Lecture No. 48
Tutorial

Lecture delivered by:

Objectives

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

- Solve problems on induced E.M.F.

Problem No 1

- A 4-pole generator has a lap-wound armature with50 slots with 16 conductors per slot. The useful flux per pole is 30 mWb. Determine the speed at which the machine must be driven to generate an e.m.f. of 240 V.

Problem No 2

- A separately-excited generator develops a no-load e.m.f. of 150 V at an armature speed of 20 rev/s and a flux per pole of 0.10 Wb. Determine the generated e.m.f. when

  (a) the speed increases to 25 rev/s and the pole flux remains unchanged,

  (b) the speed remains at 20 rev/s and the pole flux is decreased to 0.08 Wb, and

  (c) the speed increases to 24 rev/s and the pole flux is decreased to 0.07 Wb.

Problem No 3

- A d.c. shunt-wound generator running at constant speed generates a voltage of 150 V at a certain value of field current. Determine the change in the generated voltage when the field current is reduced by 20%, assuming the flux is proportional to the field current.

Problem No 4

- A d.c. generator running at 25 rev/s generates an e.m.f. of 150 V. Determine the percentage increase in the flux per pole required to generate 180 V at 20 rev/s.

Problem No 5

- A shunt generator supplies a 50 kW load at 400 V through cables of resistance 0.2Ω. If the field winding resistance is 50Ω and the armature resistance is 0.05 Ω, determine

  (a) the terminal voltage,

  (b) the e.m.f. generated in the armature.

Problem No 6

- The armature of a d.c. machine has a resistance of 0.5Ω and is connected to a 200 V supply. Calculate the e.m.f. generated when it is running

  (a) as a motor taking 50 A and

  (b) as a generator giving 70 A.