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**Question Paper Code : 91483**

**B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019**

**Third Semester**

**Mechanical Engineering**

**EE 6351 – ELECTRICAL DRIVES AND CONTROLS**

**(Common to Manufacturing Engineering, Mechanical and Automation Engineering, Petrochemical Engineering, Production Engineering, Chemical Engineering, Petrochemical Technology)**

**(Regulations 2013)**

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer ALL questions.**

**PART – A**

**(10×2=20 Marks)**

1. Draw the block diagram of an electric drive.
2. Mention the factors affecting the selection of Electrical drives.
3. Why DC shunt motor is termed as a constant speed motor ?
4. What are the different types of electric braking ?
5. Why starter is necessary to start a electrical motor ?
6. State the difference between three phase squirrel cage and slip-ring induction motors.
7. Why chopper based dc drives give better performance than rectifier controlled drives ?
8. List the limitations of field control method of DC motor.
9. Why the  $V/f$  is kept constant while controlling the speed of a 3 phase induction motor ?
10. Mention the advantages of squirrel cage induction motor over a D.C. motor.

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PART – B

(5×13=65 Marks)

11. a) i) What is an electrical drive system ? How are electric drive classified ?  
List its advantage and disadvantages. (8)
- ii) Explain Heating and Cooling curves of an electric drive. (5)
- (OR)
- b) What are the factors that influence the choice of electrical drives ?
12. a) i) Draw and explain the Speed-Torque characteristics of DC shunt, series and compound motors with necessary equations. (8)
- ii) Draw and explain the Speed-Torque characteristics of three phase induction motor. (5)
- (OR)
- b) What are the different methods used for braking of electrical motors ? Explain all the methods with neat diagrams. Also explain which method is suitable for which electrical motor.
13. a) Explain the three point starter with necessary diagram and its operations in detail.
- (OR)
- b) Briefly explain the various types of starters used in 3  $\phi$  induction motor.
14. a) i) Explain the Ward-Leonard system for speed control of DC motors. State the advantages and disadvantages of the system. (8)
- ii) Explain the Flux control method of speed control for DC shunt motor. (5)
- (OR)
- b) Describe the working of step down dc chopper, with the help of suitable circuit diagram and waveforms. State the relation between output and input voltages. How the speed of a dc motor is controlled using a step down chopper ?
15. a) Describe the variable voltage variable frequency method of speed control of 3 phase induction motors for full range of speed control.
- (OR)
- b) Explain slip power recovery scheme with neat diagram.

PART – C

(1×15=15 Marks)

16. a) A starter required for a 220 V shunt motor. The maximum allowable current is 55 A and the minimum current is about 35 A. Find the number of starter resistance required and the resistance of each section. The armature resistance of the motor is 0.4 ohm.
- (OR)
- b) Explain the different types of braking of three phase induction motors.