Lecture No. 49
Tutorial

Lecture delivered by:

Objectives

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

- Solve problems on DC generators

Problem No 1

- The shaft torque required to drive a d.c. generator is 18.7 Nm when it is running at 1250 rev/min. If its efficiency is 87% under these conditions and the armature current is 17.3 A, determine the voltage at the terminals of the generator.

Problem No 2

- A 15 kW shunt generator having an armature circuit resistance of 0.4Ω and a field resistance of 100Ω, generates a terminal voltage of 240 V at full load. Determine the efficiency of the generator at full load, assuming the iron, friction and windage losses amount to 1 kW.

Problem No 3

- A 4-pole d.c. motor has a wave-wound armature with 800 conductors. The useful flux per pole is 20 mWb. Calculate the torque exerted when a current of 40 A flows in each armature conductor.

Problem No 4

- A 150 V d.c. generator supplies a current of 25 A when running at 1200 rev/min. If the torque on the shaft driving the generator is 35.8 Nm, determine

  (a) the efficiency of the generator, and

  (b) the power loss in the generator.

Problem No 5

- A series motor having a series field resistance of 0.25Ω and an armature resistance of 0.15Ω, is connected to a 220 V supply and at a particular load runs at 20 rev/s when drawing 20 A from the supply. Calculate the e.m.f. generated at this load. Determine also the speed of the motor when the load is changed such that the current increases to 25 A. Assume the flux increases by 25%.

Problem No 6

- In a test on a d.c. motor, the following data was obtained.

  Supply voltage: 500 V. Current taken from the supply: 42.4 A

  Speed: 850 rev/min. Shaft torque: 187 Nm

  Determine the efficiency of the motor correct to the nearest 0.5%.