Measurement Systems

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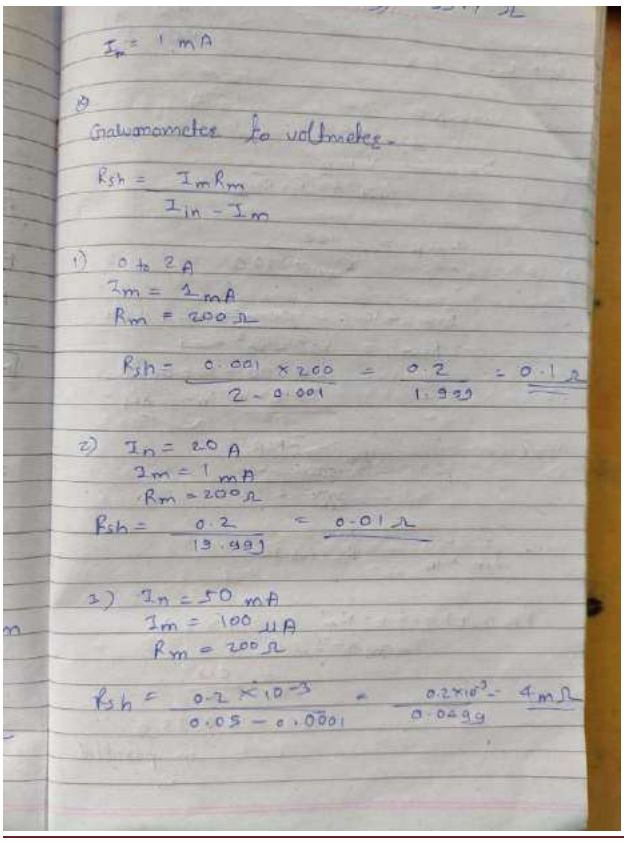
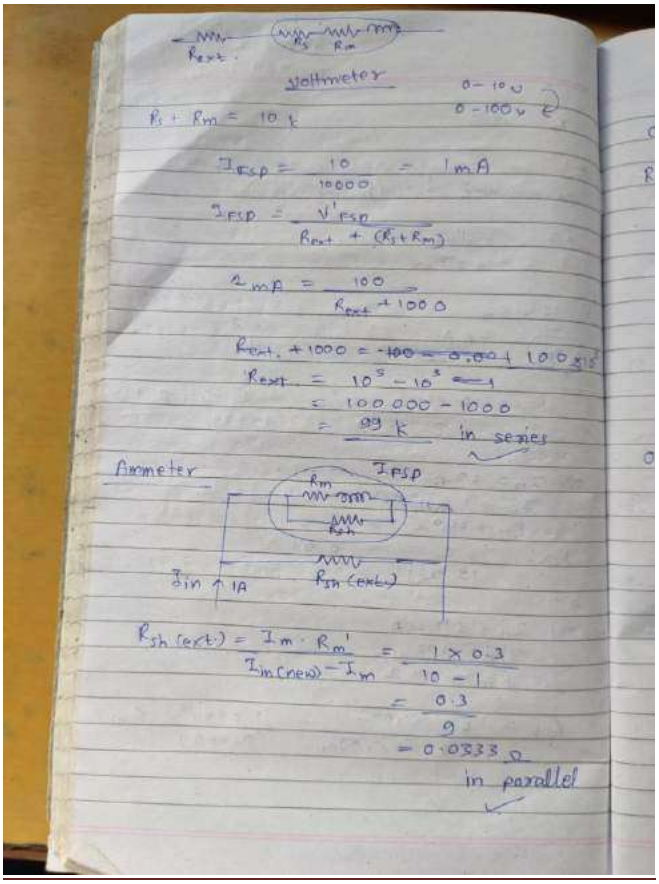
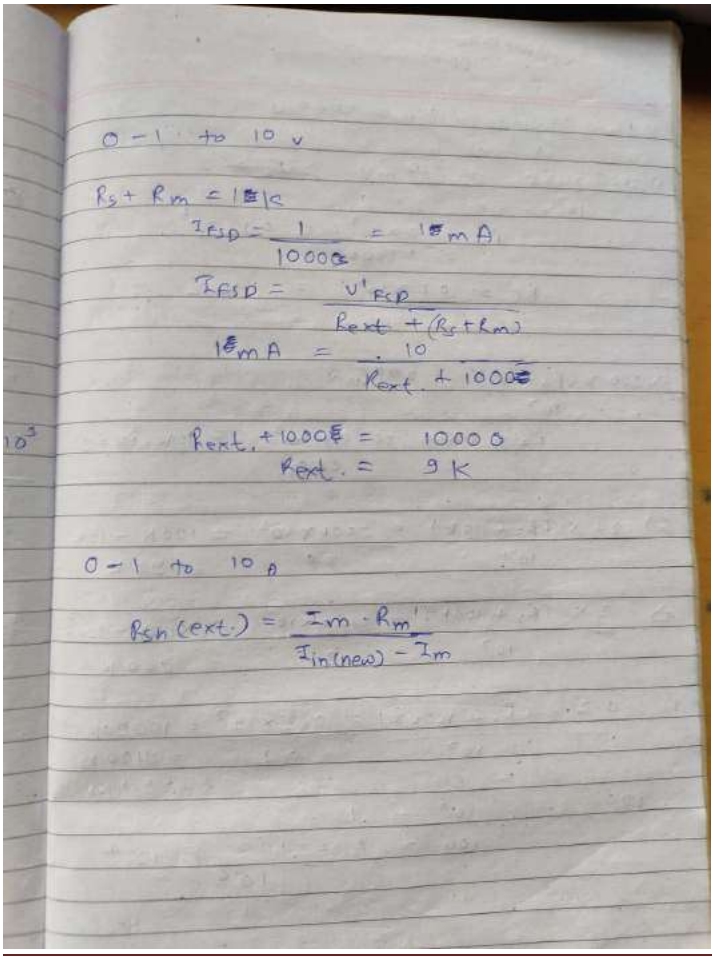
Div.: TY-C

Roll No.: 24 (Batch B1)

LAB 1: Conversion of galvanometer to voltmeter and ammeter




Rext
Rs
Rm
Voltmeter
0 - 10 V
0 - 100 V
Rs + Rm = 10 k
IFSD = 10 / 10000 = 1 mA
IFSD = V'FSD / (Rext + (Rs + Rm))
2 mA = 100 / (Rext + 1000)
Rext + 1000 = 100 / 2 mA
Rext = 10^5 - 10^3
= 100000 - 1000
= 99 k in series
Ammeter
IFSD
Rm
Rsh
Iin ↑ 1A
Rsh (ext.)
Rsh (ext.) = Im · Rm' / (Iin(new) - Im) = 1 × 0.3 / (10 - 1)
= 0.3 / 9
= 0.0333 Ω
in parallel



0 – 1 to 10 V

$R_s + R_m = 1\,k\Omega$

$I_{FSD} = \frac{1}{1000\,\Omega} = 1\,mA$

$I_{FSD} = \frac{V'_{FSD}}{R_{ext} + (R_s + R_m)}$

$1\,mA = \frac{10}{R_{ext} + 1000\,\Omega}$

10^3

$R_{ext} + 1000\,\Omega = 10000\,\Omega$

$R_{ext} = 9\,K$

0 – 1 to 10 A

$R_{sh(ext)} = \frac{I_m \cdot R_m}{I_{in(new)} - I_m}$