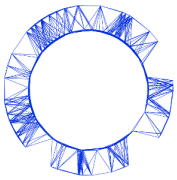


IPhO 2018
Lisbon, Portugal

A2-1

English (Official)

Write down the numbers 0 to 9 in the following table:

0	1	2	3	4	5	6	7	8	9

Part A: Stress-relaxation measurements (1.9 points)

A.1 (0.3 pt)

$\ell_0 =$ $\pm$

A.2 (0.3 pt)

$P_0 =$ $\pm$

A.3 (1 pt)
Some of the columns in this table are to be filled in other tasks.

t	$P(t)$	F/gf	$\frac{\mathrm{d}F}{\mathrm{d}t}$	$y(t)$

A.3 (cont.)

t	$P(t)$	F/gf	$\frac{\mathrm{d}F}{\mathrm{d}t}$	$y(t)$

A.3 (cont.)

t	$P(t)$	F/gf	$\frac{\mathrm{d}F}{\mathrm{d}t}$	$y(t)$

A.4 (0.3 pt)

$\ell =$ $\pm$

Part B: Measurement of the streched thread diameter (1.5 points)

B.1 (0.6 pt)

B.2 (0.3 pt)

$D =$ $\pm$

B.3 (0.3 pt)

$\bar{x} =$ $\pm$

B.4 (0.3 pt)

$d =$ $\pm$

Part C: Changing to a new thread (0.3 points)

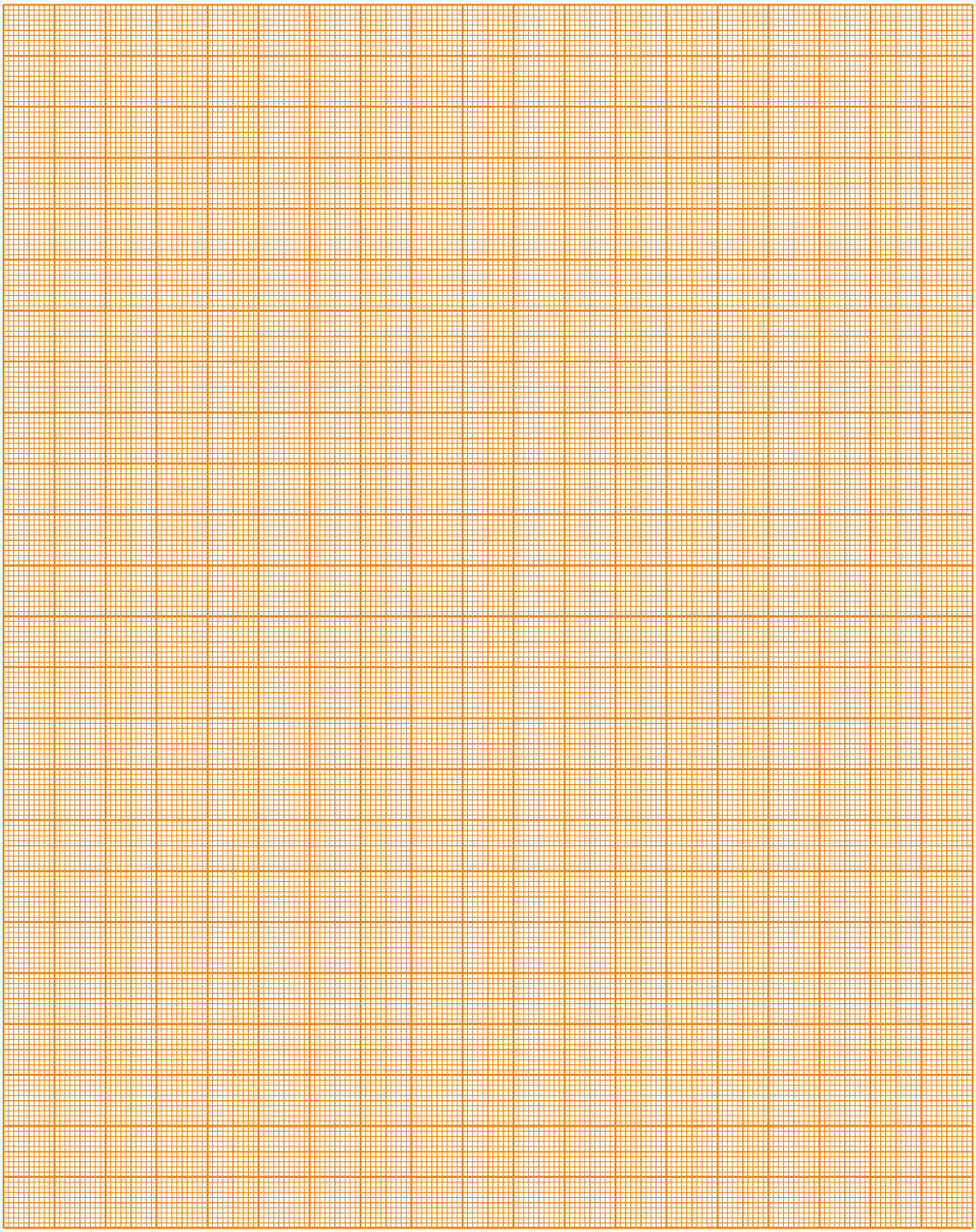
C.1 (0.3 pt)

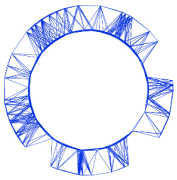
ℓ_0' $\pm$

Part D: Data analysis (5.7 points)

D.1 (0.3 pt)
Fill F in the table introduced in **A.3**.

D.2 (0.4 pt)





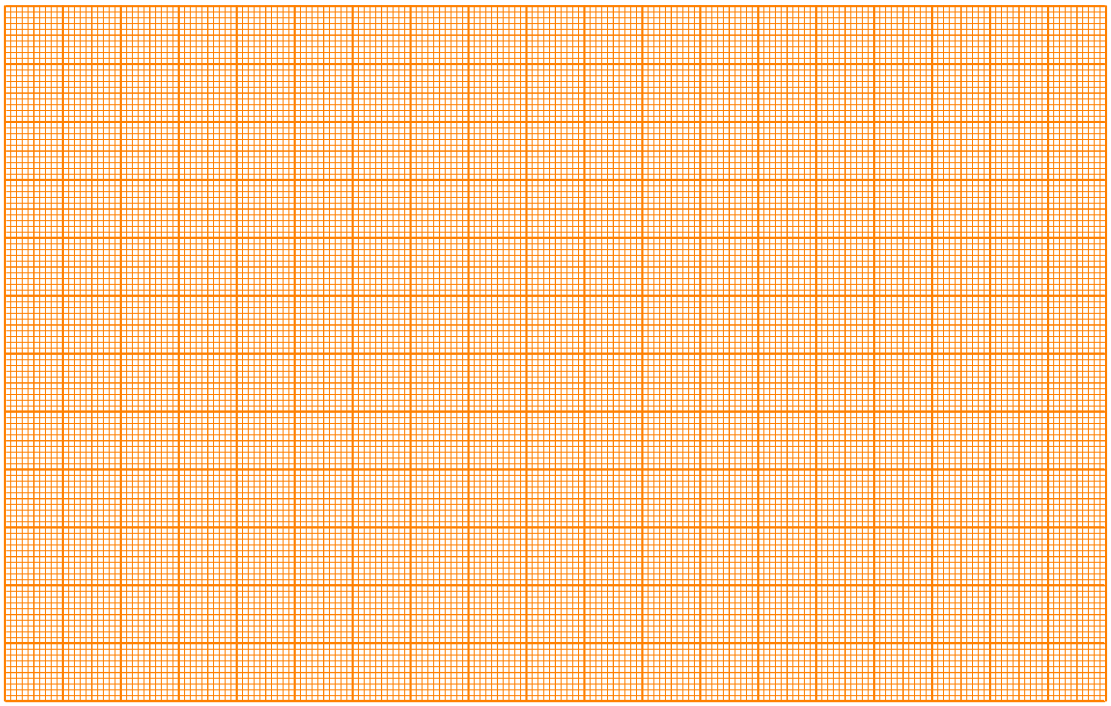
D.3 (0.3 pt)

$\epsilon =$ $\pm$

D.4 (0.3 pt)

$\beta =$

D.5 (0.4 pt)



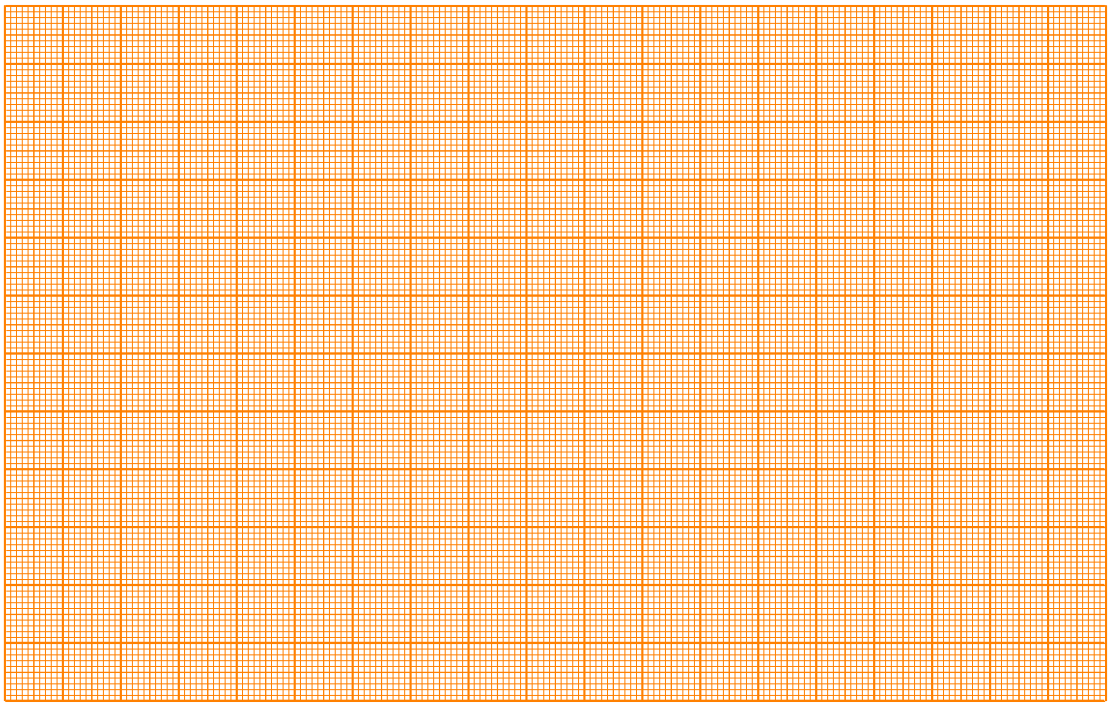
D.6 (0.5 pt)
Fill $\frac{dF}{dt}$ in the table introduced in **A.3.**

D.7 (0.3 pt)

D.8 (1.0 pt)

$E_1 =$

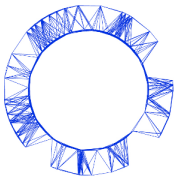
$\tau_1 =$



D.9 (0.3 pt)

$E_0 =$

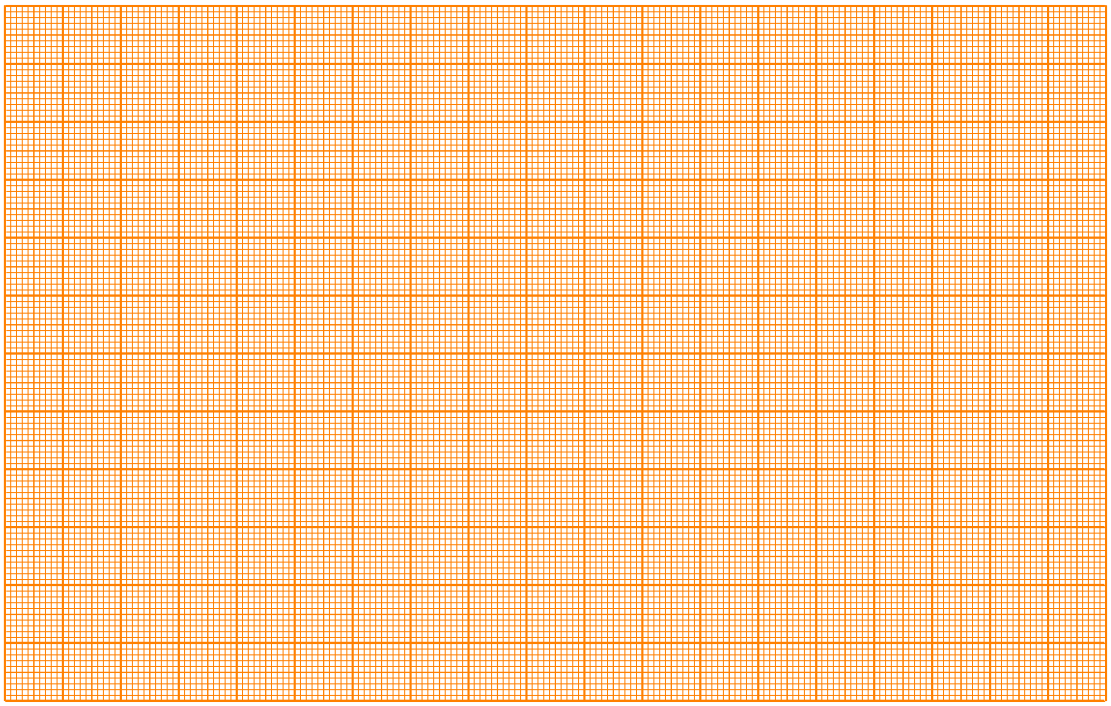
D.10 (0.3 pt)
Fill $y(t)$ in the table introduced in **A.3.**



D.11 (1.0 pt)

$E_2 =$

$\tau_2 =$



D.12 (0.3 pt)

$t_i =$

$t_f =$

D.13 (0.3 pt)

$\tau_3 =$

Part E: Measuring E in constant stress conditions (0.6 points)

E.1 (0.6 pt)

$E =$ $\frac{E-E_0}{E_0} =$