



THE UNIVERSITY OF ZAMBIA
SCHOOL OF ENGINEERING
Dept of Electrical & Electronic Engineering

EEE 3352: Electromechanics and Electrical Machines

ASSIGNMENT 6: DC GENERATORS (*Due 19/10/2018*)

1.

A separately excited generator has the magnetisation characteristic which gives a no-load voltage of 131 V when driven at 5000 rpm with field excitation of 2000 ampere-turns. The total armature circuit resistance is 0.08Ω . If the generator supplies a load current of 120 A, determine the

- (a) terminal voltage
- (b) power output
- (c) the electromagnetic power
- (d) electromagnetic torque input.

2.

The magnetic characteristic obtained for a dc generator at 1200 r/min is as in Table Q2

Table Q2

Field current (A)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	5.5
Generated emf (V)	120	240	360	480	540	600	660	696	738	744

The generator is shunt excited and is driven at 1000 rpm.

- (a) If its field resistance is 120Ω , what is its no-load generated voltage?
- (b) If the load resistance is 4Ω and the armature resistance is 1Ω , find the terminal voltage and load current.

- Continued -

ASSIGNMENT 7: DC MOTORS (*Due 22/10/2018*)

1.

A 100-V shunt motor has an armature resistance of 0.4Ω and a field resistance of 100Ω while being driven at 1200 r/min, the armature taking a current of 25 A and the load torque being maintained constant. If it is desired to raise the speed to 1600 r/min, what resistance must be inserted in the shunt field circuit, assuming a linear magnetisation curve?

2.

A dc series motor operates at 750 rpm with a line current of 80 A from the 230-V mains. Its armature-circuit resistance is 0.14Ω and its field resistance is 0.11Ω . Assuming that the flux corresponding to a current of 20 A is 40 % of that corresponding to a current of 80 A, find the motor speed at a line current of 20 A at 230 V.

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