Lecture No. 56
Tutorial

Lecture delivered by:

Objectives

At the end of this lecture, student will be able to:

- Solve problems on electromagnetic torque

Problem No 1

- A series-wound motor is connected to a d.c. supply and develops full-load torque when the current is 30 A and speed is 1000 rev/min. If the flux per pole is proportional to the current flowing, find the current and speed at half full-load torque, when connected to the same supply.

Problem No 2

- A 350 V shunt motor runs at its normal speed of 12 rev/s when the armature current is 90 A. The resistance of the armature is 0.3Ω. (a) Find the speed when the current is 45 A and a resistance of 0.4Ω is connected in series with the armature, the shunt field remaining constant. (b) Find the speed when the current is 45 A and the shunt field is reduced to 75% of its normal value by increasing resistance in the field circuit.

Problem No 3

- A 320 V series motor takes 80 A and runs at 1080 rev/min at full load. The armature resistance is 0.2Ω and the series winding resistance is 0.05Ω. Assuming the flux is proportional to the field current, calculate the speed when developing full-load torque, but with a 0.15Ω diverter in parallel with the field winding.

Problem No 4

- A 115V dc shunt motor draws an armature current of 25A when running at 1450 rpm at full load torque. Motor armature circuit resistance is 0.3Ω. Calculate the resistance to be added in series with motor armature to reduce the speed to 1200 rpm. Also calculate the armature efficiency.

Problem No 5

- A shunt motor is running at 626 r/min when taking an armature current of 50A from a 440V supply. The armature circuit has a resistance of 0.28Ω. If the flux is suddenly reduced by 5%, find

  a) the maximum value to which the current increases momentarily and the ratio of the corresponding torque to initial torque;

  b) the steady state value of the armature current assuming constant load torque

Summary

- Understand and be able to use DC Shunt motor

- Understand and be able to use DC Series motor

- Understand and be able to electromagnetic torque