



## LABORATORY WORK SHEET

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Class: C5M-C Semester: I<sup>ST</sup>

Course Code: AEE P03 Course Name: Electrical and

Name of the Course Faculty: MS M VARALAKSHMI Faculty ID: IARE 11072

Exercise Number: 09 Week Number: 09 Date: 05 January 2024

### DAY TO DAY EVALUATION:

Marks	Aim / Preparation	Algorithm / Procedure	Source Code	Program Execution	Viva - Voce	Total
		Performance in the Lab	Calculations and Graphs	Results and Error Analysis		
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	4	4	20

Signature of Faculty

### START WRITING FROM HERE :

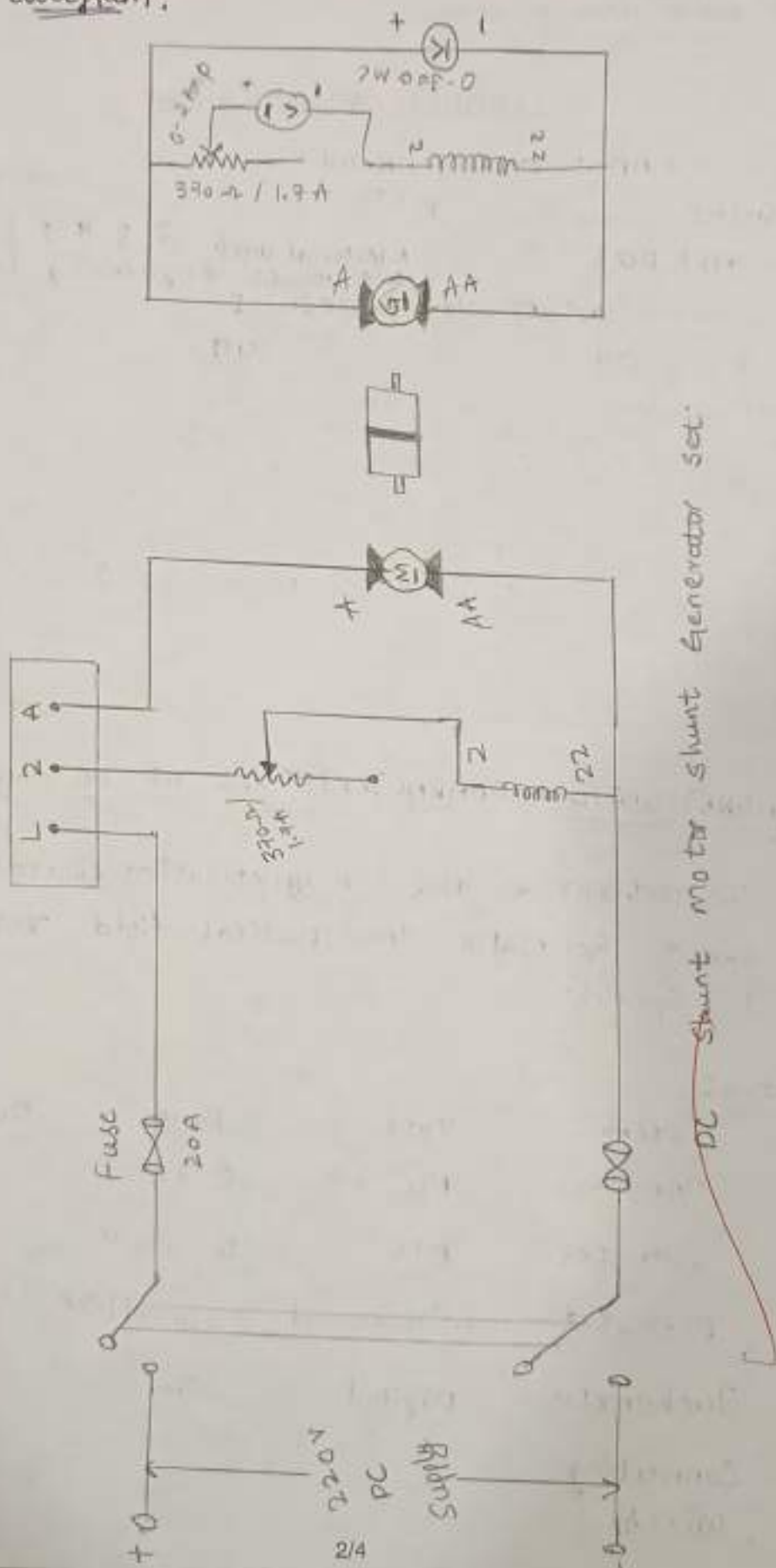
### MAGNETISATION CHARACTERISTICS OF DC SHUNT GENERATOR

Aim: To determine the magnetization characteristics of DC shunt generator the critical field resistance and critical speed.

### Apparatus:

S.No	Item	Type	Range	Quantity
1.	Ammeter	MC	0-2A	1
2.	Voltmeter	MC	0-300V	1
3.	Rheostat	wire wound	370 $\Omega$ / 1.7A	2
4.	Tachometer	Digital	-	1
5.	Connecting wires	-	-	Required

Circuit diagram:



Name plate details:

motor	
Voltage	230V
current	11 A
output	5 HP
Speed	1500 rpm

Generator	
voltage	230V
current	11 A
output	3 KW
Speed	1500 rpm.

Procedure:

- ① Choose the proper ranges of motor after noting the name plate details of the given machine and make the connection as per the circuit diagram.
- ② Keeping the motor field resistance minimum and the Generator output terminals are open circuited given supply and start the motor generator set.
- ③ Adjust the speed of the MG set to the rated speed of the generator using the motor field rheostat ( $R_f$ ).
- ④ Note down the voltage due to residual magnetisation or no load.
- ⑤ Run the dc series generator under rated load conditions and note down the internal voltage and load current by removing the loads slowly.
- ⑥ Measure the generator armature resistance  $R_a$  by drop method.
- ⑦ Calculate the generated emf  $E$  at each load from the relation  $E_g = V + I (R_a + R_{sc})$ .
- ⑧ draw the external characteristics  $V_g$  vs  $V_L$  and the internal characteristics  $E_g$  vs  $I_s$  on the same graph sheet.



Tabular column: Ascending

S.No	field current	Generated voltage
1	0.05	24
2	0.1	42
3	0.2	115
4	0.35	149
5	0.45	188
6	0.5	202
7	0.6	214
8	0.7	240

Descending

S.No	field current	Generated voltage
1	0.7	248
2	0.65	235
3	0.55	227
4	0.45	208
5	0.35	173
6	0.25	133
7	0.15	92
8	0.10	50

Calculations: Point - 1  $E_2 = 230$   $I_{f2} = 0.625$ Point - 2:  $E_1 = 212$   $I_{f1} = 0.54$ 

$$R_c = \frac{E_2 - E_1}{I_{f2} - I_{f1}} = \frac{230 - 212}{0.625 - 0.54} = \frac{18}{0.085}$$

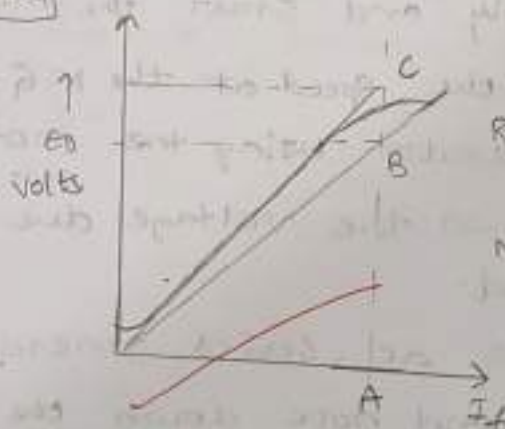
$$R_c = 211.76 \Omega$$

$$N_c = \frac{AB}{A_0} \times N_R$$

$$N_c = \frac{240}{290} \times 1500$$

$$N_c = 1241 \text{ rpm}$$

Model graph:



$$R_f = \frac{\Delta E_g}{\Delta I_f}$$

$$N_c = \frac{AR}{FC} \times \text{rated Speed}$$

Precautions:

- ① Don't switch on the supply without any load.
- ② Avoid parallax errors and loose connections.

Result: Hence determined the magnetization (open circuit) characteristics of DC shunt Generator, the critical field resistance and critical speed.

# Magnetization Characteristics of DC Shunt motor.

Scale :  
on X-axis  $I_f$  unit = 0.05 A  
on Y-axis  $E_g$  unit = 20 V

$$R_c = 211.76 \Omega$$

$$N_c = 1241 \text{ rpm}$$

