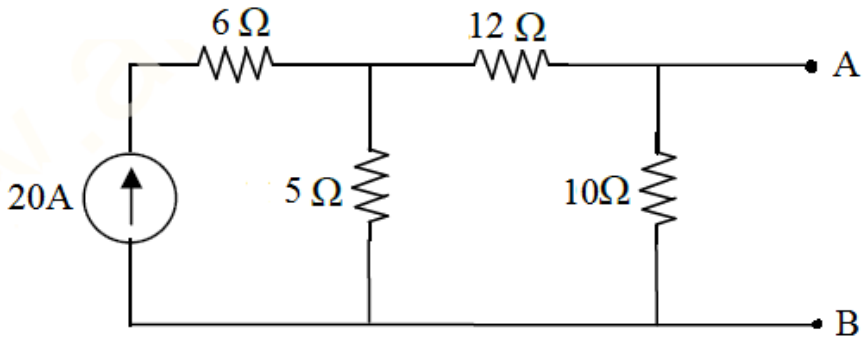


9.(a) Find load current by using Thevenin's theorem for the following circuit where R_L=3Ω. [L4][CO2]6M]

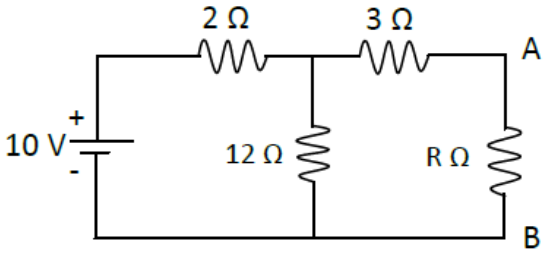


(b). State and explain Norton's Theorem? [L1][CO2][6M]

10. (a) Find the Norton's equivalent for the circuit shown below. [L4][CO2][4M]



(b) Draw the Norton's equivalent circuit for the circuit shown in figure. [L4][CO1][4M]



(c) State and Prove Maximum Power Transfer Theorem [L1][CO2][4M]

UNIT-II

A.C CIRCUITS

1. (a) Derive an expression for RMS value of sine wave form. [L2][CO3][6M]

   (b) Derive an expression for average value of sine wave form [L2] [CO3] [6M]

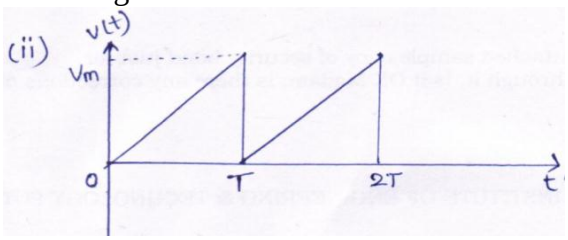
2. (a) Discuss about peak value and form factor? [L2] [CO3] [6M]

   (b) An alternating current is expressed as I = 14.14 sin 314t. Determine. [L4][CO3][6M]

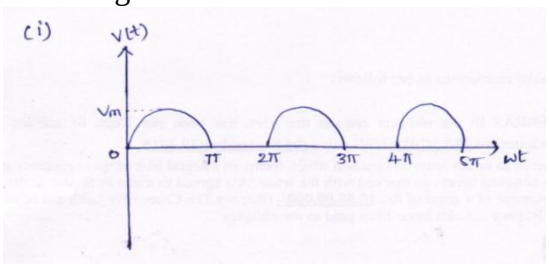
   (i) Maximum current (ii) RMS current (iii) Frequency

   (iv) Instantaneous current when t = 0.02 msec.

3. (a) Find the rms value for the following waveform [L3][CO3][6M]



   (b) Find the rms value for the following waveforms [L3][CO3][6M]



4. (a) Define active power, apparent power, and reactive power. [L1][C03][6M]

   (b) Define power factor, admittance, and impedance. [L1][C03][6M]

5. Z_1 and Z_2 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][CO3][6M]

6. (a) The impedances of series circuit are $Z_1 = (6+j8)$ ohms and $Z_2 = (8-j6)$ ohms. If the applied voltage is 120V, find total impedance, current and power factor. Draw the phasor diagram. [L2]CO3][6M]

   (b) Explain the phasor relation for R, L & C elements. [L1][CO3][6M]

7. (a) Derive an expression for the current and impedance for a series RL circuit excited by a Sinusoidally alternating voltage. Draw the phasor diagrams.

   [L3][CO3][6M]

(b) Derive an expression for the current and impedance for a series RC circuit excited by a Sinusoidally alternating voltage. Draw the phasor diagrams. [L3][CO3][6M]

8. (a) Derive an expression for the voltage and impedance for a series RLC circuit excited by a Sinusoidally alternating voltage. [L2][CO3][6M]

(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][CO3][6M]

9. (a) A resistor of 50Ω and inductance of 100mH are connected in series across 200V, 50Hz supply. Determine the following [L2][CO3][6M]
(i) Impedance (ii) current flowing through the circuit (iii) power factor

(b) A resistor of 25Ω and inductance of 60mH are connected in series across 100V, 50Hz supply. Determine the following [L2][CO3][6M]
(i) Impedance (ii) power factor

10. 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][CO3][12M]

UNIT-III

DC MACHINES

1. Explain the Constructional details of DC machine with neat sketch. [L1][CO4][12M]

2. Explain about the Working principle of a DC generator. [L1][CO4][12M]

3. (a) Derive the EMF equation of a DC generator. [L2][CO4][6M]

(b) List the various types of DC Generators and discuss in detail. [L2][CO4][6M]

4. (a) Explain OCC Characteristics of DC generator. [L2][CO4][6M]

(b) 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][CO4][6M]

5 (a) What are the losses occur in a DC Generator? [L1][CO4][6M]

(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][CO4][6M]

6. Explain the working operation of a DC Motor in detail. [L2][CO4][12M]

7. a) What is the significance of back emf explain in detail. [L1][CO4][6M]

b) A 220v dc motor has armature resistance of 0.6 Ω and current through armature is 10A find the induced in the motor. [L2][CO4][6M]

8. What are the different types of DC. motors. Explain in detail. [L1][CO4][12M]

9. (a) Define Torque and derive the expression for torque in a DC.Motor. [L2][CO4][6M]

(b) A 4-pole, 500V, Wave wound DC 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][CO4][6M]

10. (a) What is the necessity of speed control? [L2][CO4][6M]

(b) How to control the speed of DC. Shunt motor. Explain it with any one example. [L1][CO4][6M]

UNIT-IV

A.C MACHINES

1. Draw and Explain the constructional diagram of a single phase transformer. [L2][CO5][12M]

2. Explain the Working principle of single phase transformer. [L2][CO5][12M]

3. Discuss Open Circuit and Short Circuit tests on single phase transformer. [L4][CO5][12M]

4. (a) Write the short notes on transformer Voltage Regulation & Efficiency. [L1][CO5][6M]

(b) A230/110V, 1KVA, single phase transformer is connected to 230V, A.C Supply. Calculate

(i) Primary current (ii)Secondary current [L4][CO5][6M]

5.a) Explain the losses in a transformer. [L2][CO5][6M]

b) A single phase transformer has 500 turns on primary and 1000 turns on secondary. The e.m.f per turn is 0.2. Calculate i) e.m.f induced in the primary and secondary winding. ii) The net cross-sectional are of the core for a maximum flux density of 0.045T [L4][CO5][6M]

6. (a) Derive an EMF equation of a single-phase transformer [L1][CO5][6M]

(b) 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][CO5][6M]

7. Explain construction and Working Principle of 3-Ø Alternator. [L1][CO5][12M]

8. Explain Working Principle of 3-Ø Induction Motor in detail. [L2][CO5][12M

9. (a) Define the following (i) Synchronous speed (ii) Slip (iii) Rotor frequency [L1][CO5][6M]

b) A 3- Ø 6-pole 50Hz, Induction motor runs at 1500rpm. Determine i) Synchronous speed ii) Percentage slip [L1][CO5][6M]

10. Define voltage regulation of an alternator. Explain procedure to determine voltage regulation by Synchronous Impedance Method. [L4][CO5][12M]

UNIT-V

MEASURING INSTRUMENTS

1. Discuss the operating principles and essential features of measuring instruments. [L2][CO6][12M]
2. Define torque. Explain various types of torques in measuring instruments. [L1][CO6][12M]
3. (a) Classify different types of measuring instruments. [L1][CO6][6M]
   (b) Explain operating principles of Moving Iron and PMMC instruments. [L2][CO6][6M]
4. Explain operating principle of Permanent Magnet Moving Coil (PMMC) instruments. [L2][CO6][12M]
5. Explain operating principle of Moving Iron (MI) instruments. [L2][CO6][12M]
6. What is the purpose of voltmeter? Explain how the meter range will be extended with Multipliers. [L1][CO6][12M]
7. Explain the extension of range of ammeters and derive necessary formula. [L2][CO6][12M]
8. Explain construction and principle of Moving Coil Voltmeter in detail [L2][CO6][12M]
9. Explain construction and operating principle of Moving Coil Ammeter in detail [L2][CO6][12M]
10. Explain construction and operation of attraction type Moving Iron Instrument. [L2][CO6][12M]

PREPARED BY:

DR.V.R.RAJAN ,DR.R.LAKSHMI,N.BINDU MADHAVI,V.MAMATHA,K.KOMALA,R.S.SAI PRAVEEN,P.JAHNAVI & K.VISHNU