

Experiment NO. 1:3

Characteristic of Separately excited Generator

OBJECTS:

The object of this experiment is to verify the factors, which affect the building voltage in separately - excited generator, the external characteristics, and load saturation characteristics, regulating characteristics of the generator.

PROCEDURES:

Take the name plate data of the generator used in the experiment.

RUN (1): (No- load Characteristics).

Connect the circuit as in fig 1, switch (S) is open with the slide (S) of the rheostat at zero position in order to start with zero field current (I_f).

1. Run the generator at rated speed record the reading of voltmeter connected across armature terminals of the generator.
2. Switch on D.C. supply to the field winding and increase. I_f gradually in approx. equal several steps, record its value with the values of the open-circuit voltage (E) between the outside terminal of the generator which is operating in this case at N.L.
3. Decrease I_f gradually in approx. equal several steps as in step 3 and record the values of I_f and E specially at $I_f = 0$. This value is the e.m. f due to the residual magnetism.
4. Plot armature voltage versus the field current.

Observation Table

Step	Field current in increasing order (I_f)	Field in describing order (I_f)	Armature Voltage

RUN (2): (Load Characteristics)

1. With the circuit shown in fig (1) close the switch (S), run the generator at constant speed.
2. Keep the load current at say $I = 2A$. Start $V_L = 0$ and take the reading of the field current (I_f) increase if and record the reading of it and the terminal voltage across the load, keeping at each step $I_L = 2 A$ (the load is two rheostat resistances each 50 ohms and 5A). Take 5 steps.

Observation Table:

Speed of the Generator.... rpm.

Steps No.	Load Terminal Voltage	Field Current
	1987	1408

RUN (3): (External Characteristics)

1. With the connection as shown in fig (2) operate the generator at rated speed keeping it constant.

- Adjust the field rheostat to allow approx., the rated field current with rated voltage say 180V.
- Change the load current by varying load starting from $I_L = 0$ till a rated value with 5 steps. Take reading of load terminal voltage.

Observation Table:

Steps No.	Load Terminal Voltage	Load Current	Field current

RUN (4): (Regulating Characteristics)

- For the same connection as in fig (1) Adjust I_F to have open-circuit voltage say 180V, switch (S) is close.
- Keeping speed constant at rated value and $V_L = V_o$. $c =$ constant at rated value.

- Change the load and take the reading of I_F for each value of I_L .

	I_L	I_F

Observation table :

$V =$ constant
 $V_L =$ constant

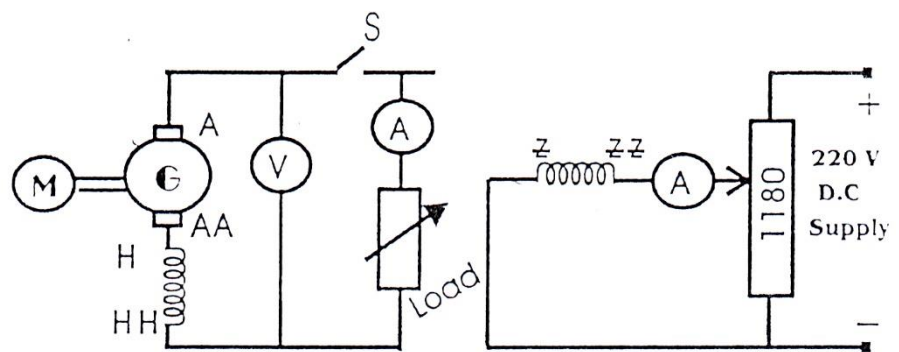


Fig. 1

DISCUSSION:

1. Draw the magnetization curve of the generator results of run (1).
2. Draw the load characteristics of run (2) at $I_L = \text{constant}$. And $N = \text{constant}$. On the same chart with the open circuit characteristics obtained in run (1)
3. Draw the external characteristics at $N = \text{constant}$.
4. Draw the regulating characteristics I_f versus h with $V_L = \text{constant}$.
5. Why load characteristics goes lower with respect to the (O.C.C).
6. Got out the internal charact. From the external charact.
7. Explain the effect of speed on the open circuit char.

