Code No: R05010501 **Set No. 1**

I B.Tech Supplimentary Examinations, Aug/Sep 2008
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

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1. (a) State and Explain Ampere's force law?
   (b) State and explain Faradays laws of Electromagnetic induction?
   (c) A wire of length 50 cm moves at right angle to its length at 40 met./sec. in a uniform magnetic field density of 1.5 wb/m^2 (Tesla). Calculate the magnitude of e.m.f induced in the conductor when the direction of motion is perpendicular to the field? [6+6+4]

2. Deduce an expression for the equivalent capacitance of three capacitors connected in
   (a) Parallel
   (b) Series. Hence calculate the equivalent capacitance if three capacitors of capacitances 2,4, and 8 Micro − Farads are connected in
      i. Series.
      ii. Parallel If a voltage of 10 V is connected, calculate the charge stored in each case. [16]

3. (a) Define the following terms
      i. Magnetic circuit
      ii. Magnetic field strength
      iii. magneto motive force (M M F)
      iv. Reluctance.
   (b) A mild steel ring has a mean diameter of 20cm and cross sectional area of 400 mm^2. Calculate
      i. The reluctance of the ring
      ii. m.m.f. to produce a flux of 500 micro-Weber's
      iii. Magnetic field strength. Assume the relative permeability of mild steel as 1080.0. [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. (a) What is an ideal transformer Draw its no load phasor diagram.

(b) The primary winding of a 50 HZ single phase transformer has 480 turns and is fed from 6400 V supply. The secondary winding has 20 turns. Find the peak value of flux in the core and the secondary Voltage. [8+8]

6. Explain what is meant by back emf and also derive the expression for the same. [16]

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. (a) Discusss the classification of electrical instruments.

(b) Explain the significance of controlling torque and damping torque relevant to the operation of indicating instruments. [8+8]

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Code No: R05010501 **Set No. 2**

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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

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1. (a) State and Explain Ampere's force law?
   (b) State and explain Faradays laws of Electromagnetic induction?
   (c) A wire of length 50 cm moves at right angle to its length at 40 met./sec. in a uniform magnetic field density of 1.5 wb/m^2 (Tesla). Calculate the magnitude of e.m.f induced in the conductor when the direction of motion is perpendicular to the field? [6+6+4]

2. Using Thevenin's theorem calculate the current I through the resistance connected between the terminal A & B (All resistances are in ohms). As shown in figure 2. [16]

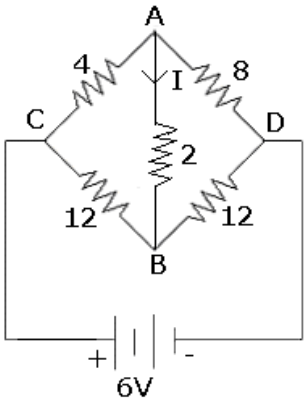

Figure 2

3. (a) Explain the magnetization characteristics of Ferromagnetic materials: with sketches/ graphs
   (b) An iron ring of mean length 50 cm has an air gap of 3 mm and a winding of 200 turns. If the permeability of iron core is 400, and the winding carries a current of 1.5 amp., Calculate the value of the flux density. [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. (a) What are the functions of a transformer.
   (b) Derive an expression for voltage per turn of a transformer. [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 repulsion type instrument. [16]

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Code No: R05010501 **Set No. 3**

I B.Tech Supplimentary Examinations, Aug/Sep 2008
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

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1. (a) Write down KVL and KCL in point form?
   (b) For the circuit as shown in figure 1b, Calculate the current in the various branches and the power delivered and consumed? [6+10]

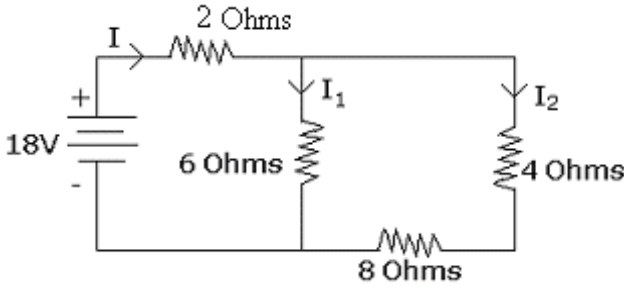

Figure 1b

2. (a) Define the term current, and define the unit of current.
   (b) Distinguish between potential difference between the points and the potential gradient.
   (c) Find the potential difference between the points A and B and the potential gradient, given the point A is at + 30V and point B is at -30V and separated by a distance of 2 Mts. [4+4+8]

3. (a) Two coils 1 and 2 having self inductances L_1, and L_2 henrys respectively and mutual inductance M are wound coaxially on an insulating cylinder. Derive an expression for the total inductance when the two coils are connected with fluxes in aiding position and opposing position (differential)
   (b) The combined inductance of two coils connected in series is 1.2 H or 0.2 H depending on the relative directions of the current in the coils. If one of coils has a self inductance of 0.4H; Calculate
      i. Self inductance of the second coil
      ii. Mutual inductance between the coil
      iii. the coupling coefficient. [8+8]

4. A resistance of 20 Ohms, an inductive reactance of 5 Ohms, and a capacitive reactance of 10 Ohms are connected in parallel with each other across a supply of 200 $\angle 45^0$ Volts. Calculate
   (a) Impedance and admittance of each branch

(b) Current in each branch

(c) Total current drawn from the supply

(d) Draw the phasor diagram. [4+4+4+4]

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 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. (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. Explain the following with reference to the indicating instruments

   (a) Deflecting torque

   (b) Controlling torque

   (c) Damping torque

   (d) Scale and pointer [16]

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Code No: R05010501 **Set No. 4**

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Write down KVL and KCL in point form?
   (b) For the circuit as shown in figure 1b, Calculate the current in the various branches and the power delivered and consumed? [6+10]

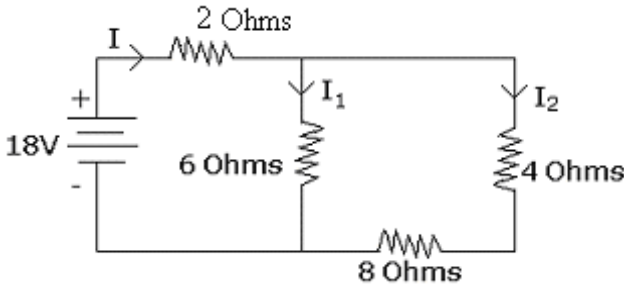

Figure 1b

2. Using Thevenin's theorem calculate the current I through the resistance connected between the terminal A & B (All resistances are in ohms). As shown in figure 2. [16]

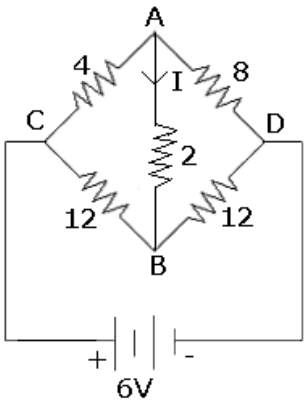

Figure 2

3. (a) Compare magnetic circuit with electric circuit and write down the analogy between the two.
   (b) A cast steel magnet has an air gap of 3mm and an iron path of 35cm. find the number of ampere turns (A) necessary for producing a flux density of 1.25 wbs/m^2 (Tesla). The relative permeability of cast steel is 1000 Neglect leakage and fringing. [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. (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. What is the principle of operation of a dc generator ? Why is commutator and brush arrangement necessary for the operation of dc generator. [16]

7. Deduce an expression for an induction motor for

(a) full load torque
(b) maximum torque. [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]

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