



CBCS SCHEME

17EE44

Fourth Semester B.E. Degree Examination, June/July 2019 Electric Motors

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is back emf? Explain its significance. (06 Marks)
b. Why a shunt motor should not be put on with field winding open? (04 Marks)
c. A 440V, dc shunt motor has a no load speed of 2000rpm. It is running at 1000 rpm at full load torque, reduced armature voltage and full load. If the load torque is reduced to 50% of rated value, with the armature voltage and field voltage held constant at previous voltages. (10 Marks)

OR

- 2 a. Briefly explain the various losses that occur in D.C. machine. Derive the condition for maximum efficiency of D.C. Motor. (10 Marks)
b. With a neat sketch, describe the working of three point starter. What are its limitations, what is the necessity of starter? (10 Marks)

Module-2

- 3 a. Explain back to back test as two identical D.C. machines and calculate the efficiency of machines as generator and motor. (10 Marks)
b. A 500V, D.C. shunt motor, when running on no load takes 5A. Armature resistance is 0.5Ω and shunt field resistance is 250Ω , find the output in kW and efficiency of motor, when running on full load and taking a current of 50A. (10 Marks)

OR

- 4 a. Discuss the torque – slip characteristics of a three phase induction motor including motoring generating and braking regions. (10 Marks)
b. A 440V, 3 ϕ , 50Hz, 4 pole star connected induction motor has full load speed of 1425 rpm. The rotor has an impedance of $(0.4 + j4)\Omega$ per phase and rotor/stator turns ratio of 0.8. Calculate: i) full load torque ii) full load copper loss iii) maximum torque and speed at which it occurs iv) starting current. (10 Marks)

Module-3

- 5 a. Starting from the fundamentals develop the equivalent circuit of a polyphase induction motor and explain hoe mechanical power developed is taken care of in equivalent circuit. (10 Marks)
b. Explain no load test and blocked rotor test in a 3 ϕ induction motor. How are the parameters of equivalent circuit determined from test results? (10 Marks)

OR

- 6 a. What is the purpose of using deep bar rotor? Explain the construction and working of deep bar rotor induction motor. (10 Marks)
- b. A 415V, 29.84kW, 50Hz delta connected motor gave the following test data.
No load test: 415V, 21A, 1250W
Blocked rotor test: 100V, 45A, 2730W
Construct the circle diagram and determine:
- Line current and power factor for rated output
 - The maximum torque. Assume stator and rotor copper losses are equal at stand still. (10 Marks)

Module-4

- 7 a. Explain in detail auto-transformer method of starting a squirrel cage induction motor. (10 Marks)
- b. Mention the different methods of speed control of 3 ϕ induction motor, describe any two methods. (10 Marks)

OR

- 8 a. Explain double field revolving theory as applied to single phase induction motor and prove that it cannot produce any starting torque. (10 Marks)
- b. Explain why single phase induction motor is not self starting. (05 Marks)
- c. Briefly explain torque-speed characteristics of capacitor split phase motor. Mention the applications of capacitor split phase motors. (05 Marks)

Module-5

- 9 a. What are V and inverted V curves? Sketch them and explain their significance. (10 Marks)
- b. Explain the operation of synchronous motor at constant load variable excitation. (10 Marks)

OR

- 10 a. State the methods of starting synchronous motor. Explain any one in details. (05 Marks)
- b. Explain the importance of damper winding in synchronous motor. (05 Marks)
- c. Explain the principle of operation of linear induction motor. List the some applications of it brief the working of linear induction motor. (10 Marks)
