

Code No: R05211002

R05**Set No. 2**

II B.Tech I Semester Examinations, November 2010

ELECTRICAL TECHNOLOGY

Common to BME, ICE, E.COMP.E, E.CONT.E, EIE

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions

All Questions carry equal marks

1. (a) Does the Induction motor have any similarities with the transformer? Compare the similarities and differences between them.
- (b) A 3-phase star connected Induction motor has 55V across its slip rings on open circuit when normal stator voltage is applied. The rotor is star connected and has impedance $(0.7+j5)\Omega$ per phase. Find the rotor current when the machine is
 - i. at stand still with the slip rings connected to a star connected starter with a phase impedance of $(4+j3)\Omega$ and
 - ii. running normally with 4% slip. [10+6]
2. Explain with neat sketch the principle of operation of permanent magnet type moving coil instrument. [16]
3. (a) Explain the construction and working principle of D.C. motor?
- (b) A series motor has a resistance of 1Ω between its terminals. The motor runs at 800 r.p.m. at 200V taking a current of 15A. Calculate the speed at which the motor will run when connected in series with a 5Ω resistance and taking the same current at the same supply voltage. [10+6]
4. (a) Develop the equivalent circuit of a transformer and explain various parameters involved.
- (b) Draw and explain the phasor diagram of transformer under load condition. [8+8]
5. (a) Mention the different reasons for the drop in the terminal voltage of a shunt generator when it is loaded?
- (b) A 4-pole, DC shunt generator, with a shunt field resistance of 100Ω and an armature resistance of 1Ω , has 378 wave connected conductors in its armature. The flux/pole is 0.02Wb. If a load resistance of 10Ω is connected across the armature terminals and the generator is driven at 1000rpm, calculate power absorbed by the load. [6+10]
6. (a) Define voltage regulation of a transformer. Deduce the expression for the voltage regulation.
- (b) The efficiency of a 20 KVA 2500/250 volts single phase transformer at unity power factor is 98% at rated load and also at half rated load. Calculate the core loss and copper losses. [8+8]
7. Explain with neat diagrams the principle of operation of

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- (a) synchros
 - (b) Stepper motor. [8+8]
8. (a) How e.m.f is induced in an 3-phase alternator? Derive the expression for e.m.f induced in an alternator in terms of pitch and distribution factors.
- (b) Explain the tests to be conducted for predetermining the regulation of alternator. [8+8]

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R05**Set No. 4****II B.Tech I Semester Examinations, November 2010****ELECTRICAL TECHNOLOGY****Common to BME, ICE, E.COMP.E, E.CONT.E, EIE****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. (a) Develop the equivalent circuit of a transformer and explain various parameters involved.
(b) Draw and explain the phasor diagram of transformer under load condition. [8+8]
2. Explain with neat sketch the principle of operation of permanent magnet type moving coil instrument. [16]
3. (a) Mention the different reasons for the drop in the terminal voltage of a shunt generator when it is loaded?
(b) A 4-pole, DC shunt generator, with a shunt field resistance of 100Ω and an armature resistance of 1Ω , has 378 wave connected conductors in its armature. The flux/pole is 0.02Wb . If a load resistance of 10Ω is connected across the armature terminals and the generator is driven at 1000rpm, calculate power absorbed by the load. [6+10]
4. (a) Define voltage regulation of a transformer. Deduce the expression for the voltage regulation.
(b) The efficiency of a 20 KVA 2500/250 volts single phase transformer at unity power factor is 98% at rated load and also at half rated load. Calculate the core loss and copper losses. [8+8]
5. (a) Does the Induction motor have any similarities with the transformer? Compare the similarities and differences between them.
(b) A 3-phase star connected Induction motor has 55V across its slip rings on open circuit when normal stator voltage is applied. The rotor is star connected and has impedance $(0.7+j5)\Omega$ per phase. Find the rotor current when the machine is
 - i. at stand still with the slip rings connected to a star connected starter with a phase impedance of $(4+j3)\Omega$ and
 - ii. running normally with 4% slip. [10+6]

Explain with neat diagrams the principle of operation of

6. (a) synchros
(b) Stepper motor. [8+8]
7. (a) How e.m.f is induced in an 3-phase alternator? Derive the expression for e.m.f induced in an alternator in terms of pitch and distribution factors.

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- (b) Explain the tests to be conducted for predetermining the regulation of alternator. [8+8]
8. (a) Explain the construction and working principle of D.C. motor?
- (b) A series motor has a resistance of 1Ω between its terminals. The motor runs at 800 r.p.m. at 200V taking a current of 15A. Calculate the speed at which the motor will run when connected in series with a 5Ω resistance and taking the same current at the same supply voltage. [10+6]

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R05**Set No. 1****II B.Tech I Semester Examinations, November 2010****ELECTRICAL TECHNOLOGY****Common to BME, ICE, E.COMP.E, E.CONT.E, EIE****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. (a) Explain the construction and working principle of D.C. motor?
 (b) A series motor has a resistance of 1Ω between its terminals. The motor runs at 800 r.p.m. at 200V taking a current of 15A. Calculate the speed at which the motor will run when connected in series with a 5Ω resistance and taking the same current at the same supply voltage. [10+6]
2. (a) Does the Induction motor have any similarities with the transformer? Compare the similarities and differences between them.
 (b) A 3-phase star connected Induction motor has 55V across its slip rings on open circuit when normal stator voltage is applied. The rotor is star connected and has impedance $(0.7+j5)\Omega$ per phase. Find the rotor current when the machine is
 - i. at stand still with the slip rings connected to a star connected starter with a phase impedance of $(4+j3)\Omega$ and
 - ii. running normally with 4% slip. [10+6]
3. (a) Develop the equivalent circuit of a transformer and explain various parameters involved.
 (b) Draw and explain the phasor diagram of transformer under load condition. [8+8]
4. Explain with neat sketch the principle of operation of permanent magnet type moving coil instrument. [16]
5. (a) Define voltage regulation of a transformer. Deduce the expression for the voltage regulation.
 (b) The efficiency of a 20 KVA 2500/250 volts single phase transformer at unity power factor is 98% at rated load and also at half rated load. Calculate the core loss and copper losses. [8+8]
6. Explain with neat diagrams the principle of operation of
 - (a) synchros
 - (b) Stepper motor. [8+8]
7. (a) Mention the different reasons for the drop in the terminal voltage of a shunt generator when it is loaded?

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- (b) A 4-pole, DC shunt generator, with a shunt field resistance of 100Ω and an armature resistance of 1Ω , has 378 wave connected conductors in its armature. The flux/pole is 0.02Wb . If a load resistance of 10Ω is connected across the armature terminals and the generator is driven at 1000rpm , calculate power absorbed by the load. [6+10]
8. (a) How e.m.f is induced in an 3-phase alternator? Derive the expression for e.m.f induced in an alternator in terms of pitch and distribution factors.
- (b) Explain the tests to be conducted for predetermining the regulation of alternator. [8+8]

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R05**Set No. 3****II B.Tech I Semester Examinations, November 2010****ELECTRICAL TECHNOLOGY****Common to BME, ICE, E.COMP.E, E.CONT.E, EIE****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions****All Questions carry equal marks**

1. (a) How e.m.f is induced in an 3-phase alternator? Derive the expression for e.m.f induced in an alternator in terms of pitch and distribution factors.
(b) Explain the tests to be conducted for predetermining the regulation of alternator. [8+8]
2. (a) Explain the construction and working principle of D.C. motor?
(b) A series motor has a resistance of 1Ω between its terminals. The motor runs at 800 r.p.m. at 200V taking a current of 15A. Calculate the speed at which the motor will run when connected in series with a 5Ω resistance and taking the same current at the same supply voltage. [10+6]
3. Explain with neat diagrams the principle of operation of
(a) synchros
(b) Stepper motor. [8+8]
4. (a) Define voltage regulation of a transformer. Deduce the expression for the voltage regulation.
(b) The efficiency of a 20 KVA 2500/250 volts single phase transformer at unity power factor is 98% at rated load and also at half rated load. Calculate the core loss and copper losses. [8+8]
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(b) A 3-phase star connected Induction motor has 55V across its slip rings on open circuit when normal stator voltage is applied. The rotor is star connected and has impedance $(0.7+j5)\Omega$ per phase. Find the rotor current when the machine is
i. at stand still with the slip rings connected to a star connected starter with a phase impedance of $(4+j3)\Omega$ and
ii. running normally with 4% slip. [10+6]
7. (a) Develop the equivalent circuit of a transformer and explain various parameters involved.

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- (b) Draw explain the phasor diagram of transformer under load condition. [8+8]
8. (a) Mention the different reasons for the drop in the terminal voltage of a shunt generator when it is loaded?
- (b) A 4-pole, DC shunt generator, with a shunt field resistance of 100Ω and an armature resistance of 1Ω , has 378 wave connected conductors in its armature. The flux/pole is 0.02Wb . If a load resistance of 10Ω is connected across the armature terminals and the generator is driven at 1000rpm, calculate power absorbed by the load. [6+10]

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