**Department of Computer Science & Engineering**

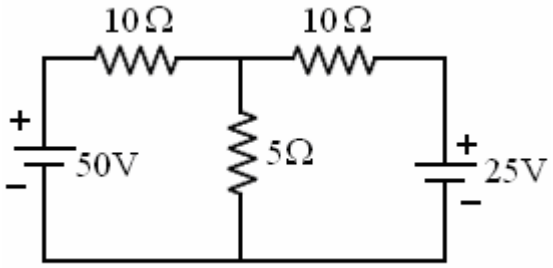
**QUESTION BANK**

**Subject: BEE** **Faculty Name: B.Sujatha**

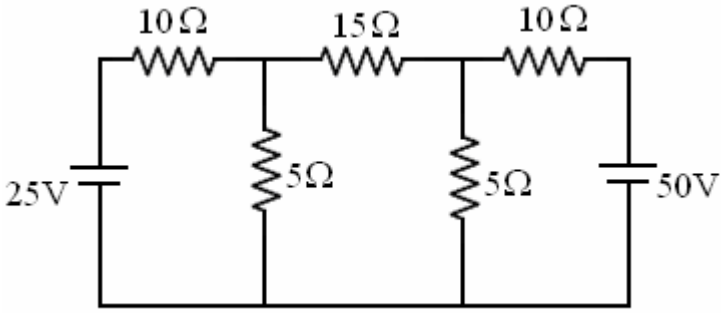
**Branch:II CSE I Sem**

**UNIT - I**

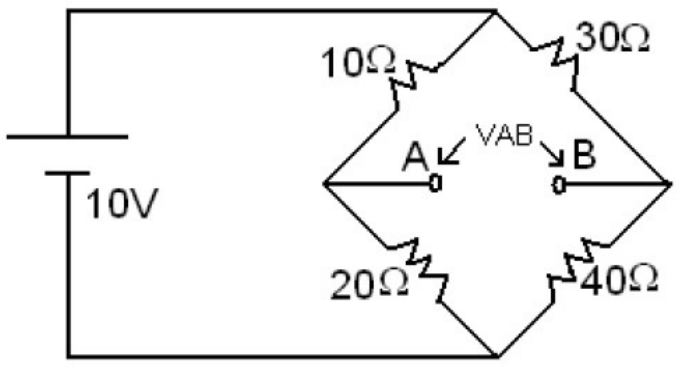
1. a) State and explain Kirchoff's laws.
   b) In the circuit given below Figure , find the current through 5 Ω resistor. **[7+8] May 2011 , Set 1**




2. By means of node voltage analysis obtain the current through 15 Ω resistor in the following circuit (Figure ).

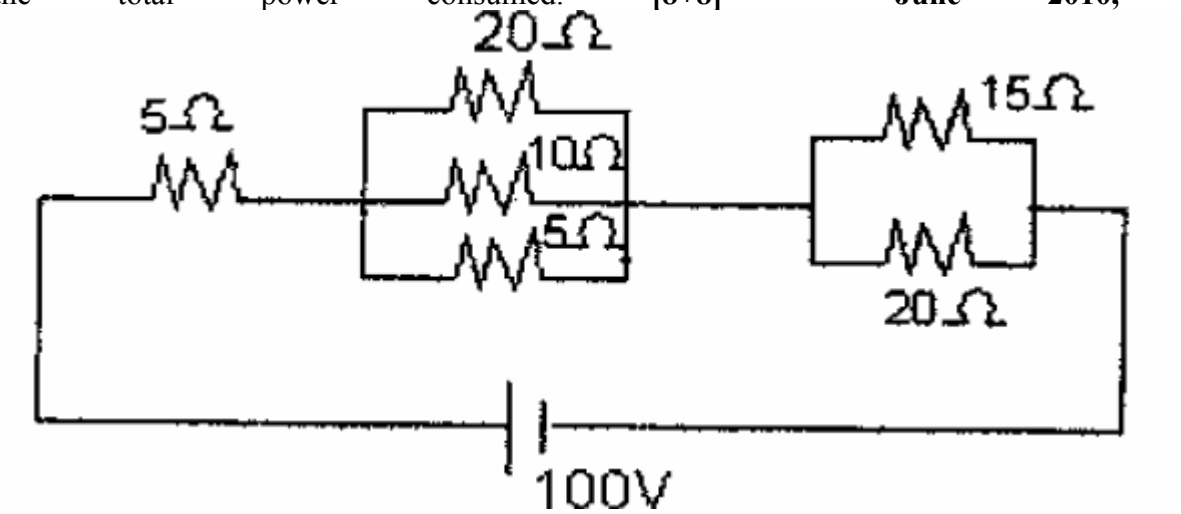



   **[15] May 2011, Set 4(BT)**
3. (a) A transmission line cable consists of 19 strands of identical copper conductors each 1.5 mm in diameter. The length of the cable is 2 km but because of the twist of the stands, the actual length of each conductor is increased by 5 percent. What is resistance of the cable? Take the resistivity of the copper $1.78*10^{-8}$ ohm-m.
   (b)Explain KVL and KCL and ohm's Law. [**10+5] Dec 2011, Set 1**
4. a)Explain ohm's Law and discuss the different Factors on which the resistance is dependent?
   (b) Calculate the resistance of copper conductor having a length of 2 km and a cross-section of 22 $mm^2$. Assume the resistivity is $18*10^{-9}$ ohm-m. [7+8] May 2011, Set 2
5. Find the voltage VAB in the circuit shown in below figure and drop across each branch. **May 2011, Set 4**




6. a) Calculate the resistance of 915 meters length of a wire having a uniform cross- sectional area of $0.77cm^2$ if the wire is made of copper having a resistivity of $1.7*10^{-6}$ ohm cm.
   (b) A wire of double 1 m has a resistance of 2 ohms. What is the resistance of second wire, whose specific resistance is double the first, if the length of wire is 3 meters and the diameter is double of the first? [7+8] May 2011, Set 3

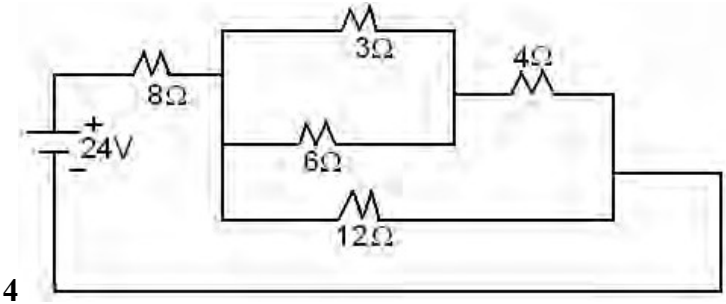
7. a) State and explain Kirchoff's law.
   b) For the circuit shown in figure, calculate the total current, individual currents in each branch. Also calculate the total power consumed. **[8+8] June 2010, Set 1,2,3,4**



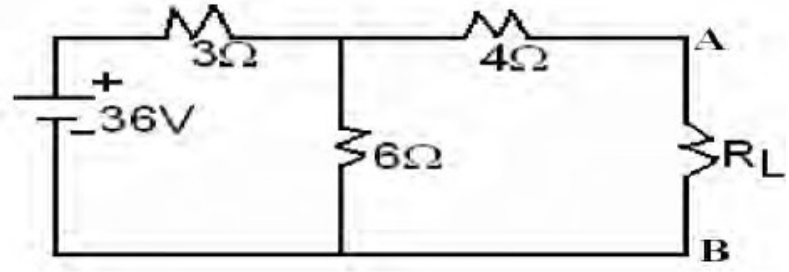

8. a) State and explain Ohm's law.
   b) Two coils connected in parallel across 100 V DC supply, takes 10 A current from the Supply. Power dissipated in one coil is 600 W. Find:
   i) What is the resistance of that coil?
   ii) What is the current flowing through that coil?
   iii) What is the current in the other coil?
   iv) What is the resistance of the other coil? **Nov 2011, Set 1**
9. a) State and explain Kirchoff's laws.
   b) Three resistance of 5 ohms, 10 ohms and 15 ohms are connected in parallel. If the current in 10 ohms resistance is 3 A, What is the current in other resistors and total current. Also determine the voltage applied to the circuit. **[7+8] Nov 2010, Set 2**
10. a) Explain the basic circuit components.
    b) Three resistances 2 ohms, 4 ohms and 6 ohms are connected in series across 24V supply. Find the voltages across three resistors. **[7+8] Nov 2010, Set 3**
11. a) State and explain Kirchoff's laws.
    b) Three resistances 2 ohms, 4 ohms and 6 ohms are connected in series across a voltage supply. Voltage across 2 ohms resistor is 4 V Find the voltages across remaining resistors and total voltage. **Nov 2010, Set 4**

## UNIT-II

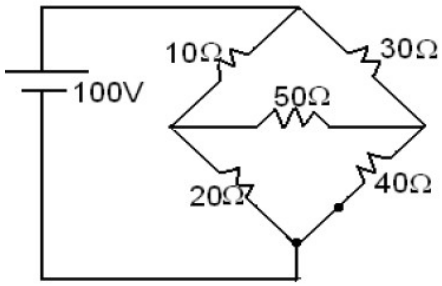
1. a) Using KVL determine total current drawn from the source in the circuit shown below in figure and also find the potential drop across each resistor.




   (b) Explain Norton's theorem. [**9+6] Dec 2011, Set 4**
2. (a)State and explain Maximum Power Transfer theorem.
   (b) Calculate the value of load resistor RL to be connected across terminals A and B which would draw the maximum power from the circuit and also find the maximum power(figure). **[7+8] Dec 2011, Set 1**

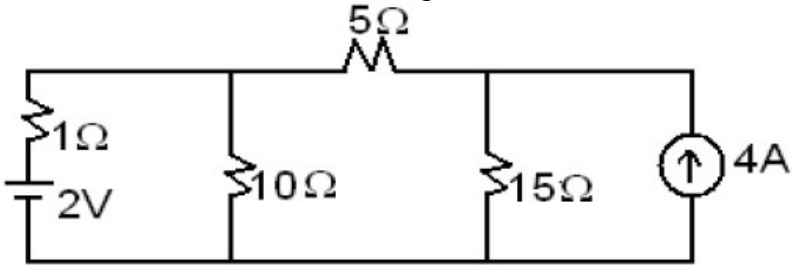


3. Find the current through 50 Ω resistor, using Norton's theorem in the unbalanced wheatstone bridge shown



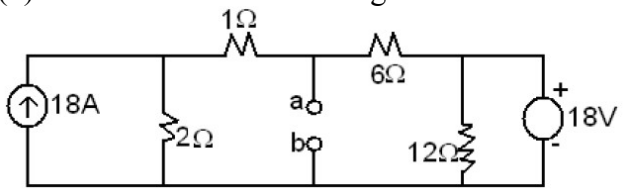

below in figure . **[15] Dec 2011, Set 3**

4. a) State and explain Thevenin's theorem.
   (b) Using Thevenin's theorem, find the current through 5Ω resistor, the circuit shown below in figure . **[6+9]**

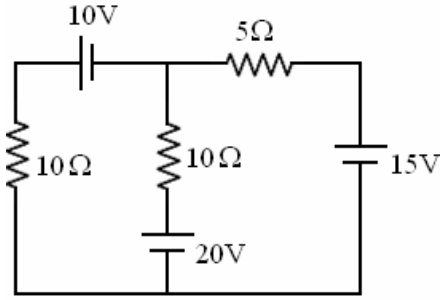



**May 2011, Set 4**

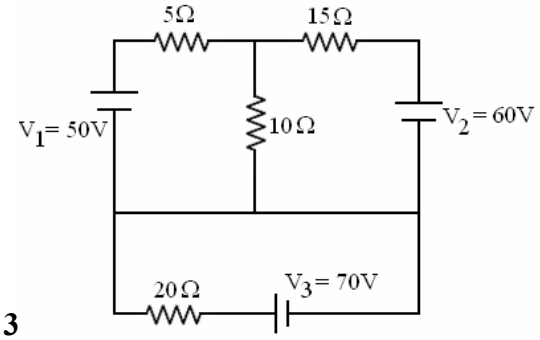
5. (a) State and explain Thevenin's theorem.
   (b) For the below circuit in figure obtain Thevenin's equivalent across ab terminals. **May 2011**, **Set 1**




6. a)Compare Linear & Non – Linear Elements.
   b) In the circuit given below Figure , calculate the current supplied by each source. **[7+8] May 2011, Set 2**

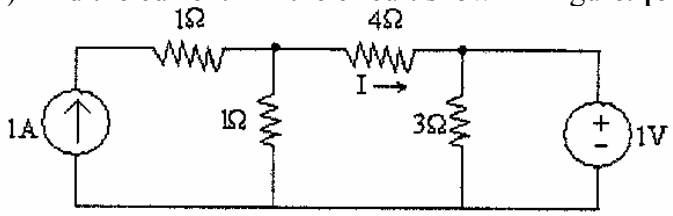



7. By means of mesh current analysis obtain the current supplied by each source in the following circuit (Figure ).



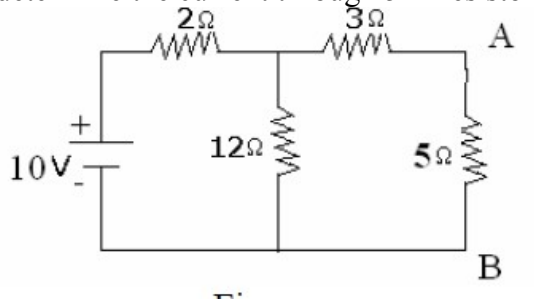

**[15] May 2011, Set 3**

8. a)Explain the steps for solving a network problem using Thevenin's theorem
   b) Find the current I in the circuit shown in figure. **[6+10] June 2010, Set 1,2,3,4**




9. a) Explain Active elements in detail

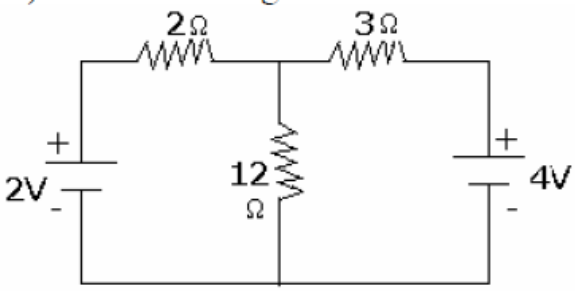
b) By using Thevenin's theorem determine the current through 5 Ω resistor (All resistances are in Ω) as shown




in figure**. [7+8] Nov 2010, Set 1**

10. a) Explain passive elements in detail.

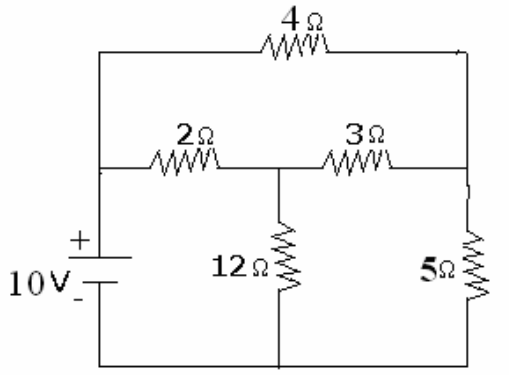
b) Using superposition theorem determine the current through 12 Ω resistor (All resistances are in Ω) as shown




in figure. **[7+8] Nov 2010, Set 2**

11. a) State and explain Maximum power transfer theorem.

b) Find the current supplied by 10 V battery by using Star – Delta transformation for the following network




shown in figure. **[7+8] Nov 2010,Set 4**

## UNIT-III

1. Define the following:

i)Alternating quantity ii)RMS value iii) Average value iv) Form factor **.[8M] Nov-09,Set-2,Sept-07 Set-1&2,May-07 Set 1,2,3**

2. In an R-C series circuit, Voltage across the combination is given by 40 sin (2000t+45), R=10Ω. The current leads the voltage by π/3 rad. Find the value of C. Also find the expression for current. .[**8M] Jan -10, Set-1**

3. A coil A having a resistance of 10 ohms and inductance of 0.2 Henry is connected in series with another coil B having a resistance of 30 ohms and inductance 0.1 H. The two coils in series are fed from 200 V, 50 Hz supply. Determine the voltage across each coil, power dissipated in each coil, and the power factor of the combined series circuit: Draw the phasor (vector) diagram. **[16] June 2010, Set 1**

4. A coil A having a resistance of 10 ohms and inductance of 0.2 Henry is connected in series with another coil B having a resistance of 30 ohms and inductance 0.1 H. The two coils in series are fed from 200 V, 50 Hz supply. Determine the voltage across each coil, power dissipated in each coil, and the power factor of the combined series circuit: Draw the phasor (vector) diagram. **[16] June 2010, Set 2**

5. (a) A current of 10A in a series circuit consisting of R = 10 ; L = 0.1H and C = 100 μF. Find the power, and impedance, if the frequency of the supply is 50Hz.

(b) A 50 Hz sinusoidal voltage; V=141 sin wt is supplied to a series R-L circuit comprising of R=3Ω , and L=0.01272 Henry. Compute :i. the effective value of the steady state current as well as the relative phase angle;

ii. the instantaneous current ( time equation);

iii. effective magnitude, the phase angle of the voltage drops appearing across each circuit element ? **[7+8] May 2011, Set 2**

6. Find the active and reactive components of the current taken by a series circuit consisting of a coil of inductance 0.1 H and resistance 8 and a capacitor of 120μF connected to a 240 V, 50 Hz supply? **[15] MAY 2011, Set 2**

7. (a) An alternative voltage of (160 +j120)V is applied to a circuit and the current in the circuit is given by 6+j8 A. Find : i. the values of elements of the circuit; ii. the power factor of the circuit; iii. power consumed?

(b) A choking coil of negligible resistance takes a current of 3.2A, when connected to 200V, 50Hz supply, Calculate i. inductance, and ii. the current taken by the coil, if the frequency is reduced to 20Hz? [**8+7] May 2011, Set 3**

8. (a) A circuit consists of resistance R, and capacitive reactance of 60 connected in series. Determine the value of R for which p.f. of the circuit is 0.8 and also draw its phasor diagram.

(b) A circuit consisting of a variable resistor in series with a capacitance of 80μF is connected across a 120V, 50Hz supply. Calculate the value of resistance so that the power absorbed is 100W. **[8+7] Dec 2011, Set 2**

9. (a) The voltage applied to a circuit is V = 100 sin(wt+30 $^0$), and the current owing in the circuit is i = 15(wt+60 $^0$). Determine the impedance, resistance, reactance, power and the power factor.

(b) A 230V, 50 Hz voltage is applied to a coil of L = 0.5 H and R = 200 in series with a capacitor C. What value must C have in order that the total voltage across the coil shall be 250V? **Dec 2011, Set 4**

10. (a) The voltage applied to a circuit is: v = 100 sin(wt+30$^0$), and the current owing in the circuit is i = 15(wt+60$^0$). Determine the impedance, resistance, reactance, power and the power factor of the circuit.

(b) A circuit consists of resistance R, and capacitive reactance of 30Ω connected in series. Determine the value of R for which p.f. of the circuit is 0.8 and also draw the phasor diagram. **[8+7] Dec 2011, Set 1**

11. An a.c. circuit consists of a resistance of 5 ohms, an inductance of 0.1 H, and a capacitance of 100 μF, all in series. Determine for this circuit: (a) total reactance; (b) impedance; (c) admittance; (d) susceptance, and

(e) conductance. The supply frequency is 60 Hz. **[15] Dec 2011, Set 3**

## UNIT-IV

1. Explain the construction of a single phase transformer. .[**8M] June-10 Set-1, 2,3, 4.June-09, Set-1**
2. Discuss in detail the difference between the core type and shell type transformer. .[**8M] June-10 Set-1, 2,3,4. June-09 Set-1.**
3. a) Derive an emf equation of a single phase transformer.

   b) The maximum flux density in the core of 250/3000 Volts 50 Hz single phase transformer is 1.2 webers per square meter. If the emf per turn is 8 volts determine primary and secondary turns and area of the core. **[8+8] June 2010, Set 1,2,3,4**
4. A 1- φ phase transformer takes 10A on no-load at a power factor of 0.1. The turns ratio 4:1. If a load is supplied by the secondary at 200 A, and a power factor of 0.8, find the primary current, and the power factor. Neglect the internal voltage drops in a transformer and also draw the phasor diagram. **[15] May 2011, Set 2**

5. (a) The design requirement of a 11,000 / 415 V, 50 Hz, single phase, core-typ transformer are approximate emf/ turn is 15 V, maximum flux density 1.5 T. Find a suitable number of primary, and secondary turns and the net cross sectional area of the core.

   (b) Explain different losses in case of transformer. **[8+7] May 2011, Set 1**

6. A 220/440 V, 10 KVA , 50 Hz single-phase transformer has at full-load, a copper loss of 120 W. If it has an efficiency of 98% at full-load and unity p.f determine the iron losses. What would be the efficiency at half full-load, and 0.8 p.f lagging?[**15] May 2011, Set 3**

7. (a) Explain in detail O.C and S.C tests to be conducted on a transformer for calculation of regulation.

   (b) The open-circuit test readings on a 400/200 V, single phase transformer conducted from L.V side are : voltage = 200 V; current = 0.7 A ; power = 95 W. Calculate the no-load circuit parameters referred to H. V side. **[9+6] Dec 2011, Set 2**

8. (a) Draw the phasor diagram of Transformer under no load.

   (b) A 1,000/200 V transformer takes 0.3 A at p.f of 0.2 on open circuit. Find the magnetizing, and iron loss component of no-load primary current. **[7+8]Dec 2011, Set 4**

9. (a) Describe in detail constructional features of a single - phase, 50 Hz, core-type transformer has a square cores of 20 cm side. Permissible maximum flux- density is 1 wb/$m^2$. Calculate the number of turns per limb on the High and low-voltage sides for a 3000/220 V ratio.

   (b) Derive the induced e.m.f equation of transformer. **[8+7]Dec 2011, Set 1**

10. (a) Derive the induced e.m.f equation of transformer.

    (b) A single-phase, 25 Hz transformer has 50 primary turns and 600 secondary turns. The cross sectional area of the core is 400 sq.cm. If the primary of the transformer is connected to 230 V supply. Find

    i. the secondary induced emf

    ii. the flux density (peak) in the core. **[7+8] Dec 2011, Set 3**

## UNIT-V

1. Draw a detailed sketch of a dc machine and identify the different parts. Briefly explain the function of each major part. **[16] June 2010, Set 1,2,3,4, May 2011, Set 2,4, Dec 2011, Set 2**

2. (a) Discuss the classification of d.c generators with suitable diagrams.

   (b) A 10KW shunt generator supplies load at a terminal voltage of 200 volts. The shunt field resistance is 100 ohms and armature resistance is 0.1 ohm.

3. Calculate the e.m.f induced in the generator. **[7+8] MAY 2011, Set 2**

4. (a) Name the main parts of a D.C. Machine and state the materials of which each part is made.

   (b) A shunt generator delivers 450 A at 230V and the resistances of the shunt field and armature is 50 and 0.03 respectively. Calculate the generated e.m.f. **[15] May 2011, Set 1**

5. a) Explain the compound DC generator with neat circuit diagram.

   (b) The armature of a 4-pole wave wound d.c generator is required to generate an e.m.f of 480V on open circuit when revolving at a speed of 620 rpm. Calculate the magnetic flux per pole required. The armature has 160 slots with 2 coil sides per slot and each coil consisting of three turns. The armature is wave-wound. **May 2011, Set 3**

6. (a) What are the classifications of self excited DC generators and explain series generator?

   (b) A 4-pole lap wound D.C. shunt generator has a useful flux per pole of 0.06wb. The armature winding consists of 240 turns each of 0.0035 resistance. Calculate the terminal voltage when running at 920 rpm, if the armature current is 60A. **Dec 2011, Set 4**

7. A separately excited generator running at 1500 rpm supplies 225A at 120V to a current of constant resistance. What will current be when the speed is dropped to 1000 rpm with the field current unaltered? The armature resistance is 0.06 and the total drop at the brushes is 1.5V. Ignore armature reaction. **[15] Dec 2011, Set 1**

8. (a) What are the applications of DC generators?

   (b) The resistance of the field circuit of a shunt excited d.c generator is 200 when the output of the generator is 120 kW, the terminal voltage is 525V and the generated e.m.f is 550V. Calculate

   i. the armature resistance and

   ii. if the terminal voltage is 540 V at 80 kW of the output what will be the generated emf? **[5+10] Dec 2011, Set 3**

## UNIT-VI

1. (a) Discuss the Significance of back EMF
   (b) A 230V motor has an armature circuit resistance of 0.8. If the full load armature current is 25A and the no load armature current is 6A. Find the change in back e.m.f from no-load to full-load. **[6+9] May 2011, Set 3**
2. (a) Derive the expression for
   i. Back emf relation to the applied voltage in DC motor
   ii. Torque equation of a DC motor.
   (b) A 220V, shunt motor on no load runs at 750rpm and draws a 5A from supply.The armature and field resistance are 0.10ohms and 220ohms respectively.Calculate the speed, when loaded and drawing full load current of 100A from the supply if the armature reaction weakens the field flux by 4%. **[7+8] Dec 2011, Set 4**
3. A 230 V dc shunt motor having an armature resistance of 0.3 takes 3A excluding a field current of 1A when running on no-load. Determine its efficiency taking currents as 30A. **Dec 2011, Set 3**
4. How is the efficiency of the dc motor determined by the direct loading method? Derive the equation for efficiency. **.[8M] June-09 Set-2**
5. Explain the motoring and generating action of a dc machine? **.[8M]Jan-10 Set-3, Nov-09 Set-2**
6. Write down the similarities and dissimilarities between the motors and generators? **.[8M] Nov-09 Set-2, Sept-08, Set-4** Derive torque equation of DC Motor?**.[8M] June-09 Set-2 ,June-08 Set-1,3,4**
7. What is a dc motor? Explain the working of a dc motor. **[8M] Sept-08 Set-4**
8. .What are the differences between the dc shunt motor and series motor? **.[8M] June-09 Set-1, June-08 Set-1**

## UNIT-VII

1. Define .[**8M] i**) Slip speed ii)Slip iii) Synchronous speed iv) Torque **Jan-10 Set-4**

2. Why an induction motor is called a rotating transformer? Justify. **.[8M]Nov-09 Set-1 June-09 Set-1**

3. .A 3-phase induction motor is wound for 4 poles and is supplied from 50Hz system. Calculate the synchronous speed, rotor speed when slip is 4% and rotor frequency when rotor runs at 600rpm.**[8M]Nov-09 Set-1 ,June-09 Set-1**

4. Explain with the help of suitable diagram how the rotating magnetic field is produced in a three phase motor**? [8M]June-08 Set-4, Sept-07 Set-1, May-07 Set-1,2&3**

5. Explain in detail the construction of a 3-phase induction motor specifying in detail the squirrel cage and slip-ring motor construction. **[8M]June-09, Set-2**

6. A 4-pole 50Hz, three phase induction motor has rotor resistance and reactance of 0.03Ω and 0.12Ω per phase respectively. Determine a) the value of speed at which the maximum torque occurs.

b) The value of the external rotor resistance per phase to be inserted to obtain 80% of the maximum torque at the starting.**[10M] Nov-09 ,Set-3**

7. .a)Explain with the help of suitable diagrams how rotating magnetic field is produced in a three phase induction motor.

b) A 6 pole induction motor is fed from 50Hz supply. If the frequency of rotor EMF at full load is 4 Hz. Find the full load speed and % slip. **[10+6] June 2010, Set 1,2,3,4**

8. .(a) Derive the condition for maximum torque under running condition of 3-phase induction Motor

(b) A 50 Hz, 4-pole, 3-phase induction motor has a rotor current of frequency 2Hz. Determine

i. the slip and ii. speed of the motor. **[7+8] May 2011, Set 2**

9. (a) Describe how the rotating magnetic field is produced in 3-Phase winding induction motor

(b) A 3-phase slip ring induction motor with star connected rotor has an inducedemf of 60 V between the slip rings at standstill with normal voltage applied to the stator. The rotor winding has a resistance per phase of 0.5 ohms and standstill reactance per phase of 3 ohm. Calculate the slip and rotor current per phase when the rotor is developing maximum torque. **[7+8] May 2011, Set 3**

10. (a) Explain how the rotating magnetic field is developed in a 3- φ_ induction Motor.

(b) A 6 pole, 3- φ_ induction motor runs at 1140rpm on full load when supplied power from a 60Hz supply. Determine the slip at full load. **[7+8] Dec 2011, Set 4**

11. How the induction motors are classified? Explain the types of induction motors indetail. **Dec 2011, Set**

(a) Explain why a 3-phase induction motor can not develop torque when runningat synchronous speed.

(b) A 3-phase, 4-pole 50Hz induction motor has a slip of 1% at no-load and 3% at full load. Find

i. Synchronous speed ii. Full-load speed ii. No-load speed. **Dec 2011, Set 3**

## UNIT-VIII

1. Give the advantages of moving iron instruments. **.[8M]Jan-10, Set-1,Nov-09 Set-2,June-09 Set-2, June-08 Set-1**
2. Why the scale of a MI instrument is non uniform? Explain**?[8M]Jan-10, Set-3,Nov-09 Set-3,June-09 Set-4**
3. Differentiate between moving coil and moving iron instruments? **[8] Jan-10 Set-2 , June-08 Set-1**
4. a) Discuss the classification of electrical instruments.

   b) Explain the significance of controlling torque and damping torque relevant to the operation of indicating instruments. **[8+8] June 2010, Set 1,2,3,4, Dec 2011 ,Set 2**
5. Explain the construction and working principle of PMMC instruments and list outits advantages. **[15] May 2011, Set 2**
6. Describe the various controlling systems used in measuring systems with neat sketches. **May 2011, Set 4**
7. a). What are the various types of Ammeters and voltmeters?

   (b) Prove that deflecting torque is Proportional to the Square of the current in attraction type M I instruments. **[15] May 2011, Set 1**
8. Derive the relation between the torque and inductance of a moving iron instrument.**[15] Dec 2011, Set 1**
9. Explain the essential requirements of indicating instruments with necessary diagrams. **Dec 2011, Set 3**