Experiment 01 : Verification of Overcurrent Relay Characteristics

A K Pradhan Kuldip Nayak (TA)

Name: Pratyush Jaiswal

Roll: 18EE30021

DISCUSSION:

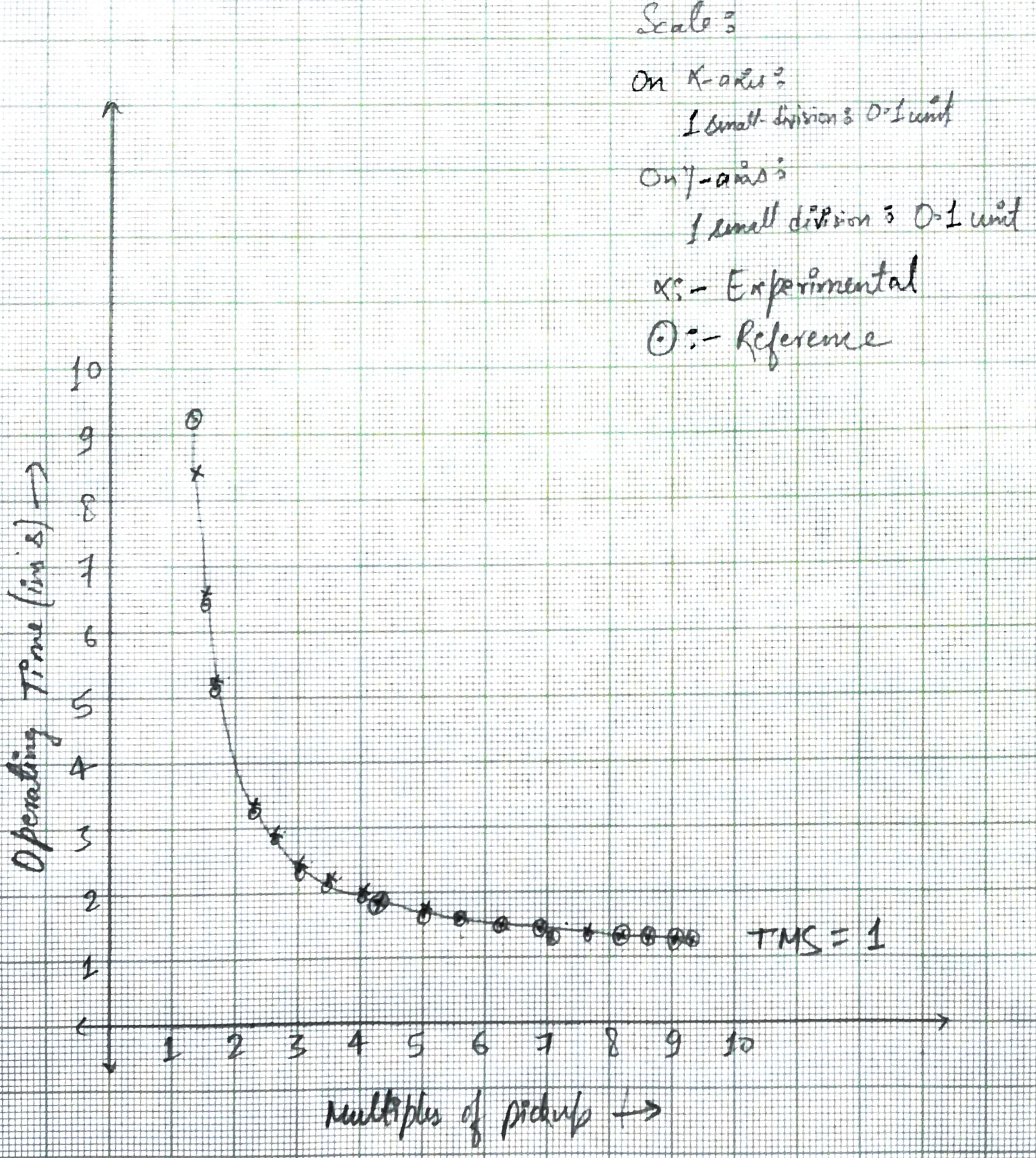
As we know for IDMT, the time current characteristic is inverse over some range and then after saturation assumes the definite form. At low values of operating current the shape of the curve is determined by the effect of the restraining force of the control spring, while at high values of the current, the effect of saturation predominates.

If the saturation occurs at a still later stage, the characteristic assume the curve which is known as very inverse. The current time characteristics is inverse over a greater range and after saturation tend to definite time.

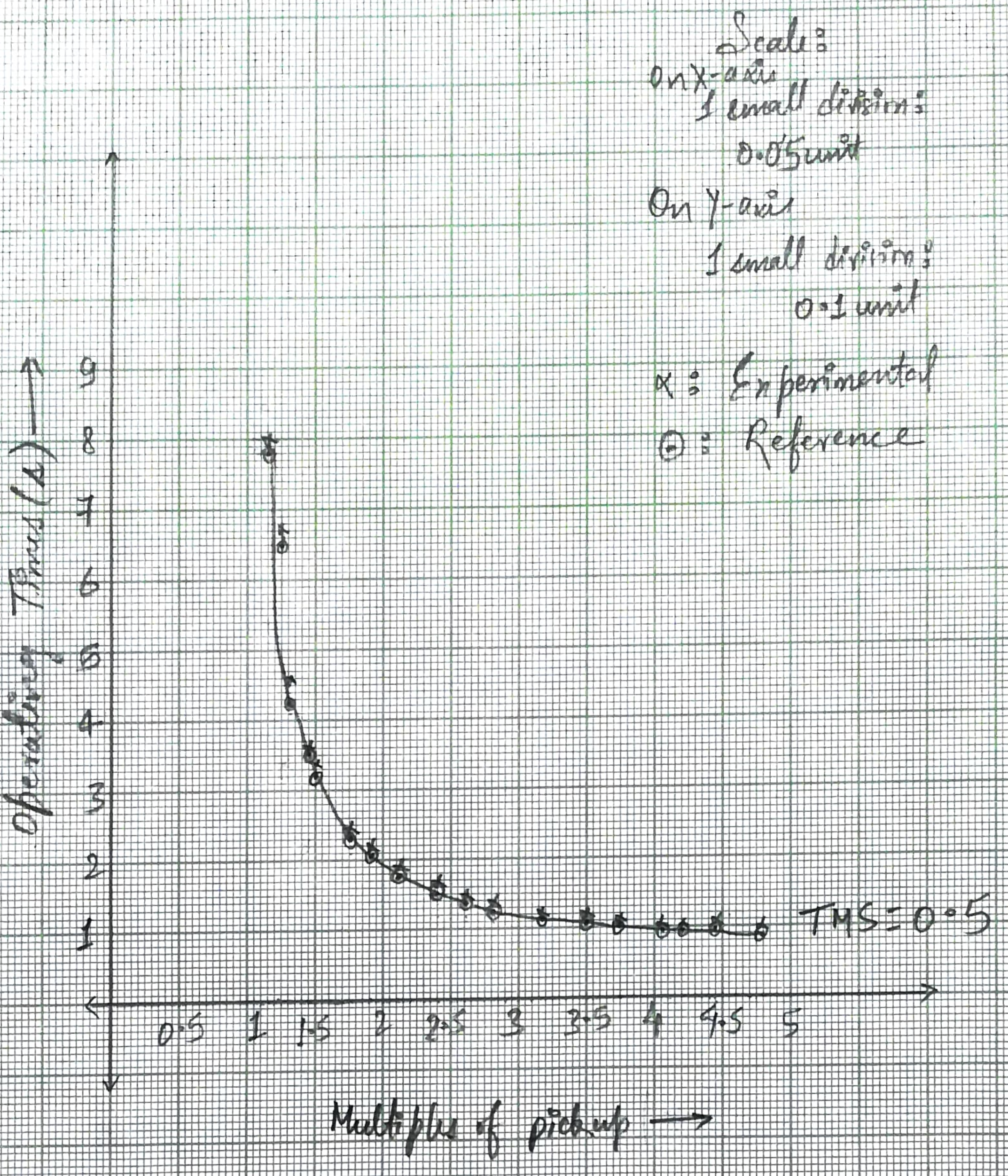
Theoretically their time ordinates should be proportional to the time multiplier setting so that if the times for a given current were divided by the TMS all the curves should coincide. Owing to the inertia of the disc which takes a little time for the disc to accelerate from standstill to its steady speed at low current values they may not actually exactly coincide. It introduces some error in the time which might affect the discrimation of the whole scheme. These all things can be verified from the a 4 graphs we analyzed.

We can improve the performance of relays by using combined IDMT high set continuous overcurrent relays. This reduces the tripping time at high fault levels. This rapid fault clearance helps in minimizing damage at the fault location.

Pratyush Jaiswal, 18EE30021 # Curve 1-IEEE_MI



Pratyush Jaiswal, 18EE30021 # Curve 2_IEEE_MI



Pratyush Jaiswal, 18EE30021, # Curve 2-IEEE-VI

Scale:

On X-axis:

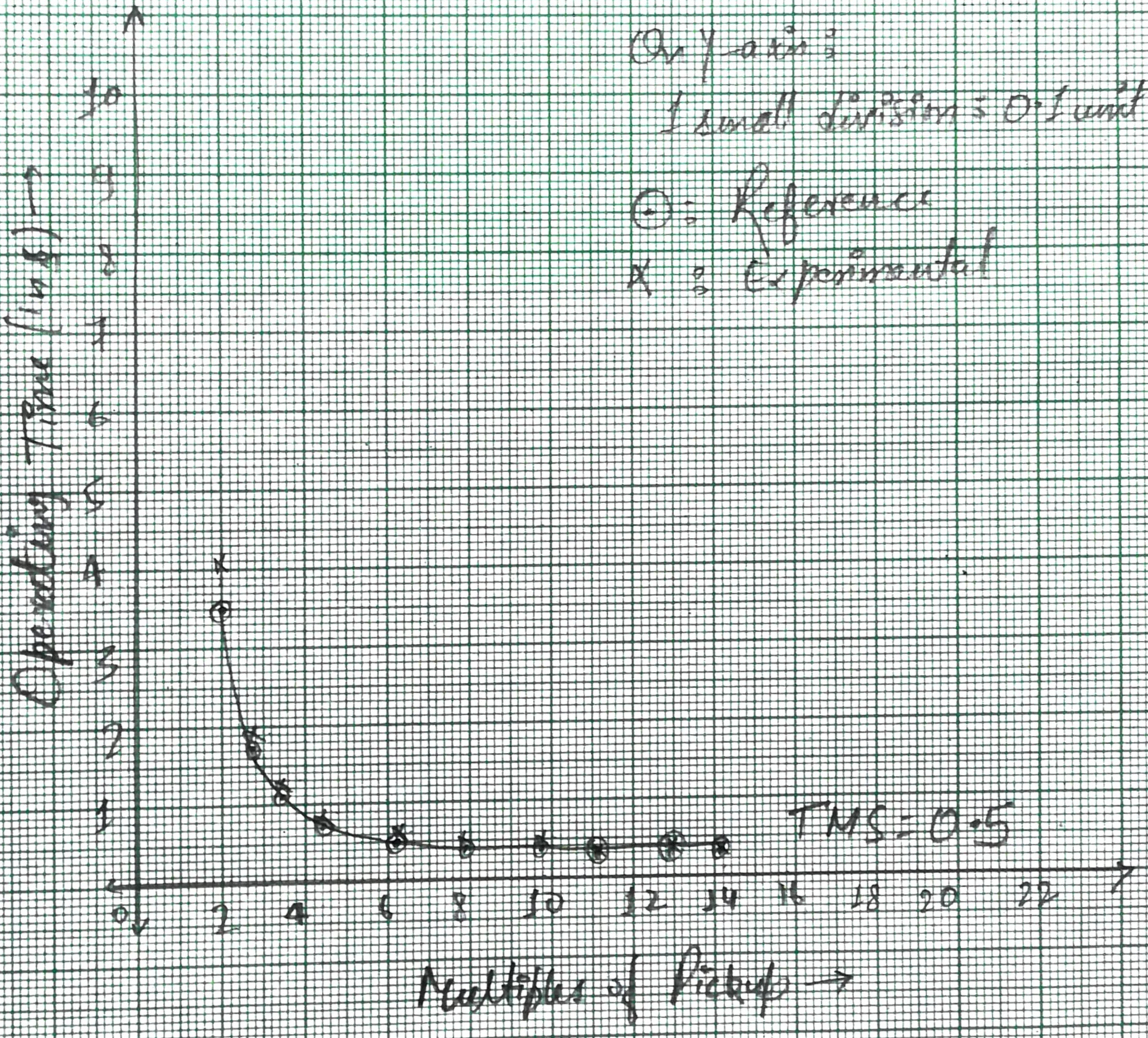
1 small division = 0.2 unit

On Y-axis:

1 small division = 0.1 unit

⊙ : Reference

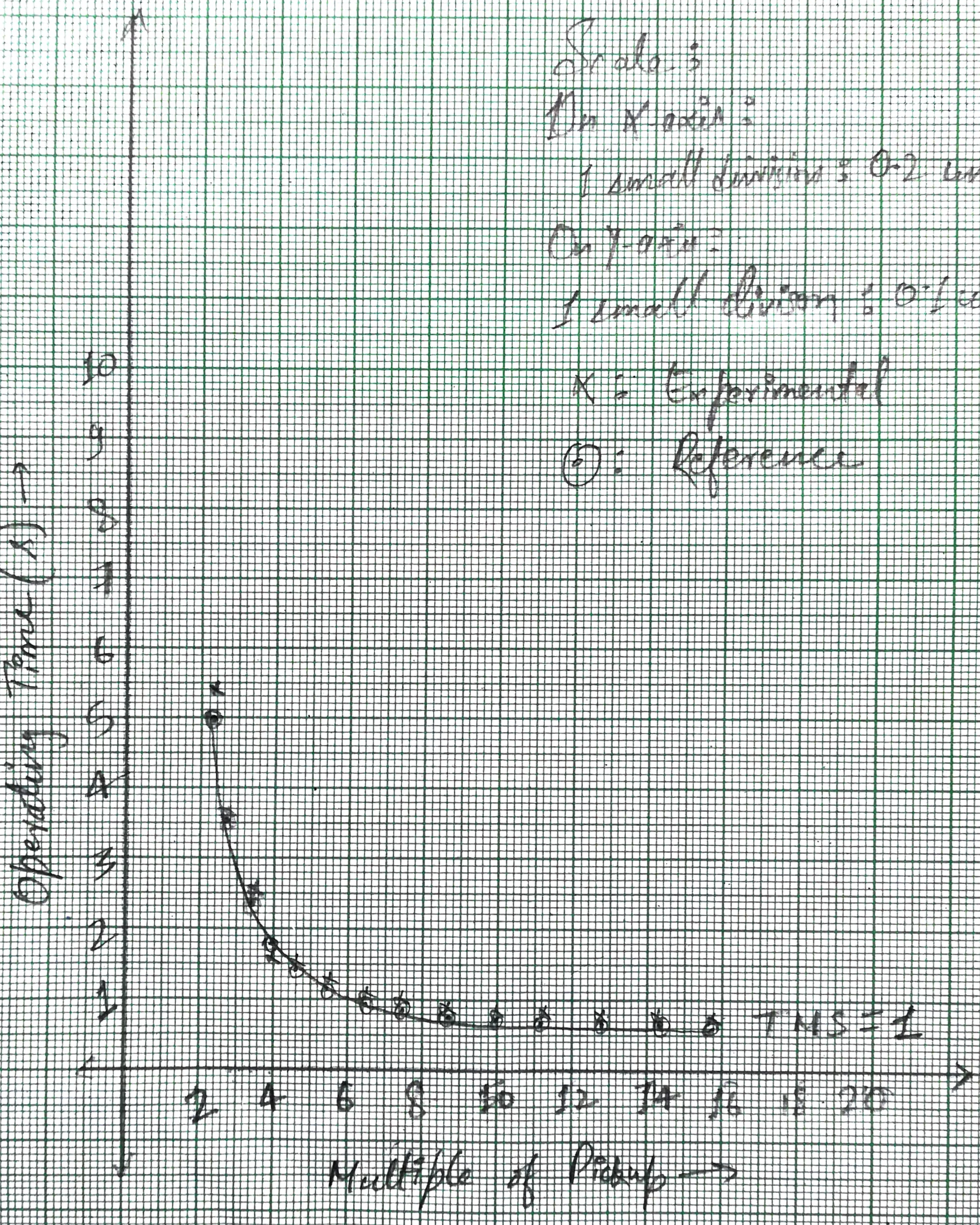
X : Experimental



Pratyush Jaiswal, 18EE30021.
Curve_1-IEEE_VI

Scale :
On X-axis :
1 small division : 0.2 unit
On Y-axis :
1 small division : 0.1 unit

x : Experimental
⊙ : Reference



Name: Pratyush Jaiswal
Roll: 18EE30021

5. Given:

CT: $150:5 = 30:1$
$\downarrow$
R_B & R_C

Fault Max : $R_B = 750A$
I_{pickup} : 5A {for both R_B & R_C}
Coordination Interval: 0.3 s
VI relay will be used in case of both R_B & R_C.
Lower fault current $\rightarrow$ higher TMS value

$\frac{750}{30} = 25A$ {secondary side current fault}

$PSM = 5 \left\{\frac{25}{I_{pickup}}\right\}$

$T_B = 0.1$ (min possible TMS near fault)

$t_B = 0.1\left(0.491 + \frac{19.61}{5^2-1}\right) = 0.138.$

$t_C = 0.3 + t_B = 0.43$ s.

$T_C = \frac{0.43}{1.308} = 0.329$

Since we need to have 0.3 s as a required interval, we have to choose the upper bound {because only that ensures 0.3 s interval}

$TMS_C = 0.4$.