

Experiment



Asian
Physics
Olympiad
Adelaide 2019

A1-1

English (Official)

Static response of a magnetically active fluid (10 points)

Part A: Static Testing (1.6 points)

Magnetic interaction: force on a ferrofluid

A.1 (0.8 pt)

Diagram:

$z =$

A.2 (0.8 pt)

Density difference $\Delta\rho =$

Part B: Magnetic interaction: surface tension of a ferrofluid (1.2 points)

B.1 (0.6 pt)

$z_{\text{crit}} =$

$\lambda =$

B.2 (0.6 pt)

$\sigma =$

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A1-2

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Part C: Optical surface characterisation: non-spiking regime (4.1 points)

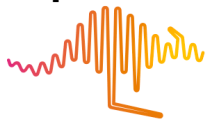
Optical surface characterisation: non-spiking regime

C.1 (0.6 pt)
Diagram

Measurements:

$\Delta z =$

Experiment



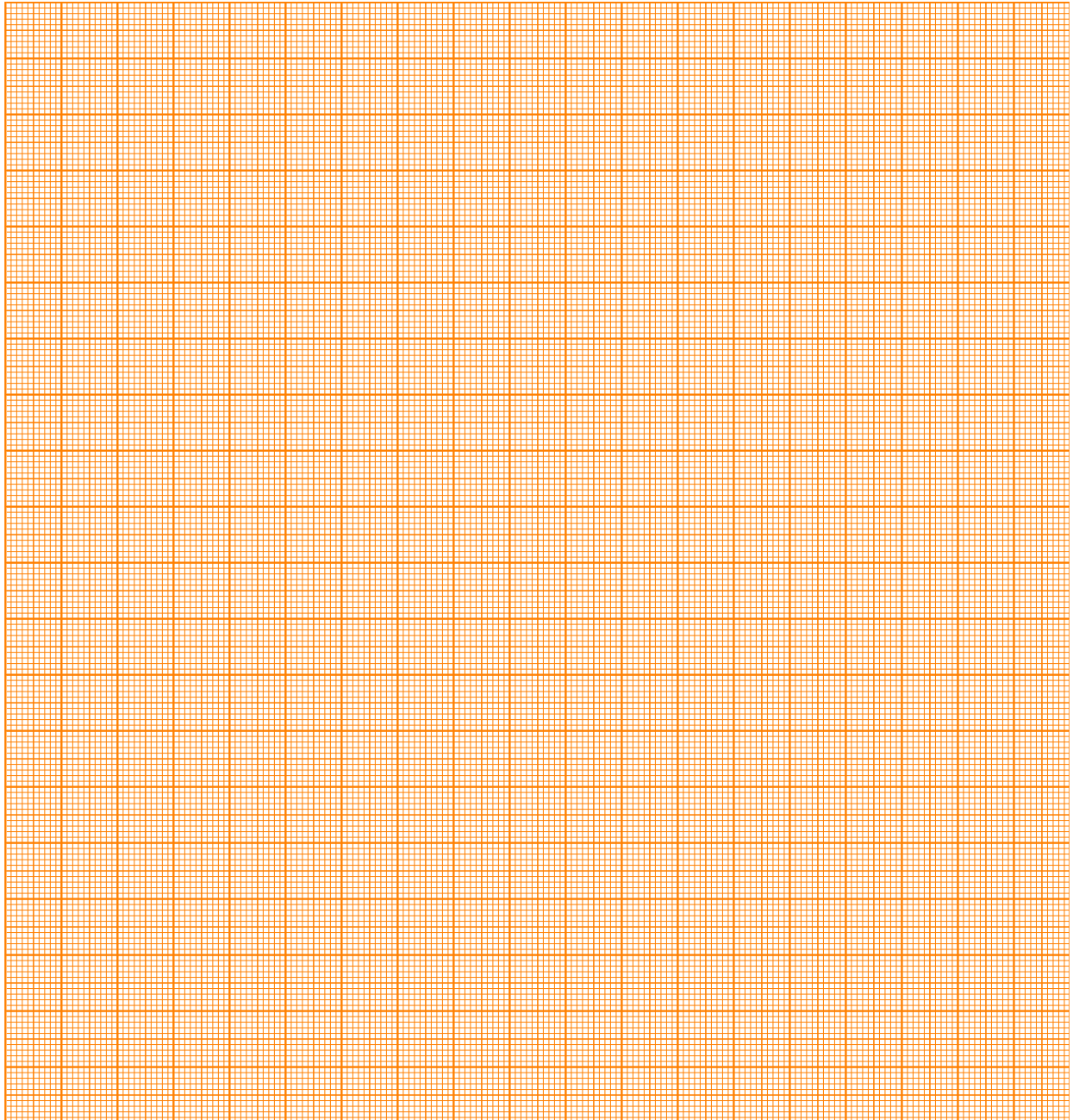
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A1-4

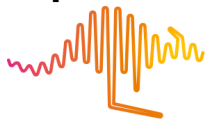
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C.2 (cont.)

Graph:



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A1-5

English (Official)

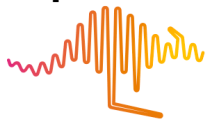
C.2 (cont.)

Relationship plotted on graph:

Space to work

$n =$

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A1-6

English (Official)

Part D: Spiked surface characterisation: spike formation and disappearance (3.1 points)

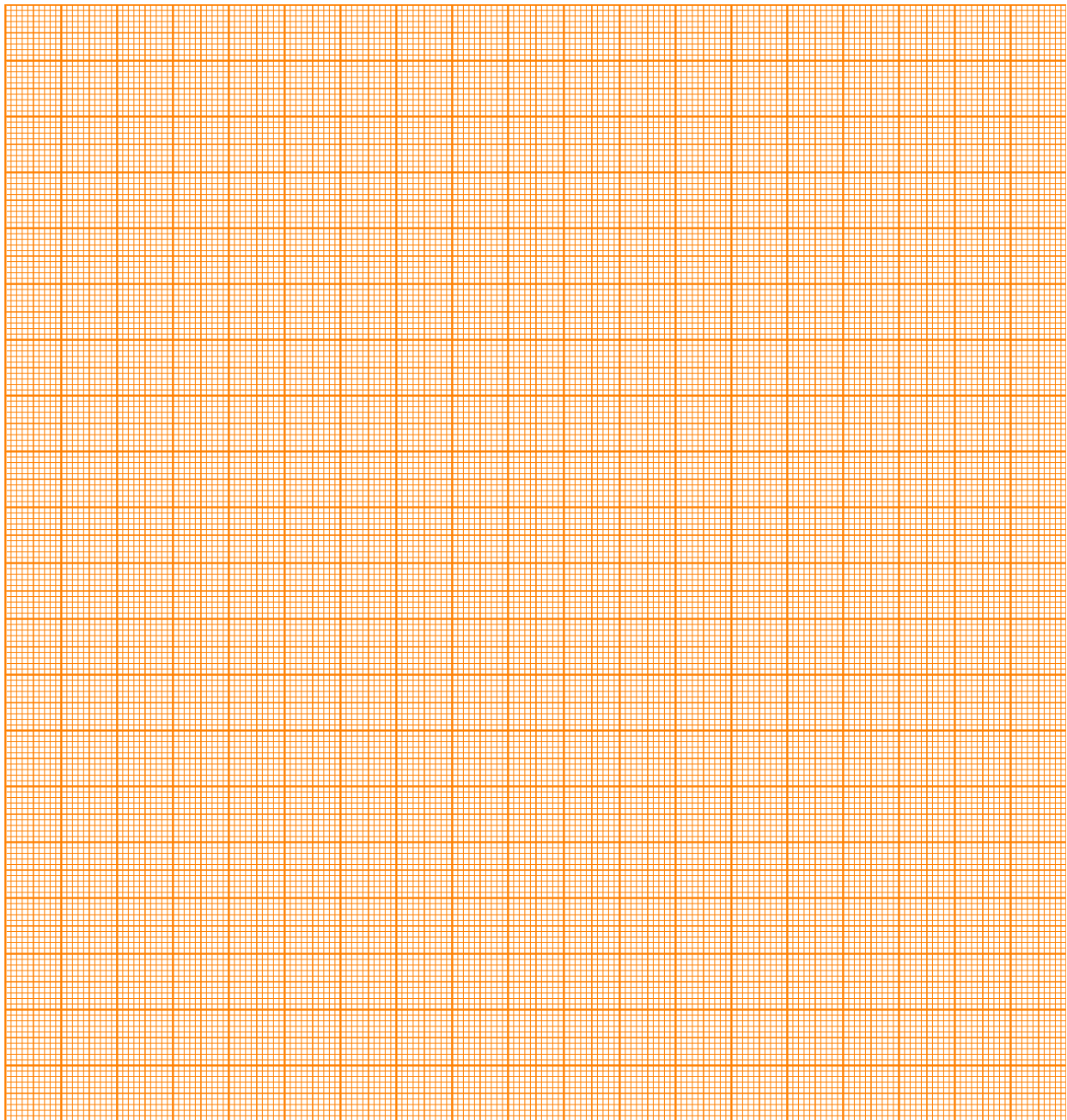
Spiked surface characterisation: spike formation and disappearance

D.1 (0.5 pt)

Surface tension of ferrofluid in air: $\sigma_{fa} =$



D.3 (1 pt)



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D.4 (0.6 pt)
Sketch:

Experiment

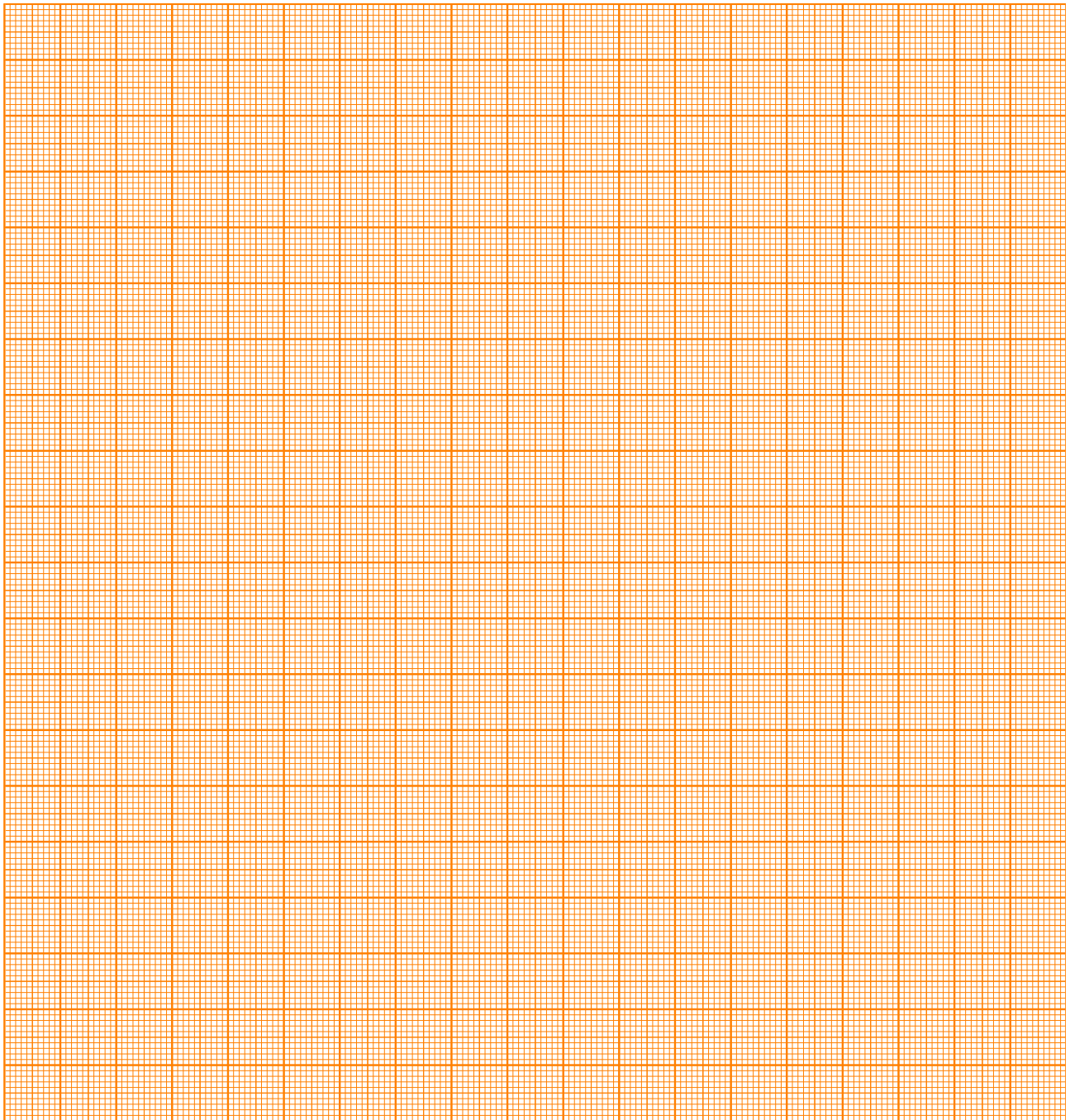


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A1-10

English (Official)

Additional graph paper



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A1-11
English (Official)

Additional graph paper

