S1 PORTAL FRAME (ENERGY METHOD)

DATA

Dimensions of portal frame:

Width = 4L = _________ mm

Height = 3L = _________ mm

RESULTS

Test 1 (a): Portal frame subjected to vertical load, *W_1*,

Load W_1 (Newton)	Experimental Horizontal Thrust, H_{test} (N)			Theoretical Horizontal Thrust, $H_{theory} = W_1/12$
	Incremental load	Decremental load	Average	
2				
Incremental load ↓ 4 Decremental load ↑				
6				
8				
10				
12				

Test 1 (b): Portal frame subjected to horizontal load, *W_2*.

Load W_2 (Newton)	Experimental Horizontal Thrust, H_{test} (N)			Theoretical Horizontal Thrust, $H_{theory} = 0.5W_2$
	Incremental load	Decremental load	Average	
2				
Incremental load ↓ 4 Decremental load ↑				
6				
8				
10				
12				

Test 1 (c): Portal frame subjected to a combination of vertical load,W_1 and horizontal load, W_2.

Load (Newton)		Experimental Horizontal Thrust, H_{test} (N)			H_{theory} $= W_1/12 + 0.5W_2$
Vertical	Horizontal	Incremental load	Decremental load	Average	
$W_1 =$ 2	$W_2 =$ 2				
4	4				
6	6				
8	8				
10	10				
12	12				

1. For each test of 1(a), 1(b) and 1(c), plot the graphs of experimental horizontal thrust ($H_{tes}$and theoretical horizontal thrust (H_{theory}) versus load, (i.e. either W_1 or W_2).
2. Based on the above diagrams, calculate the discrepancy percentage of the horizontal thrust using the following relationship;

i.e.

$$\text{Discrepancy percentage} = \frac{\text{Difference in slope between } H_{test} \text{ and } H_{theory}}{\text{Slope of } H_{theory}} \times 100\%$$

Test	Discrepancy percentage
1(a)	
1(b)	
1(c)	