IARE

INSTITUTE OF AERONAUTICAL ENGINEERING

(An Autonomous Institute affiliated to JNTUH, Hyderabad)

Dundigal, Hyderabad - 500 043

LABORATORY WORK SHEET

Name of the Student: Abdul Basith Khan

Class: 1st Year (CSM-A) Semester: I st

Roll Number									
2	3	9	5	1	A	6	6	0	1

Course Code: AEC001 Course Name: EEE Laboratory

Name of the Course Faculty: Dr. L Rajashekhar Goud Faculty ID: IARE11067

Exercise Number: 09 Week Number: 09 Date: 17/01/2024

DAY TO DAY EVALUATION:

Marks	Aim / Preparation	Algorithm / Procedure / Performance in the Lab	Source Code / Calculations and Graphs	Program Execution / Results and Error Analysis	Viva - Voce	Total
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	3	4	19

Signature of Faculty

START WRITING FROM HERE : Magnetization Characteristics of a DC Shunt Generator:-

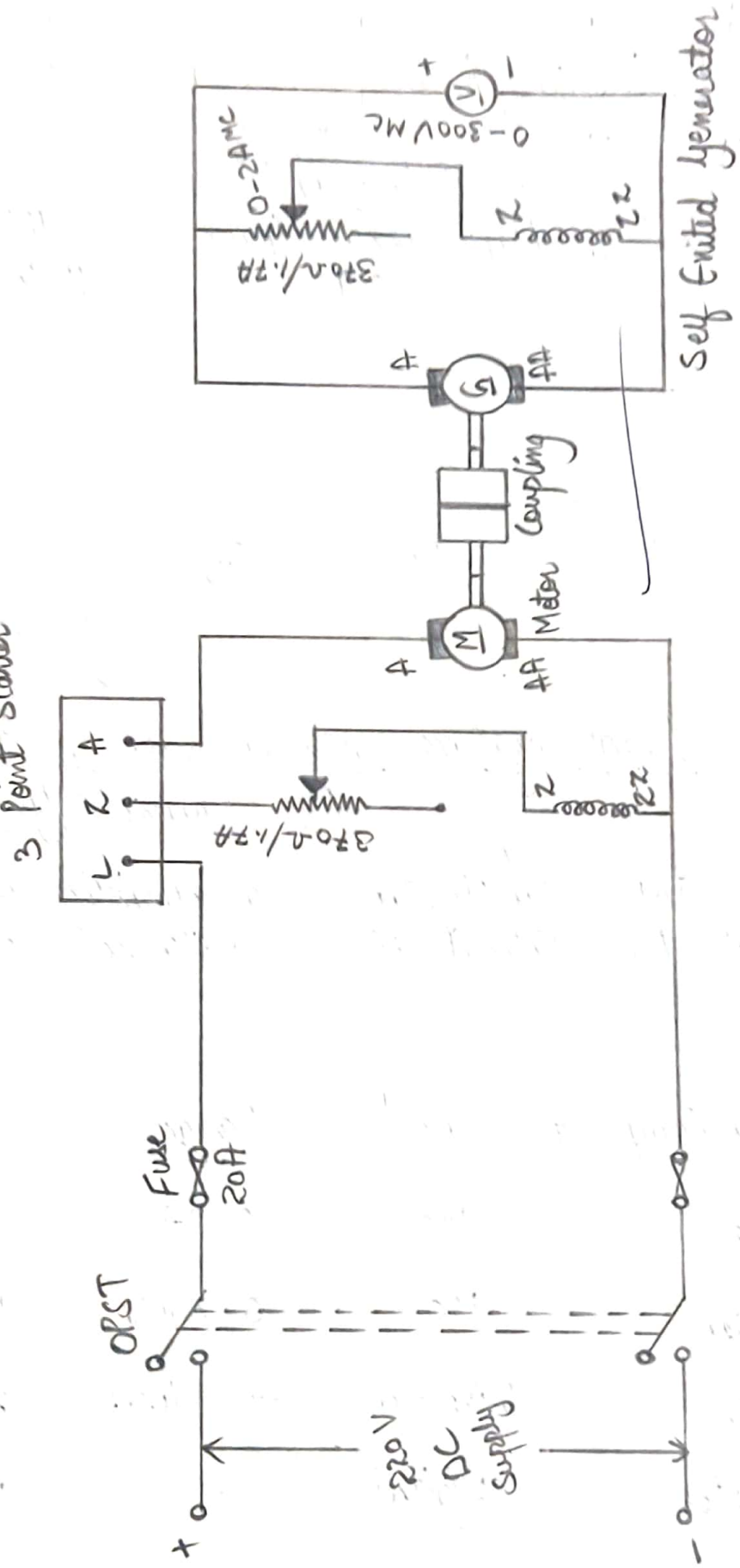
Aim:-

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

Apparatus:-

S.No.	Item(or) Equipment	Type	Range	Quantity
1.	Ammeter	Mc	0-2A	1
2.	Voltmeter	Mc	0-300V	1
3.	Rheostat	Wire wound	370Ω/1.7A	2
4.	Tachometer	Digital	-	1
5.	Connecting wires	-	-	As Required

Circuit Diagram :-



ROLL NUMBER :

Name Plate Details :-

Motor

Voltage	230V
Current	19A
Output	5Hp
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 mote the connection as per the circuit diagram.
2. Keeping the motor field resistance minimum and the generator output terminals are open - circulated given supply and start the motor generator set.
3. Adjust the speed at the MG set to the rated speed of the generator using the motor field rheostat (R_f).
4. Adjust the . Note down the voltage due to residual magnetism or no load.
5. Run the DC series generator undes rated load condition 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 general EMF c at each load from the relation $E_g = V + I(R_a) = V + I_a R_a$
8. Draw the external characteristics $V_1 V_s I_L$ and the Internal characteristics, $E_g V_s I_s$ on the same graph sheet.

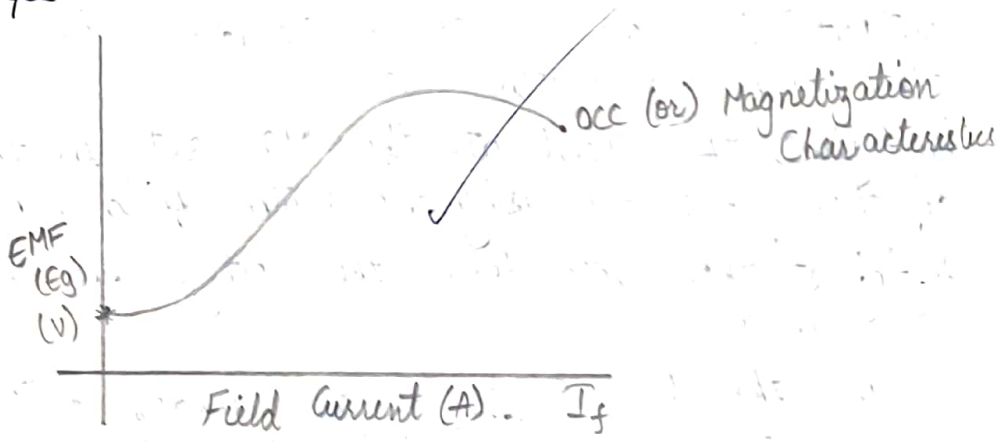
ROLL NUMBER :

5. Gradually increase the field current by varying the Field rheostate and note down the field current (I_f I_s) and and induced EMF. Keep speed constant. Vary the field current in steps by varying field Rheostat and note down field current and induced EMF she procedure will be repeated until an induced EMF in the generator reaches 290 volts or 1.25 times rated voltage.

Gradually decrease the field current (I_f) and note down the induced EMF. This procedure repeated until the voltage reaches minimum.

Draw the graph between field current and induced EMF.

Model Graph:-



Induced EMf Equation = $E_g = \frac{\phi Z N}{60} \times \frac{P}{A}$

$= \left[\frac{ZNP}{60A}\right] \phi$

$= K_g . \phi$

$E_g = K_g . I_f$

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Course Code : AEED01 Course Name : EEE Laboratory

Name of the Course Faculty : Dr. L Rajashekhar Goud Faculty ID : IARE11067

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START WRITING FROM HERE :

Tabular Column :- Ascending

S.No.	Field Current	Generated Voltage
1.	0.0	24
2.	0.1	42
3.	0.2	115
4.	0.35	149
5.	0.45	188
6.	0.5	202
7.	0.6	224
8.	0.7	240

ROLL NUMBER :

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

$E_2 = 230 \quad If_2 = 0.625$

Point - 2

$E_1 = 212 \quad If_1 = 0.54$

$$R_c = \frac{E_2 - E_1}{If_2 - If_1}$$

$$= \frac{18}{0.625 - 0.54}$$

$$R_c = 211.76\ \Omega$$

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

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

$$N_c = 1241\ r.p.m$$