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**Question Paper Code : 90196**

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

Third Semester

Manufacturing Engineering

EE 8353 : ELECTRICAL DRIVES AND CONTROLS

(Common to Mechanical Engineering/Mechanical and Automation Engineering)

(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART - A

(10×2=20 Marks)

1. Write the basic equation of losses on the motor.
2. List the three broad classifications of electric drives.
3. Write the effect of variation of armature voltage in a series motor.
4. What is meant by regenerative braking ?
5. List the starting method of induction motor.
6. Mention the necessity of starter.
7. Comment about the smoothness in speed control of separately excited DC motor using field type control.
8. Which speed control method gives very poor stable operation in DC series motor ?
9. List the applications of rotor resistance speed control in 3 phase induction motor.
10. Draw the cyclo-converter in the rotor circuit of static slip energy recovery scheme.

PART - B

(5×18=65 Marks)

11. a) i) Demonstrate the basic elements of an electric drive using static elements. (6)  
ii) Explain the four quadrant operation of a drive. (7)  
(OR)  
b) Describe the two different types of continuous duty for an electric motor. (18)



12. a) Compare the mechanical and electrical braking of an electric motor. (13)  
(OR)  
b) Discuss in detail about characteristics of series and shunt motors. (13)
13. a) Discuss the stator mechanism for controlling the speed of induction motors. (13)  
(OR)  
b) A 3-phase squirrel cage induction motor has a starting current eight times the full load value. The full load slip is 4%. Compute the starting torque as a percentage of full load torque if the motor is started (a) direct on line (b) by star/delta starter (c) using an auto transformer to limit the starting current to three times the full load value. What is the line current as a percentage of full load value. (13)
14. a) Compare armature resistance and armature voltage types speed control of DC series motor in details. (13)  
(OR)  
b) Discuss briefly about ward-Leonard speed control method. (13)
15. a) Explain the two types of speed control of synchronous motor drive. (13)  
(OR)  
b) Demonstrate the conventional slip power recovery schemes with its suitable diagrams. (13)

## PART – C

(1×15=15 Marks)

16. a) The temperature rise of an electric motor is 40°C after 1 hour and 60°C after 2 hours. The motor current is 100A. Determine approximately its final temperature rise when it works on load cycle of 4 minutes working, 8 minutes rest with a current of 125 A. Neglect the effects of iron losses. (15)  
(OR)
- b) A 500 V DC shunt motor with constant field drives a load whose torque is proportional to the square of the speed. When running at 900 rpm it takes an armature current of 45A. Find the speed at which the motor runs if a resistance of 8 Ω is connected in series with the armature. The armature resistance may be taken as 1 Ω. (15)