

EE 306 – Term 172

HW # 4: DC Machines

Submission Deadline 27/03 (ST Classes) 28/03 (MW Classes)

Problem 1:

A separately excited DC generator has six poles and is running at 1150 rpm. The armature has 120 slots with 8 conductors per slot and is connected as **wave winding**. The generated voltage in each conductor is 1.5 V and each conductor can carry a full load current of 4 A. Determine the following:

- (a) The terminal voltage at no load,
- (b) The output current at full load,
- (c) The required flux per pole,
- (d) The power developed by the armature on full load.

Problem 2:

Chapter 4 Exercise **Problem 4.8 (a) and (b)** [Text Book, Third Ed., P.C. SEN]

Hint: The machine information is given in Problem 4.3

Problem 3:

Chapter 4 Exercise Problem **4.13 (a), (b) and (c)** [Text Book, Third Ed., P.C. SEN]

Problem 4:

A six poles **short** shunt compound DC generator running at 1200 rpm delivers 25 KW to a load resistance at a terminal voltage of 250 V. The resistance of the armature, shunt field resistance and the series field resistance are 0.12 Ω , 125 Ω and 0.05 Ω respectively. The efficiency of the machine at the given load is 82%.

- (a) Draw the equivalent circuit
- (b) Estimate the input power and the corresponding applied input torque
- (c) Find the developed power and the corresponding developed torque

Problem 5:

Chapter 4 Exercise **Problem 4.26 (a), (b) and (c)** [Text Book, Third Ed., P.C. SEN]

Problem 6:

Chapter 4 Exercise **Problem 4.27** [Text Book, Third Ed., P.C. SEN]