



Reg. No. : .....

Name : .....

**Fourth Semester B.Tech. Degree Examination, May 2015**  
**(2013 Scheme)**  
**13.403 : ELECTRICAL TECHNOLOGY**  
**(MP)**

Time : 3 Hours

PART – A



Max Marks : 100

Answer **all** questions.

1. What are the components of stray losses in DC Machine ?
2. Define critical field resistance and critical speed in DC shunt generator.
3. Define All day efficiency.
4. List advantages and applications of autotransformer.
5. How does torque slip characteristics of 3 phase induction motor vary with rotor resistance ?
6. Why single phase induction motor is not self starting ?
7. Compare the two types of rotor construction in alternators.
8. What is synchronous condenser ?
9. What are the advantages of electric traction ?
10. Draw and explain mechanical characteristics of series motor for traction.

(10×2= 20 Marks)

PART – B

Answer **any one** full question from **each** Module.

**Module – I**

11. a) Explain armature reaction in DC generators. 10
- b) A 4 pole lap connected 230 V shunt motor has 410 armature conductors. It takes 41 A on full load and the flux/pole is 0.05 wb. The armature and field resistances are  $0.1 \Omega$  and  $230 \Omega$  respectively. Contact drop/brush = 1 V. Determine the speed of motor at full load. 10



12. a) Draw and compare the characteristics of shunt and series motors. 10
- b) A 4 pole lap wound shunt generator supplies 50 lamps of 100 watts, 200 V each. The field and armature resistances are  $50\ \Omega$  and  $0.2\ \Omega$  respectively. If contact drop per brush = 1 V, find
- armature current
  - current per parallel path
  - generated emf and
  - power output of armature. 10

### Module – II

13. a) Explain the operation of transformer when loaded. Draw and explain the phasor diagram for lagging pf load. 12
- b) The no load current of a transformer is 3 A at 0.2 power factor when supplied at 240 V, 50 Hz. The number of turns in the primary winding is 250. Determine
- the maximum value of flux in the core
  - the core loss and
  - magnetising current. 8
14. a) Explain the types of rotor construction in 3 phase induction motors. How rotating magnetic field is produced in 3 phase induction motor ? 15
- b) A 2 pole, 3 phase, 50 Hz induction motor is running at a slip of 3%. Calculate the rotor frequency and speed. 5

### Module – III

15. a) Explain the working principle and applications of stepper motor. 10
- b) A 16 pole, 3 phase alternator has star connected armature with 144 slots and 10 conductors /slot. The flux per pole is 0.03 wb distributed sinusoidally and the speed is 375 rpm. Find the line voltage assuming full pitch coils with distribution factor 0.96. 10
16. a) Explain the working of capacitor start induction motor with phasor diagram. 10
- b) Explain how regulation of alternator is obtained by EMF method. 10

### Module – IV

17. a) Describe briefly various types of arc welding processes used in industry. 10
- b) Explain how regenerative braking is employed with dc motors. 10
18. a) Mention the advantages of electric traction. Draw and explain the functional schematic of ac electric locomotive. 10
- b) Discuss the speed control methods used in induction motors for traction. 10