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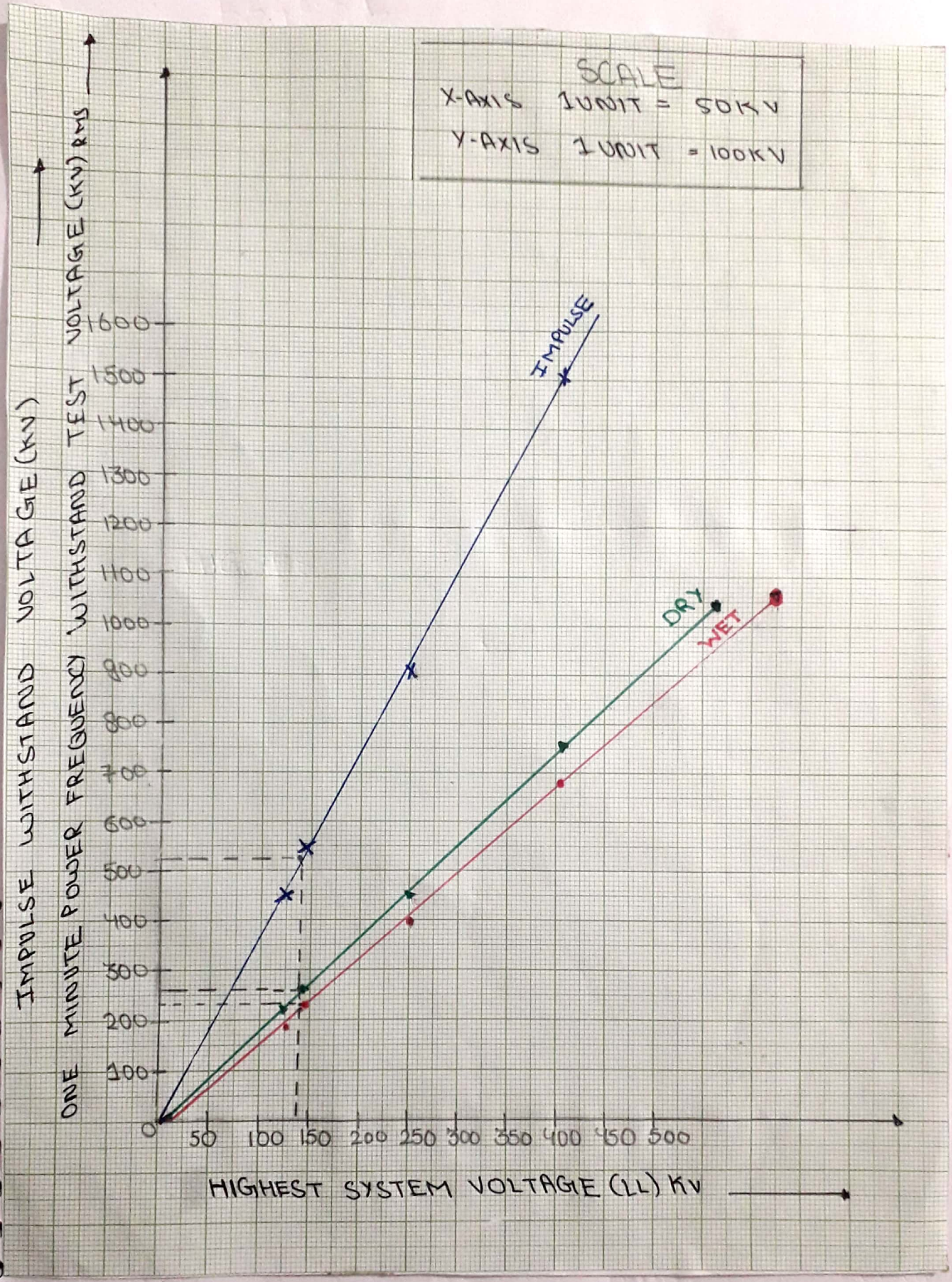
NIMRA IDRIS SIDDIQUI

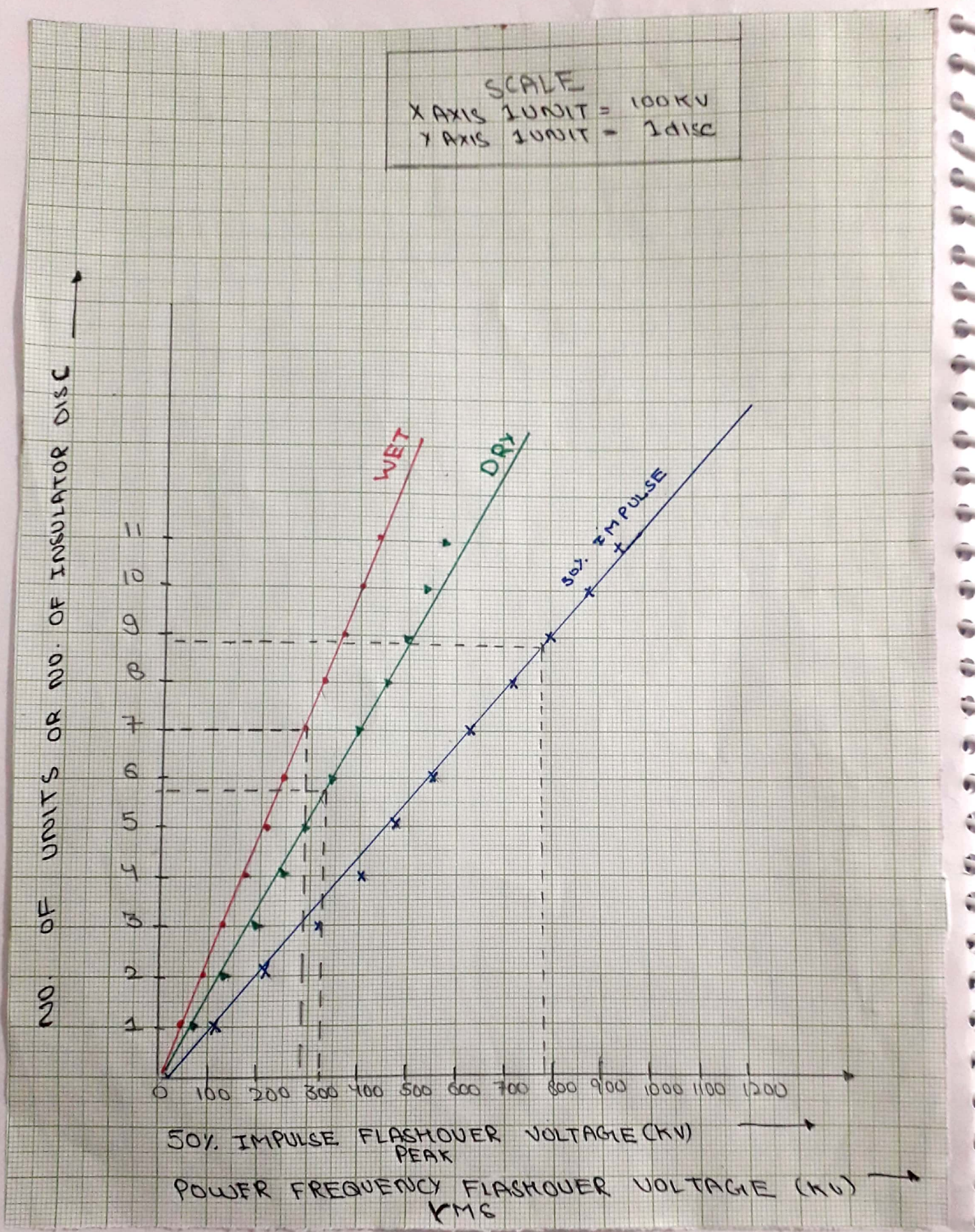
17 EEB 409

GI-2134

GROUP-07



GRAPH 1



GRAPH-2

Step 1

Maximum system voltage

= 10% more than the system voltage

= 1.1 x system voltage

= 1.1 x 132 KV

MSV = 145.2 KV

STEP-2 Number of insulator discs required to withstand continuous operating voltages.

@ Dry withstand voltage = we obtain the voltage level for dry condition corresponding to the higher system voltage from Graph 1

Flashover voltage for dry condition =

Dry withstand voltage x flashover withstand voltage ratio x non atmospheric atmospheric condition factor

= Dry withstand voltage x 1.15 x 1.1

$= 260 \times 1.15 \times 1.1$

$= 328 \text{ KV}$

Corresponding to 328 KV, the no. of insulator discs (N_1) from graph 2

$N_1 = 5.7 \simeq 6$

(b) Wet withstand voltage = we obtain the voltage level for wet condition from graph 1

Flashover voltage for wet condition = wet withstand voltage × Flashover withstand voltage ratio × non standard atmospheric condition factor

= wet withstand voltage × 1.15 × 1.1

$= 230 \times 1.15 \times 1.1$

$= 290.95 \text{ KV}$

Corresponding to 290.95KV, the no. of insulator disc (N_2) from graph 2

$n_2 = 7$

Mean of n_1 & n_2

$$n_3 = \frac{n_1 + n_2}{2} = \frac{6+7}{2}$$

$$= 6.5$$

Step - 3

Number of insulator discs required to withstand impulse voltage or lightening over voltages.

→ The impulse withstand voltage corresponding to the maximum system voltage from graph 1 = 530 V

Lightning impulse voltage =

(impulse withstand overvol.) × (flashover to impulse withstand val.) × (non std. atmospheric conditions) × (additional factor of safety)

= (impulse withstand overvol.) × (1.15) × (1.1) × (1.15)

= 771.017

corresponding to 771.07 KV
the no. of insulator disc N_4 in graph 2

$$N_4 = 8.8 \simeq 9$$

Step - 4

Total no. of insulator discs required will be selected from the values obtained for N_3 & N_4

$\because N_4 > N_3$

$\therefore$ Total no. of insulator discs(N)

$$= N_4 = 9$$

9 insulator discs are required for the selected system vol. level

for factor of safety

The final value of the no. of insulator discs = $N+1$

$$= 9+1 = 10$$

10 discs are required for the selected system voltage level.