**PHYSICS PAPER 3 MARKING SCHEME**

**DECEMBER EXAM 2021**

**FORM FOUR**

**QUESTION 1**

(a) W = 4.00cm (3.90-4.10) 2dp ( ½ mark)

T= 4.00cm (3.90-4.10) 2dp ( ½ mark)

(e) Lo = 43.5 (43.0 –44.0) cm 1dp ( ½ mark)

X = 40.5 (40.0 –41.0) cm 1dp ( ½ mark)

Determining the weight of the wooden block, W by using the formula

W = Lo ½ Substitution

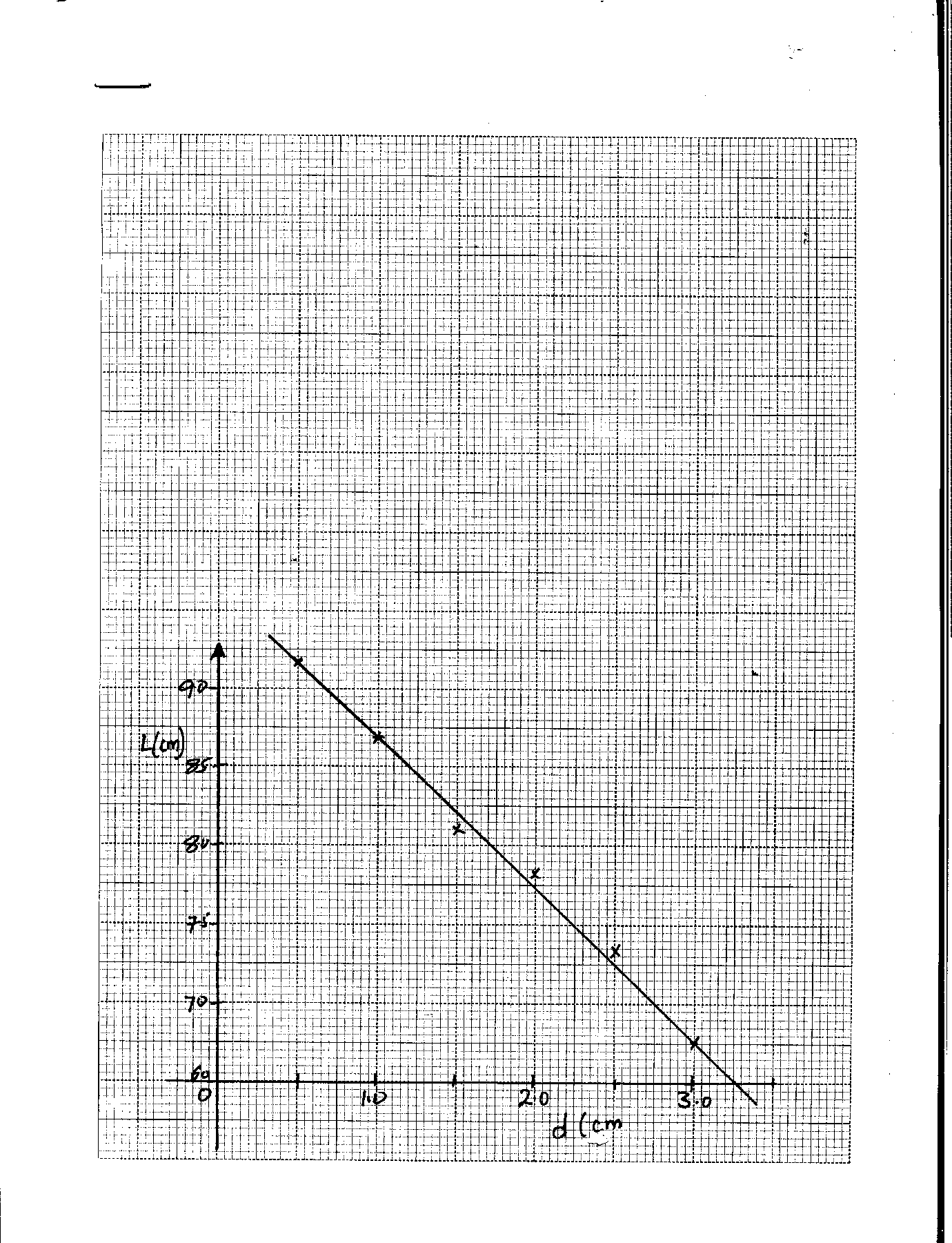
2X ½ Correct evaluation

(g) **Table**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mark** | **1** | **2** | **3** | **4** | **5** | **6** |
| Depth immersed, d (cm) | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
| L (cm) + 0.5 1dp | 92.0 | 87.0 | 81.5 | 78.5 | 73.0 | 67.5 |

1 mark each for correct reading up to the 5th entry (d =2.5)

(h) Graph of L (y-axis) against d



– Both axes labelled with appropriate units; 🗸1

- Simple and uniform scale; 🗸1

- Correctly plotted point ½ mark each maximum of 4 points🗸2

-straight line with **negative** gradient passing through at least 3 correctly plotted points, shape extrapolated y-axis; 🗸1

(i) No line no slope (3)

1 interval

1 Substitution

1 Correct evaluation

(j) A=WT (2)

1 Correct Substitution

1 Correct evaluation

(k) -20 ρ A = slope 1 Correct Substitution

1 Correct evaluation

**QUESTION 2**

**PART A**

**PART I**

(d) d = 0.2 ± 0.01 m Attempt to average 🗸

**PART II** Correct answer 🗸

(h) *mark v in the table when u = 60cm.* 1mk

(j)

±1 1dp

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| u(cm) | 30 | 35 | 40 | 50 | 60 | 70 |
| v(cm) | 60.0 | 46.7 | 40.0 | 33.3 | 30.0 | 28.0 |
| u +v (cm) | 90.0 | 81.7 | 80.0 | 83.3 | 90.0 | 98.0 |
| uv(cm2) | 1800.0 | 1.634 | 1600 | 1665 | 1800 | 1960 |

½ mark each for correct reading of v to 1d.p. up to a maximum of 2mks ignoring v when u=60cm.

1 mark exact for **ALL** the candidate’s own correct conversion of u+v.

1 mark exact for **ALL** the candidate’s own correct conversion of uv.

(l) **NO LINE NO GRADIENT**

Gradient = 1800 – 0🗸 1mk

90-0

= 20cm 🗸 1mk

Power of lens = 1 = 1

Gradient 20 x 10-2

= 5 Diopters 🗸 ans 1mk

(m) d = focal length

d = 1

power of lens 🗸

**PART B**

(o) L1  = 70.0 ± 2cm🗸 1dp

L2 = 30.0 ± 2cm🗸 1dp

(p) L1 = L2🗸

R1 R2

70 = 30🗸

C 4

C = 70 x 4 = 9.333 Ω ( 8.50 – 10.29) 🗸 4sf or exact within range.

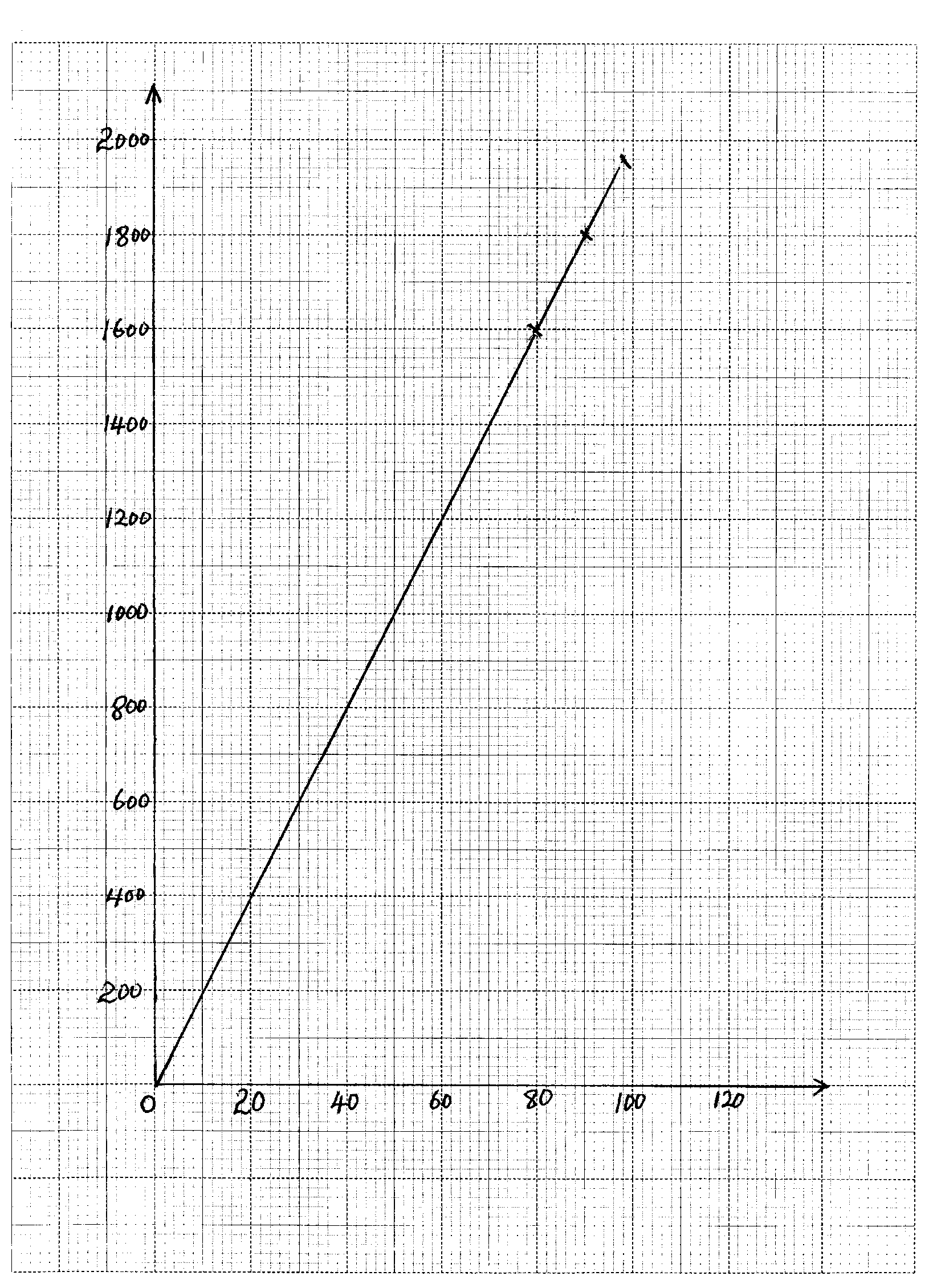
30

(k) – Both axes labelled with appropriate units; 🗸1

- Simple and uniform scale; 🗸1

- Correctly plotted point ½ mark each maximum of 4 points🗸2

-straight line with **positive** gradient passing through at least 3 correctly plotted points; 🗸1



***UV (cm2)***

***Axes 🗸***

***Scales🗸***

***Plotting🗸***

***Label*** 🗸

(u + v) cm