Code No: RR220402 | RR | | Set No. 2 |

Time: 3 hours   Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What are all the various losses in a D.C. Machine?

    (b) A series motor of resistance 1 ohm between terminals runs at 1,000rpm at 250Vwith a current of 20A. Find the speed at which it will run when connected in series with a 6Ω resistance and taking the same current at the same supply voltage.

    (c) Derive an expression for efficiency of a D.C. Machine.   [4+8+4]

2. (a) Explain the rotor resistance starter for an induction motor.

    (b) A 3-phase, 6 pole, 400 V, 50 Hz induction motor. takes a power input of 35 kW at its full-load speed of 890 r.p.m. The total stator losses are 1 kW and the friction and windage losses are 1.5 kW.
    Calculate
       i. slip
       ii. rotor ohmic losses
       iii. shaft power
       iv. shaft torque and
       v. efficiency.   [6+10]

3. (a) Define efficiency of a transformer. Obtain the condition for maximum efficiency.   [2+6]

    (b) A 25 kVA, 2500 / 250 V, single-phase transformer gave the following test results.

O.C. test (LV side):	250 V	1.4A	105 Watts
S.C. test (HV side):	105V	8A	320 Watts

    Compute the equivalent circuit parameters referred to LV side and HV side. Also obtain percentage regulation at full load with 0.8 power factor lagging.
                                                                        [8]

4. (a) Explain the operation of a single phase induction motor on the basis of double revolving field theory.

    (b) Draw a typical torque-speed curve of a single-phase induction motor on the basis of double revolving field theory.   [8+8]

5. (a) Draw the phasor diagram of a transformer on
       i. no load,

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      ii. full load with inductive load and explain.

  (b) A 1-phase transformer is supplied 6000 V. The terminal voltage on the secondary side when loaded at power factor 0.8 is 254 V. The equivalent resistance and reactance drops are 1 and 5%. Find the turn ratio. [8+8]

6. (a) Derive e.m.f equation for an alternator and explain distribution factor and pitch factor used in e.m.f. Equation.

  (b) Write the expression showing the relationship between speed frequency and no. of poles of a synchronous machine. The speed of rotation of the turbine driving an alternator is 166.7 r.p.m. What should be the no. of poles of the alternator if it is to generate voltage 50HZ. [10+6]

7. (a) Explain how a.c. voltage generated is converted to D.C. voltage in a generator?

  (b) What is the main purpose of laminating the armature core of a D.C. Generator.

  (c) A 4-pole, long shunt, lap wound generator supplies 25kw at a terminal voltage of 500 V. The armature resistance is 0.03Ω, series field resistance is 0.04Ω and shunt field resistance is 200Ω. The brush drop may be taken as 1 V. Determine the e m f generated. [5+3+8]

8. (a) Compare $3 - \phi$ induction motor with $3 - \phi$ synchronous motor in any four aspects.

  (b) The input to an 1100 V, 3 phase star connected synchronous motor is 60 A. The effective resistance and synchronous reactance per phase is 1 ohm and 30 ohm respectively. Find the power supplied to the motor and the induced e.m.f for a power factor of 0.95 leading. [6+10]

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Code No: **RR220402**　　　　**RR**　　　　**Set No. 4**

II B.Tech II Semester Examinations,December 2010
ELECTRICAL TECHNOLOGY
Common to IT, ICE, E.COMP.E, ETM, CSE, ECE, CSSE
Time: 3 hours　　　　　　　　　　　　　　　　Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Define efficiency of a transformer. Obtain the condition for maximum efficiency. [2+6]
   (b) A 25 kVA, 2500 / 250 V, single-phase transformer gave the following test results.

O.C. test (LV side):	250 V	1.4A	105 Watts
S.C. test (HV side):	105V	8A	320 Watts

   Compute the equivalent circuit parameters referred to LV side and HV side. Also obtain percentage regulation at full load with 0.8 power factor lagging. [8]

2. (a) Explain the operation of a single phase induction motor on the basis of double revolving field theory.
   (b) Draw a typical torque-speed curve of a single-phase induction motor on the basis of double revolving field theory. [8+8]

3. (a) Explain how a.c. voltage generated is converted to D.C. voltage in a generator?
   (b) What is the main purpose of laminating the armature core of a D.C. Generator.
   (c) A 4-pole, long shunt, lap wound generator supplies 25kw at a terminal voltage of 500 V. The armature resistance is 0.03Ω, series field resistance is 0.04Ω and shunt field resistance is 200Ω. The brush drop may be taken as 1 V. Determine the e m f generated. [5+3+8]

4. (a) Draw the phasor diagram of a transformer on
      i. no load,
      ii. full load with inductive load and explain.
   (b) A 1-phase transformer is supplied 6000 V. The terminal voltage on the secondary side when loaded at power factor 0.8 is 254 V. The equivalent resistance and reactance drops are 1 and 5%. Find the turn ratio. [8+8]

5. (a) Compare $3-\phi$ induction motor with $3-\phi$ synchronous motor in any four aspects.
   (b) The input to an 1100 V, 3 phase star connected synchronous motor is 60 A. The effective resistance and synchronous reactance per phase is 1 ohm and 30 ohm respectively. Find the power supplied to the motor and the induced e.m.f for a power factor of 0.95 leading. [6+10]

3

6. (a) Derive e.m.f equation for an alternator and explain distribution factor and pitch factor used in e.m.f. Equation.

   (b) Write the expression showing the relationship between speed frequency and no. of poles of a synchronous machine. The speed of rotation of the turbine driving an alternator is 166.7 r.p.m. What should be the no. of poles of the alternator if it is to generate voltage 50HZ.   [10+6]

7. (a) Explain the rotor resistance starter for an induction motor.

   (b) A 3-phase, 6 pole, 400 V, 50 Hz induction motor. takes a power input of 35 kW at its full-load speed of 890 r.p.m. The total stator losses are 1 kW and the friction and windage losses are 1.5 kW.
   Calculate
      i. slip
      ii. rotor ohmic losses
      iii. shaft power
      iv. shaft torque and
      v. efficiency.   [6+10]

8. (a) What are all the various losses in a D.C. Machine?

   (b) A series motor of resistance 1 ohm between terminals runs at 1,000rpm at 250Vwith a current of 20A. Find the speed at which it will run when connected in series with a 6Ω resistance and taking the same current at the same supply voltage.

   (c) Derive an expression for efficiency of a D.C. Machine.   [4+8+4]

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Code No: RR220402 $\boxed{\textbf{RR}}$ $\boxed{\textbf{Set No. 1}}$

II B.Tech II Semester Examinations,December 2010
ELECTRICAL TECHNOLOGY
Common to IT, ICE, E.COMP.E, ETM, CSE, ECE, CSSE

Time: 3 hours Max Marks: 80

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

1. (a) Explain the rotor resistance starter for an induction motor.

   (b) A 3-phase, 6 pole, 400 V, 50 Hz induction motor. takes a power input of 35 kW at its full-load speed of 890 r.p.m. The total stator losses are 1 kW and the friction and windage losses are 1.5 kW.
   Calculate
       i. slip
       ii. rotor ohmic losses
       iii. shaft power
       iv. shaft torque and
       v. efficiency. [6+10]

2. (a) Derive e.m.f equation for an alternator and explain distribution factor and pitch factor used in e.m.f. Equation.

   (b) Write the expression showing the relationship between speed frequency and no. of poles of a synchronous machine. The speed of rotation of the turbine driving an alternator is 166.7 r.p.m. What should be the no. of poles of the alternator if it is to generate voltage 50HZ. [10+6]

3. (a) Draw the phasor diagram of a transformer on
       i. no load,
       ii. full load with inductive load and explain.

   (b) A 1-phase transformer is supplied 6000 V. The terminal voltage on the secondary side when loaded at power factor 0.8 is 254 V. The equivalent resistance and reactance drops are 1 and 5%. Find the turn ratio. [8+8]

4. (a) Define efficiency of a transformer. Obtain the condition for maximum efficiency. [2+6]

   (b) A 25 kVA, 2500 / 250 V, single-phase transformer gave the following test results.

O.C. test (LV side):	250 V	1.4A	105 Watts
S.C. test (HV side):	105V	8A	320 Watts

   Compute the equivalent circuit parameters referred to LV side and HV side. Also obtain percentage regulation at full load with 0.8 power factor lagging. [8]

5. (a) Compare $3 - \phi$ induction motor with $3 - \phi$ synchronous motor in any four aspects.

   (b) The input to an 1100 V, 3 phase star connected synchronous motor is 60 A. The effective resistance and synchronous reactance per phase is 1 ohm and 30 ohm respectively. Find the power supplied to the motor and the induced e.m.f for a power factor of 0.95 leading.   [6+10]

6. (a) Explain how a.c. voltage generated is converted to D.C. voltage in a generator?

   (b) What is the main purpose of laminating the armature core of a D.C. Generator.

   (c) A 4-pole, long shunt, lap wound generator supplies 25kw at a terminal voltage of 500 V. The armature resistance is 0.03Ω, series field resistance is 0.04Ω and shunt field resistance is 200Ω. The brush drop may be taken as 1 V. Determine the e m f generated.   [5+3+8]

7. (a) What are all the various losses in a D.C. Machine?

   (b) A series motor of resistance 1 ohm between terminals runs at 1,000rpm at 250Vwith a current of 20A. Find the speed at which it will run when connected in series with a 6Ω resistance and taking the same current at the same supply voltage.

   (c) Derive an expression for efficiency of a D.C. Machine.   [4+8+4]

8. (a) Explain the operation of a single phase induction motor on the basis of double revolving field theory.

   (b) Draw a typical torque-speed curve of a single-phase induction motor on the basis of double revolving field theory.   [8+8]

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Code No: RR220402 | **RR** | **Set No. 3**

II B.Tech II Semester Examinations,December 2010
ELECTRICAL TECHNOLOGY
Common to IT, ICE, E.COMP.E, ETM, CSE, ECE, CSSE
Time: 3 hours   Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Derive e.m.f equation for an alternator and explain distribution factor and pitch factor used in e.m.f. Equation.

   (b) Write the expression showing the relationship between speed frequency and no. of poles of a synchronous machine. The speed of rotation of the turbine driving an alternator is 166.7 r.p.m. What should be the no. of poles of the alternator if it is to generate voltage 50HZ.   [10+6]

2. (a) Explain how a.c. voltage generated is converted to D.C. voltage in a generator?

   (b) What is the main purpose of laminating the armature core of a D.C. Generator.

   (c) A 4-pole, long shunt, lap wound generator supplies 25kw at a terminal voltage of 500 V. The armature resistance is 0.03Ω, series field resistance is 0.04Ω and shunt field resistance is 200Ω. The brush drop may be taken as 1 V. Determine the e m f generated.   [5+3+8]

3. (a) Define efficiency of a transformer. Obtain the condition for maximum efficiency.   [2+6]

   (b) A 25 kVA, 2500 / 250 V, single-phase transformer gave the following test results.

O.C. test (LV side):	250 V	1.4A	105 Watts
S.C. test (HV side):	105V	8A	320 Watts

   Compute the equivalent circuit parameters referred to LV side and HV side. Also obtain percentage regulation at full load with 0.8 power factor lagging.
                                                                       [8]

4. (a) Draw the phasor diagram of a transformer on
      i. no load,
      ii. full load with inductive load and explain.

   (b) A 1-phase transformer is supplied 6000 V. The terminal voltage on the secondary side when loaded at power factor 0.8 is 254 V. The equivalent resistance and reactance drops are 1 and 5%. Find the turn ratio.   [8+8]

5. (a) Explain the rotor resistance starter for an induction motor.

   (b) A 3-phase, 6 pole, 400 V, 50 Hz induction motor. takes a power input of 35 kW at its full-load speed of 890 r.p.m. The total stator losses are 1 kW and the friction and windage losses are 1.5 kW.
      Calculate

7

        i. slip

      ii. rotor ohmic losses

    iii. shaft power

    iv. shaft torque and

     v. efficiency.   [6+10]

6. (a) Compare $3 - \phi$ induction motor with $3 - \phi$ synchronous motor in any four aspects.

   (b) The input to an 1100 V, 3 phase star connected synchronous motor is 60 A. The effective resistance and synchronous reactance per phase is 1 ohm and 30 ohm respectively. Find the power supplied to the motor and the induced e.m.f for a power factor of 0.95 leading.   [6+10]

7. (a) What are all the various losses in a D.C. Machine?

   (b) A series motor of resistance 1 ohm between terminals runs at 1,000rpm at 250Vwith a current of 20A. Find the speed at which it will run when connected in series with a 6Ω resistance and taking the same current at the same supply voltage.

   (c) Derive an expression for efficiency of a D.C. Machine.   [4+8+4]

8. (a) Explain the operation of a single phase induction motor on the basis of double revolving field theory.

   (b) Draw a typical torque-speed curve of a single-phase induction motor on the basis of double revolving field theory.   [8+8]

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