Set No. 1

I B.Tech Supplimentary Examinations, Aug/Sep 2007
BASIC ELECTRICAL ENGINEERING
(Common to Computer Science & Engineering, Information Technology
and Computer Science & Systems Engineering)

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Distinguish between
    i. Conductor
    ii. Semi- Conductor
    iii. Insulators and give one example for each.

   (b) Distinguish between
    i. potential difference
    ii. electromotive force.

   (c) Two resistance R_1 and R_2 are connected in parallel and if the current entering the parallel combination is I. Calculate the values of currents I_1, I_2 flowing in the resistance R_1, R_2 in terms I, R_1 R_2.   [6+4+6]

2. (a) State and explain superposition theorem.

   (b) calculate the current through 2 ohm resistor using superposition theorem (All resistances are is ohms). as shown in figure 2   [10+6]
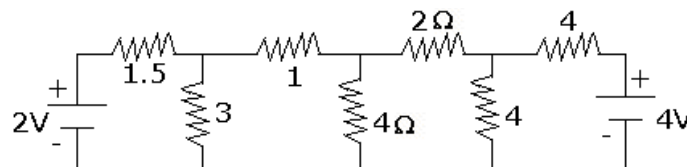

Figure 2

3. (a) Draw the analogy between a magnetic circuit and an electric circuit

   (b) A cast steel ring has a mean diameter of 250 mm diameter and a cross sectional area $250mm^2$. Calculate the reluctance of the material if the relative permeability of the material is 800. if a flux of 400×10^{-6} wb. is to set up in the material, what should be the m.m.f?   [8+8]

4. (a) Define the following
    i. Alternating Quantity
    ii. R.M.S. Value
    iii. Average value
    iv. Form factor.

   (b) A coil having a resistance of 10 ohms and an inductance of 0.2H is connected in series with a 100×10^{-6} F capacitor across a 230V, 50Hz supply, Calculate

     i. The active and reactive components of the current

    ii. the voltage across the coil, Draw the phasor diagram. [8+8]

5. With neat diagram discuss the principle of working of a transformer. [16]

6. (a) Derive the expression of induced emf of dc generator.

   (b) An 8 pole lap wound dc generator has 960 conductors, a flux of 40 milliwebers and is driven at 400 rpm. Find induced emf. [8+8]

7. Explain with the help of suitable diagrams how rotating magnetic field is produced in a three phase induction motor. [16]

8. With a neat sketch explain in detail moving iron repulsion type instrument. [16]

$\star\star\star\star\star$

$$\boxed{\textbf{Set No. 2}}$$

I B.Tech Supplimentary Examinations, Aug/Sep 2007
BASIC ELECTRICAL ENGINEERING
(Common to Computer Science & Engineering, Information Technology
and Computer Science & Systems Engineering)
Time: 3 hours **Max Marks: 80**
Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Write down KVL and KCL in point form?

   (b) For the circuit as shown in figure 1, Calculate the current in the various branches and the power delivered and consumed? [6+10]
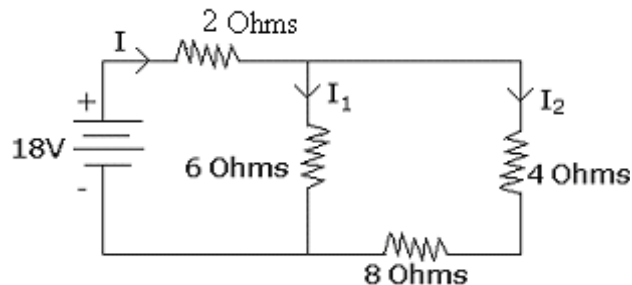

Figure 1

2. (a) State and explain superposition theorem.

   (b) calculate the current through 2 ohm resistor using superposition theorem (All resistances are is ohms). as shown in figure 2 [10+6]
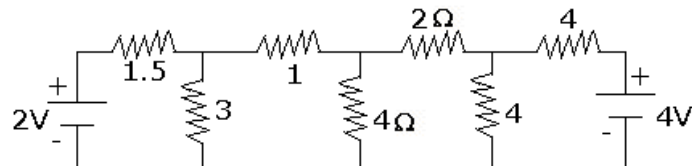

Figure 2

3. (a) Define the terms

   i. Magnetic flux
   ii. Magnetic flux density
   iii. Magneto motive force
   iv. Reluctance.

   (b) The air gap in a magnetic circuits is 1.5 mm long and 2500 mm^2 in cross sectional area. Calculate

   i. the reluctance of the air gap
   ii. the m.m.f required to set up a flux of 800 $\times 10^{-6}$ wb. in the air gap.[8+8]

4. (a) Define the following

   i. Alternating Quantity

ii. R.M.S. Value

iii. Average value

iv. Form factor.

(b) A coil having a resistance of 10 ohms and an inductance of 0.2H is connected in series with a $100{\times}10^{-6}$ F capacitor across a 230V, 50Hz supply, Calculate

i. The active and reactive components of the current

ii. the voltage across the coil, Draw the phasor diagram. [8+8]

5. With neat diagram discuss the principle of working of a transformer. [16]

6. (a) Derive an expression for the speed of a dc motor in terms of back emf and flux per pole.

(b) Explain speed current and speed torque characteristic of dc shunt motor.[8+8]

7. Explain with neat sketches the construction of a synchronous machine. [16]

8. Explain the following with reference to the indicating instruments

(a) Deflecting torque

(b) Controlling torque

(c) Damping torque

(d) Scale and pointer [16]

$\star\star\star\star\star$

$\boxed{\textbf{Set No. 3}}$

I B.Tech Supplimentary Examinations, Aug/Sep 2007
BASIC ELECTRICAL ENGINEERING
(Common to Computer Science & Engineering, Information Technology
and Computer Science & Systems Engineering)
Time: 3 hours   **Max Marks: 80**
Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What is meant by EMF of a source?

    (b) Distinguish between ideal and practical voltage source? Give examples?

    (c) Distinguish between ideal and practical current sources? Give example?

    (d) The internal resistance of a 12v − battery is a0.9 ohms. What will be its terminal voltage when the current drawn from the battery is 2 Amps.[4+4+4+4]

2. (a) Give the statement of Thevenin's theorem and explain by taking a network.

    (b) Determine the current I in the network by using Thevenin's theorem. as shown in figure 2   [10+6]
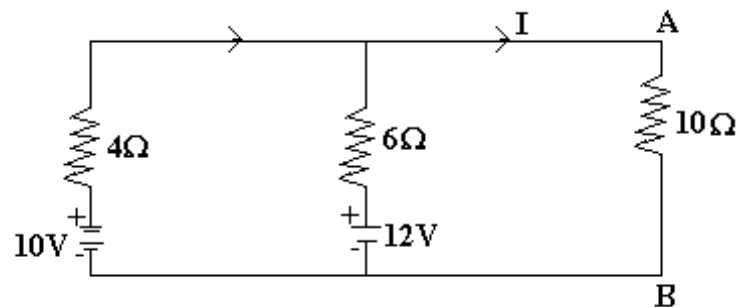

Figure 2

3. (a) Draw the analogy between a magnetic circuit and an electric circuit

    (b) A cast steel ring has a mean diameter of 250 mm diameter and a cross sectional area $250mm^2$. Calculate the reluctance of the material if the relative permeability of the material is 800. if a flux of 400×10^{-6} wb. is to set up in the material, what should be the m.m.f?   [8+8]

4. (a) Define

    i. DC Voltage and

    ii. Alternating voltage and give some examples in terms of pictorial representation.

    (b) Define the terms

    i. frequency

    ii. time period

    iii. Maximum value

(c) Calculate the maximum value, and frequency of a supply voltage of 24 volts 60 Hz which is fed to a residential building and write down expression for instantaneous value. [6+6+4]

5. What is an ideal transformer . Derive an expression for insuced emf in a transformer in terms of frequency the maximum value of flux, and the number of turns on the winding.

[16]

6. (a) Give the concept of counter emf in dc motor.

(b) A 230 volts dc shunt motor takes 51 A at full load. Resistances of armature and field windings are 0.1ohm and 230 ohms respectively. Determine

    i. armature current

    ii. field current

    iii. back emf developed at full load. [8+8]

7. (a) Explain the working principle of three phase induction motor.

(b) A 6 pole induction motor is fed by three phase 50 HZ supply and running with a full load slip of 3%. Find the full load speed of induction motor and also the frequency of rotor emf. [8+8]

8. With a neat sketch explain in detail moving iron attraction type instrument. [16]

⋆ ⋆ ⋆ ⋆ ⋆

Code No: R05010501

Set No. 4

I B.Tech Supplimentary Examinations, Aug/Sep 2007
BASIC ELECTRICAL ENGINEERING
**(Common to Computer Science & Engineering, Information Technology
and Computer Science & Systems Engineering)**

Time: 3 hours   Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What is meant by resistance parameter? What are its units?

   (b) How are Mega −ohms, Kilo-ohms, Milli-ohms and Micro-ohms denoted?

   (c) What is meant by electrical conductance? What are its units?

   (d) Calculate the resistance of coil of diameter 4 cm and containing 400 turns of magnetic wire of 0.5 cm in diameter. Given the resistivity of the material is 42×10^{-6} ohm-cm.   [2+4+2+8]

2. (a) State the principle of constant flux linkages.

   (b) Why is it that current through an inductance does not change suddenly?

   (c) Enumerate the features and uses of inductances.

   (d) A current of 5A is reduced to 2A in 0.05 Sec in a coil of inductance 1.0 H calculate the mean value of the EMF induced in the coil.   [4+3+3+6]

3. (a) Derive expression for force of attraction of an electromagnet and the energy required.

   (b) Determine the force necessary to separate two surface of contact area 400 cm^2 when the flux dentsity normal to the surface is 0.8wb/m^2. Calculate the energy required if the two surface are to be separated through a distance of 2cm.   [8+8]

4. (a) How do you obtain the power factor and power factor angle from.

      i. Impedance triangle
      ii. admittance triangle
      iii. KVA triangle.

   (b) A coil when connected to 200 V d.c Supply dissipates 2000 watts of power. When connected across 200 V, 1 − Phase, 50 HZ supply dissipates 800 watts of power. Calculate the value of resistance and inductance of the coil. [6+10]

5. (a) Define voltage regulation of a transformer. Deduce the expression for the voltage regulation.

   (b) The number of turns on the primary and secondary windings of a single phase transformer are 350 and 35 respectively. If the primary is connected to a 2.2 KV 50 HZ supply determine the secondary voltage.   [8+8]

6. (a) Derive the expression of induced emf of dc generator.

(b) An 8 pole lap wound dc generator has 960 conductors, a flux of 40 milliwebers and is driven at 400 rpm. Find induced emf.   [8+8]

7. Deduce an expression for an induction motor for

   (a) full load torque

   (b) maximum torque.   [16]

8. With a neat sketch explain in detail moving iron attraction type instrument. [16]

⋆⋆⋆⋆⋆