Code.No: A109210504 | R09 | SET-1

II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
BASIC ELECTRICAL ENGINEERING
(COMMON TO CSE, IT)

Time: 3hours **Max.Marks:75**

Answer any FIVE questions
All questions carry equal marks
- - -

1.a) State and explain Ohms 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? [7+8]

2.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]
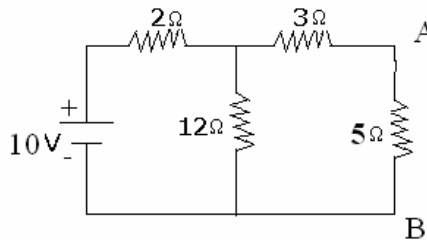
Figure

3.a) Derive the expression for root mean square value of an alternating sinusoidal current wave form $I = I_m \sin \theta$.
  b) A reactor having negligible resistance and an inductance of 0.1 H is connected in series with a resistor of 15 ohms. The circuit is connected across a 230 V, 50 Hz, Single phase AC supply. Find
  i) Current flowing through the circuit
  ii) Power factor of the circuit
  iii) Voltage across the reactor. [7+8]

4.a) Explain the principle of operation of a Transformer.
  b) A single phase transformer working at unity power factor has an efficiency of 90 % at both one half load and at the full load of 500 W. Determine the efficiency at 75 % of full load. [7+8]

5.a) Explain the principle of operation of DC generator.
  b) A 6 – pole, Lap wound armature has 840 conductors and flux per pole of 0.018 Wb. Calculate the emf generated when the machine is running at 600 rpm. [7+8]

6.a) Explain the principle of operation of DC motors.
  b) The armature of a 6 – pole, 6 circuit DC shunt motor takes 300 A at speed of 400 rpm. The flux per pole 75 mWb. The number of armature turns is 500. The torque lost in windage, friction and iron losses can be assumed as 2.5 %.
  Calculate
    i) The torque developed by the armature
    ii) The shaft torque.   [7+8]

7.a) Explain the principle of operation of a 3 phase induction motor.
  b) A 3 – phase, 6 – pole, 50 Hz induction motor develops 4 kW including friction and windage losses at 950 rpm. If the stator loss is 250 W. Find the slip of the induction motor.   [10+5]

8. Explain the construction and operation of Permanent Magnet Moving Coil instruments with a neat diagram.   [15]

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II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
BASIC ELECTRICAL ENGINEERING
(COMMON TO CSE, IT)

Time: 3hours **Max.Marks:75**

Answer any FIVE questions
All questions carry equal marks
- - -

1.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]

2.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]
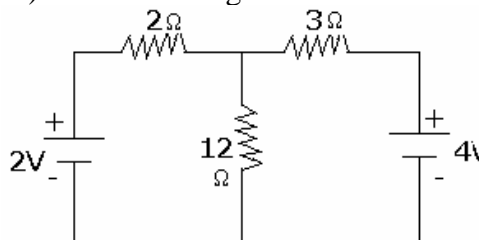
Figure

3.a) Derive the expression for average value of an alternating sinusoidal current wave form $I = I_m \sin \theta$.
 b) A capacitor of 100 µF is connected across 200 V, 50 Hz, Single phase supply.
 Calculate
 i) The reactance of the capacitor
 ii) RMS value of the current
 iii) The maximum value of the current. [7+8]

4. Define efficiency and regulation of a Transformer. Explain how will you pre - determine the efficiency and regulation with neat circuit diagrams. [15]

5.a) Explain how will you classify DC generators in detail and also explain the types of DC generators.
 b) A 4 – pole wave connected DC generator having 60 slots on its armature with 6 conductors per slot, runs at 750 rpm and generates an open circuit voltage of 230 V. Find the useful flux per pole. [10+5]

6.a) Derive the torque equation of a DC motor.
 b) A 200V DC shunt motor takes a total current of 100 A and runs at 750 rpm. The resistance of the armature winding and shunt field winding is 0.1 ohms and 40 ohms respectively. Find the torque developed by the armature. [7+8]

7.a) Explain with the help of diagrams how a rotating magnetic field is produced in a 3 phase induction motor.
 b) A 3 – phase, 6 – pole, 50 Hz induction motor develops 4 kW including friction and windage losses at 950 rpm. If the stator loss is 250 W. Find the rotor frequency. [9+6]

8. Explain the construction and operation of Moving iron attraction type instruments with a neat diagram. [15]

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Code.No: A109210504 | R09 | SET-3

II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
BASIC ELECTRICAL ENGINEERING
(COMMON TO CSE, IT)

Time: 3hours **Max.Marks:75**

Answer any FIVE questions
All questions carry equal marks

- - -

1.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]

2.a) State and explain Superposition theorem.
  b) Write short notes on star – delta transformation. If R_{ab}, R_{bc} and R_{ca} are connected in delta, derive the expressions for equivalent star connection. [7+8]

3.a) Show that power dissipated by a pure inductor exited by a sinusoidal voltage source $V = V_m \sin \omega t$ is Zero.
  b) An alternating current is expressed as I = 14.14 Sin 314t.
     Determine:
     i) RMS current   ii) Average current
     iii) Form factor   iv) Peak factor. [7+8]

4.a) Explain the constructional details of Transformer.
  b) A 100 kVA, 1000/10000 V, 50 Hz, Single phase transformer has an iron loss of 1100 W. The copper loss with 5 A in the high voltage winding is 400 W. Calculate the efficiency at 25 %, 0.8 Power factor. The out put terminal voltage being maintained at 10000 V.

  [7+8]

5.a) Derive the emf equation of a DC generator.
  b) A 4 – pole DC shunt generator with lap connected armature supplies a load of 100 A at 200 V. The armature resistance 0.1 ohms and the shunt field resistance is 80 ohms find the
     i) Total armature current
     ii) Current per armature path
     iii) Emf generated. [7+8]

6.a) Explain the losses that occur in a DC machine.
  b) A 200V DC shunt motor takes a total current of 100 A and runs at 750 rpm. The resistance of the armature winding and shunt field winding is 0.1 ohms and 40 ohms respectively. Find the total copper losses. [7+8]

7.a) Explain with the help of diagrams how a rotating magnetic field is produced in a 3 phase induction motor.
  b) Three phase induction motor is wound for 4 – poles and is supplied from a 50 Hz supply. Calculate
     i) The synchronous speed
     ii) The speed of the motor when the slip is 3 %
     iii) The rotor frequency. [9+6]

8. Explain the construction and operation of Moving iron repulsion type instruments with a neat diagram. [15]

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Code.No: A109210504　　　　R09　　　　SET-4

II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
BASIC ELECTRICAL ENGINEERING
(COMMON TO CSE, IT)

Time: 3hours　　　　　　　　　　　　　　　　**Max.Marks:75**

Answer any FIVE questions
All questions carry equal marks

- - -

1.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.　　　　　　　　　　　　　　[7+8]

2.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]
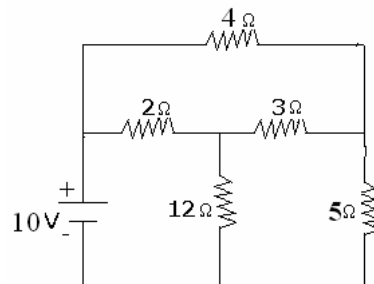
Figure

3.a)　Show that power dissipated by a pure capacitor exited by a sinusoidal voltage source $V = V_m \sin \omega t$ is Zero.

　b)　An alternating current is expressed as $I = 14.14 \sin 314t$. Determine:

　　i)　Maximum current　　ii)　RMS current

　　iii)　Frequency　　　　iv)　Instantaneous current when $t = 0.02$ ms.　　[7+8]

4.a)　Explain the losses that occur in Transformers.

　b)　A 100 kVA, 1000/10000 V, 50 Hz, Single phase transformer has an iron loss of 1100 W. The copper loss with 5 A in the high voltage winding is 400 W. Calculate the efficiency at 25 %, Unity Power factor. The out put terminal voltage being maintained at 10000 V.

　　　　　　　　　　　　　　　　　　　　　　　[7+8]

5.a)　Explain the types of DC generators in detail.

　b)　A lap wound DC generator having 80 slots with 10 conductors per slot generates at no load emf of 400 V, when running at 1000 rpm. At what speed should it be rotated to generate a voltage of 220 V on open circuit.　　　　　　　　[7+8]

6.a)　What is the significance of back emf generated in a DC machine, hence explain the principle of operation of a DC motor.

　b)　A 100V series motor takes 45 A when running at 750 rpm. Its armature resistance is 0.22 ohms, while the series field resistance is 0.13 ohms. Iron and frictional losses amounts to 750 W. Find the shaft power.　　　　　　　　　　[7+8]

7.a) Explain the principle of operation of a 3 phase induction motor.
  b) Three phase induction motor is wound for 6 – poles and is supplied from a 50 Hz supply. Calculate
    i) The synchronous speed
    ii) The speed of the motor when the slip is 3 %
    iii) The rotor frequency when the speed of the rotor is 900 rpm.   [9+6]

8. Explain the following with reference to the measuring instruments:
    i) Deflecting torque   ii) Controlling torque   iii) Damping torque
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