Code No: RR211001 **RR** **Set No. 2**

II B.Tech I Semester Examinations,November 2010
ELECTRICAL TECHNOLOGY
Common to Bio-Medical Engineering, Electronics And Control Engineering, Electronics And Instrumentation Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) With the help of O.C.C. explain how voltage is build up in a D.C. shunt generator.
   (b) State the reasons for droop in terminal voltage of a D.C. shunt generator when it is loaded.
   (c) The magnetization curve of a d.c. shunt generator running at 1000rpm is as follows:

Filed amperes:	0.25	0.5	1.0	1.5	2.0	2.5	3.0
EMF Volts:	36.0	72.0	138.0	188.0	225.0	250.0	27.0

   Find
   i. the value of field resistance to give 240V on no-load
   ii. the speed at which the generator just fails to build up. [6+4+6]

2. (a) What is a stepper motor? Enumerate its advantages and applications.
   (b) With neat sketch, explain the working principle of shaded-pole single-phase induction motor. [8+8]

3. (a) Explain the principle of operation of synchronous motors.
   (b) A 3-phase alternator is rated at 5 KVA, 110V, 26.3A, 50 Hz and 1200 r.p.m. The stator resistance between terminals as measured with dc is 0.2 ohm. With no load and rated speed the stator line voltage is 160V for a field current of 4A.At rated speed, the short circuit stator current per terminal is 50A for a field current of 4A.compute voltage regulation of alternator at 0.8 p.f. Lagging. Using synchronous impedance method. [8+8]

4. (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]

5. (a) Define voltage regulation of an alternator. Explain synchronous impedance method of determining regulation of an alternator.

   (b) Calculate the voltage induced per phase in a 3phase 50 Hz, alternator having a flux per pole of 0.1515 wb. The no. of conductors in series are 360. Assume full pitch coil with a distribution factor of 0.96. [8+8]

6. (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]

7. Write short notes on:

   (a) OC and SC tests on transformers.

   (b) Losses in transformers. [10+6]

8. (a) Derive the condition for maximum efficiency of a transformer.

   (b) The parameters of the equivalent circuit for a 1-phase transformer are $R_0 = 400\ \Omega$, $X_0 = 231\Omega$, $R_t = 0.16\Omega$ *and* $X_t = 0.7\Omega$. The input voltage is 200 V, and load $5.96 + j4.44\Omega$. (All values are referred to primary.) The ratio of secondary to primary turns is 10. Find the secondary terminal voltage; the primary current; and the efficiency. [8+8]

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Code No: RR211001 **RR** **Set No. 4**

II B.Tech I Semester Examinations,November 2010
ELECTRICAL TECHNOLOGY
Common to Bio-Medical Engineering, Electronics And Control Engineering, Electronics And Instrumentation Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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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) With the help of O.C.C. explain how voltage is build up in a D.C. shunt generator.
   (b) State the reasons for droop in terminal voltage of a D.C. shunt generator when it is loaded.
   (c) The magnetization curve of a d.c. shunt generator running at 1000rpm is as follows:

Filed amperes:	0.25	0.5	1.0	1.5	2.0	2.5	3.0
EMF Volts:	36.0	72.0	138.0	188.0	225.0	250.0	27.0

   Find
   i. the value of field resistance to give 240V on no-load
   ii. the speed at which the generator just fails to build up. [6+4+6]

3. (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]

4. (a) Define voltage regulation of an alternator. Explain synchronous impedance method of determining regulation of an alternator.

(b) Calculate the voltage induced per phase in a 3phase 50 Hz, alternator having a flux per pole of 0.1515 wb. The no. of conductors in series are 360. Assume full pitch coil with a distribution factor of 0.96. [8+8]

5. (a) Derive the condition for maximum efficiency of a transformer.

(b) The parameters of the equivalent circuit for a 1-phase transformer are $R_0 = 400\ \Omega$, $X_0 = 231\Omega$, $R_t = 0.16\Omega$ *and* $X_t = 0.7\Omega$. The input voltage is 200 V, and load $5.96 + j4.44\Omega$. (All values are referred to primary.) The ratio of secondary to primary turns is 10. Find the secondary terminal voltage; the primary current; and the efficiency. [8+8]

6. (a) Explain the principle of operation of synchronous motors.

(b) A 3-phase alternator is rated at 5 KVA, 110V, 26.3A, 50 Hz and 1200 r.p.m. The stator resistance between terminals as measured with dc is 0.2 ohm. With no load and rated speed the stator line voltage is 160V for a field current of 4A.At rated speed, the short circuit stator current per terminal is 50A for a field current of 4A.compute voltage regulation of alternator at 0.8 p.f. Lagging. Using synchronous impedance method. [8+8]

7. (a) What is a stepper motor? Enumerate its advantages and applications.

(b) With neat sketch, explain the working principle of shaded-pole single-phase induction motor. [8+8]

8. Write short notes on:

(a) OC and SC tests on transformers.

(b) Losses in transformers. [10+6]

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Code No: RR211001 **RR** **Set No. 1**

II B.Tech I Semester Examinations,November 2010
ELECTRICAL TECHNOLOGY
Common to Bio-Medical Engineering, Electronics And Control Engineering, Electronics And Instrumentation Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Derive the condition for maximum efficiency of a transformer.
   (b) The parameters of the equivalent circuit for a 1-phase transformer are $R_0 = 400\ \Omega$, $X_0 = 231\Omega$, $R_t = 0.16\Omega$ *and* $X_t = 0.7\Omega$. The input voltage is 200 V, and load $5.96 + j4.44\Omega$. (All values are referred to primary.) The ratio of secondary to primary turns is 10. Find the secondary terminal voltage; the primary current; and the efficiency. [8+8]

2. (a) Explain the principle of operation of synchronous motors.
   (b) A 3-phase alternator is rated at 5 KVA, 110V, 26.3A, 50 Hz and 1200 r.p.m. The stator resistance between terminals as measured with dc is 0.2 ohm. With no load and rated speed the stator line voltage is 160V for a field current of 4A.At rated speed, the short circuit stator current per terminal is 50A for a field current of 4A.compute voltage regulation of alternator at 0.8 p.f. Lagging. Using synchronous impedance method. [8+8]

3. (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]

4. (a) With the help of O.C.C. explain how voltage is build up in a D.C. shunt generator.
   (b) State the reasons for droop in terminal voltage of a D.C. shunt generator when it is loaded.
   (c) The magnetization curve of a d.c. shunt generator running at 1000rpm is as follows:

Filed amperes:	0.25	0.5	1.0	1.5	2.0	2.5	3.0
EMF Volts:	36.0	72.0	138.0	188.0	225.0	250.0	27.0

   Find
   i. the value of field resistance to give 240V on no-load
   ii. the speed at which the generator just fails to build up. [6+4+6]

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
   i. slip
   ii. rotor ohmic losses
   iii. shaft power
   iv. shaft torque and
   v. efficiency. [6+10]

6. (a) What is a stepper motor? Enumerate its advantages and applications.
   (b) With neat sketch, explain the working principle of shaded-pole single-phase induction motor. [8+8]

7. (a) Define voltage regulation of an alternator. Explain synchronous impedance method of determining regulation of an alternator.
   (b) Calculate the voltage induced per phase in a 3phase 50 Hz, alternator having a flux per pole of 0.1515 wb. The no. of conductors in series are 360. Assume full pitch coil with a distribution factor of 0.96. [8+8]

8. Write short notes on:
   (a) OC and SC tests on transformers.
   (b) Losses in transformers. [10+6]

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Code No: RR211001 **RR** **Set No. 3**

II B.Tech I Semester Examinations,November 2010
ELECTRICAL TECHNOLOGY
Common to Bio-Medical Engineering, Electronics And Control Engineering, Electronics And Instrumentation Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Write short notes on:
   (a) OC and SC tests on transformers.
   (b) Losses in transformers. [10+6]
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 voltage regulation of an alternator. Explain synchronous impedance method of determining regulation of an alternator.
   (b) Calculate the voltage induced per phase in a 3phase 50 Hz, alternator having a flux per pole of 0.1515 wb. The no. of conductors in series are 360. Assume full pitch coil with a distribution factor of 0.96. [8+8]
4. (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]
5. (a) Explain the principle of operation of synchronous motors.
   (b) A 3-phase alternator is rated at 5 KVA, 110V, 26.3A, 50 Hz and 1200 r.p.m. The stator resistance between terminals as measured with dc is 0.2 ohm. With no load and rated speed the stator line voltage is 160V for a field current of 4A.At rated speed, the short circuit stator current per terminal is 50A for a field current of 4A.compute voltage regulation of alternator at 0.8 p.f. Lagging. Using synchronous impedance method. [8+8]

6. (a) With the help of O.C.C. explain how voltage is build up in a D.C. shunt generator.

   (b) State the reasons for droop in terminal voltage of a D.C. shunt generator when it is loaded.

   (c) The magnetization curve of a d.c. shunt generator running at 1000rpm is as follows:

Filed amperes:	0.25	0.5	1.0	1.5	2.0	2.5	3.0
EMF Volts:	36.0	72.0	138.0	188.0	225.0	250.0	27.0

   Find

   i. the value of field resistance to give 240V on no-load

   ii. the speed at which the generator just fails to build up. [6+4+6]

7. (a) Derive the condition for maximum efficiency of a transformer.

   (b) The parameters of the equivalent circuit for a 1-phase transformer are $R_0 = 400\ \Omega$, $X_0 = 231\Omega$, $R_t = 0.16\Omega$ *and* $X_t = 0.7\Omega$. The input voltage is 200 V, and load $5.96 + j4.44\Omega$. (All values are referred to primary.) The ratio of secondary to primary turns is 10. Find the secondary terminal voltage; the primary current; and the efficiency. [8+8]

8. (a) What is a stepper motor? Enumerate its advantages and applications.

   (b) With neat sketch, explain the working principle of shaded-pole single-phase induction motor. [8+8]

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