Measurement Systems

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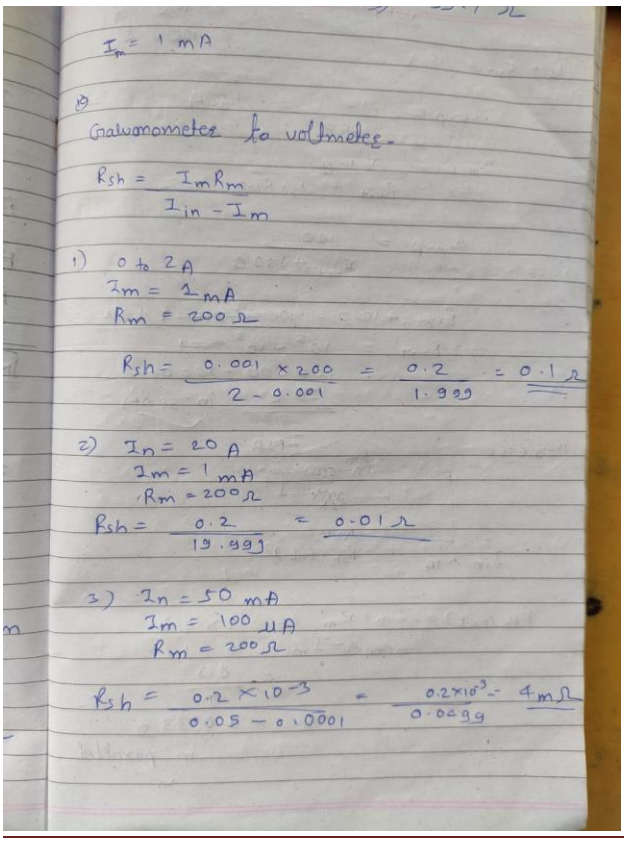
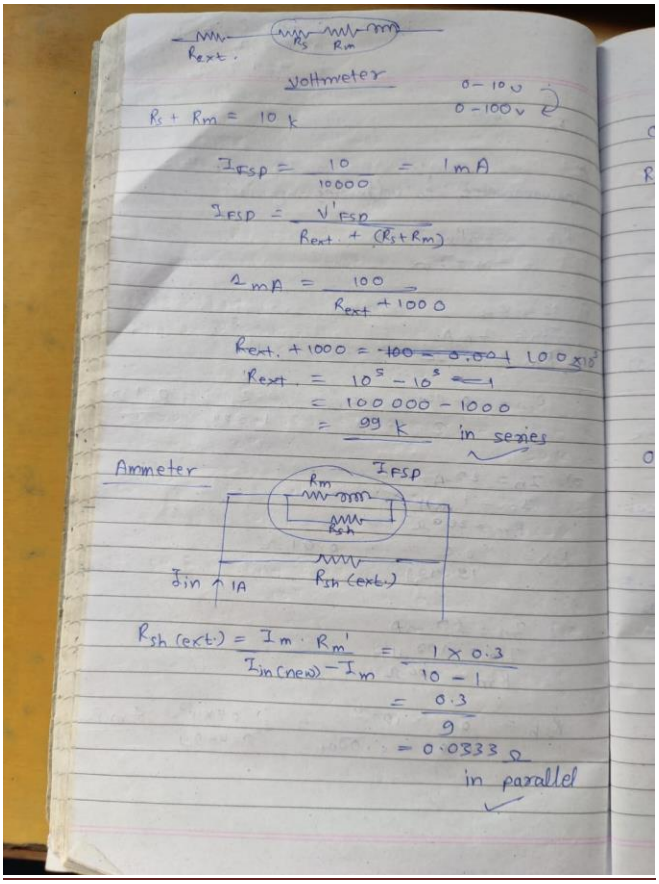
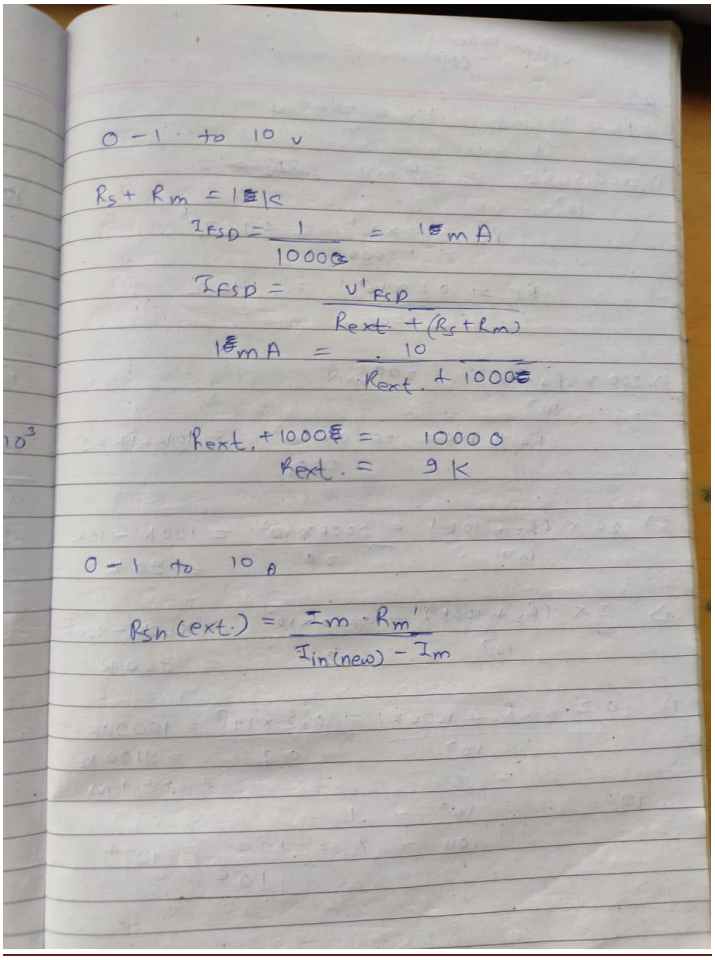
Div.: TY-C

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



0 – 1 to 10 V

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

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

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

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

10^3

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

$R_{ext.} = 9\,K$

0 – 1 to 10 A

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