

Fourth Semester B.Tech Degree Examination , April 2015
(2013Scheme)

13.403 ELECTRICAL TECHNOLOGY (MP)

MODEL QUESTION PAPER

Time:3hrs

Max. Marks-100

PART A

(Answer **all** questions)

1. What is the role of commutator in a dc generator?
2. What is armature reaction?
3. Derive the expression for torque in a dc motor.
4. Derive the condition for maximum efficiency of a transformer.
5. What is the necessity of starter in a three phase induction motor?
6. Compare slip ring and squirrel cage induction motors.
7. Mention few applications of stepper motor.
8. Sketch the V curve of a synchronous motor.
9. Draw the functional schematic of an electric locomotive.
10. Mention few motors used in traction system. (10x2=20)

Part B

(Answer any **one full question** from **each module**)

Module 1

11. a) Explain the procedure for determining the OCC of a self-excited DC shunt generator. (10)
b) The OCC of a shunt generator running at 1000 rpm is as under:

I_f	0	2	4	6	8	A
E_0	10	90	170	214	240	V

 - (i) Find critical field resistance when machine is operated at 1000 rpm.
 - (ii) Machine is run at 1500 rpm with above value of field resistance. Find E_0
 - (iii) Find critical speed if field resistance is 60 Ω .
 - (iv) The machine is run at 1500 rpm. Field resistance is as calculated in part (i). The armature current is 400 A, the armature resistance is 0.063 Ω and brush voltage drop is 2V. Find output voltage and load current. (10)
12. a) Based on relevant equations, sketch the torque –speed, torque-armature current characteristics of shunt ,series& cumulatively compounded motors. (10)
b) A 250 V dc shunt motor has a field resistance of 125 Ω and armature resistance of 1 Ω . It takes an armature current of 25A at a speed of 900rpm.It is required to increase the speed to 1100 rpm, keeping the torque constant. Find the additional resistance of field regulator to achieve this speed. Assume that the magnetic circuit is unsaturated. (10)

Module 2

13. a) Describe how the parameters of equivalent circuit of a single phase transformer can be determined from the OC & SC test. (10)
- b) A 100 kVA distribution transformer is supplying the following loads: (a) 80 kW at 0.8 pf for 8 hours, (b) 40 kW at unity pf for 6 hours and (c) no-load for the remaining 10 hours of the day. Find all day efficiency if full-load copper losses are 2 kW and the iron losses are 1 kW. (10)
14. a) Sketch the Torque- slip curve of a 3-phase induction motor showing the stable and unstable regions of operation, stalling torque and starting torque. How do the characteristics vary when the rotor resistance is increased. (10)
- b) Explain the Auto- transformer method of starting a 3-phase induction motor? (10)

Module 3

15. a) Explain why a single phase induction motor is not self starting ? (10)
- b) What is the principle underlying the operation of a split phase induction motor? (10)
16. a) Explain the procedure for determining the regulation of alternator by EMF method. (12)
- b) Describe any one starting method of synchronous motor. (8)

Module 4

- 17.a) Explain the various braking methods used in traction motors. (15)
- b) Mention the various systems of power supply in traction. (5)
- 18.a) What are the different types of Electric welding? Explain any two. (10)
- b) Discuss the speed control methods of traction motors. (10)
