

B.E./B.TECH. Degree Examination, December 2020

Semester – VI

EE16602 – Solid State Drives and Traction

(Regulation 2016)

Time: Three hours

Maximum :80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

1. _____ is also called line shaft drive.
 - a. Individual drive
 - b. Group Drive
 - c. Multimotor drive
 - d. None of the above
2. Under which of the following condition the squirrel cage induction motor is preferred over the wound rotor induction motor.
 - a. When an external voltage is to be necessarily into the rotor
 - b. When the wide range of speed control is required
 - c. When the cost is the major consideration
 - d. When higher starting torque is required
3. Which of the application requires high starting torque?
 - a. Air blower
 - b. Elevator
 - c. Locomotive
 - d. Centrifugal pump
4. A synchronous motor is found to be economical when the load is above
 - a. 1 kW
 - b. 10 kW
 - c. 20 kW
 - d. 100 kW
5. Draw and explain the components in the block diagram of electric drive.
6. Compare the control strategies of chopper.
7. Describe the drawbacks of stator voltage controlled Induction motor.
8. Discuss the advanced control techniques applied to traction motor.

PART B - (4 X16 = 64 marks)

9. (a) State the conditions to obtain the steady state stability of equilibrium point of an electric drive and also compare the different modes of operation of electric drive. **(16)**
- (OR)**
- (b) (i) State the essential parts of electrical drive. What are the functions of power modulator? **(8)**
 - (ii) What are the main factors which decide the choice of electrical drive for a given application? **(8)**
10. (a) Analyze and write briefly about the operation of a three phase fully controlled converter fed separately excited DC motor with neat waveforms and derive the speed torque characteristics. **(16)**

(OR)

- (b) Compare the operation of single quadrant and dual quadrant chopper control of separately excited DC motor and also derive the necessary equations. **(16)**

11. (a) (i) Discuss how phase Locked loop speed control scheme operates. **(8)**
(ii) Derive the transfer function of speed control of DC motor for field weakening mode. **(8)**

(OR)

- (b) Derive the transfer function of DC motor with load and converter system. **(16)**

12. (a) (i) Compare VSI and CSI fed induction motor drive. **(8)**
(ii) Analyze the operation of vector control of induction motor drive with necessary diagram and support the answer with equations. **(8)**

(OR)

- (b) (i) How does a synchronous motor works under the self-control mode of operation? **(8)**
(ii) Briefly explain margin angle control in synchronous motor. **(8)**