

PART FOUR

Questions 36 to 44 carry a total of 30 marks.

Question 36

In an experiment on the effect of freezing, 43 sets of measurements were taken on the axial length y of ice crystals (in thousandths of millimetres) some time (x , measured in seconds) after introduction into a chamber, the interior of which is maintained at -5°C .

A scatter plot of axial length against freezing time is given in Figure 5.

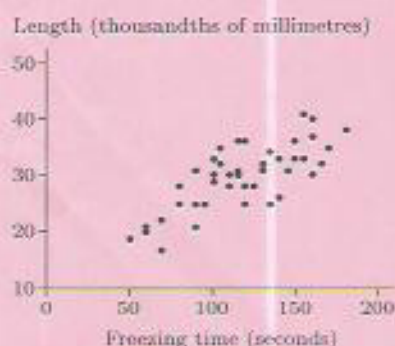


Figure 5

- (a) The equation of the least squares regression line through the data points is given by

$$\text{Axial length} = 14.4 + 0.13 \times \text{Time}$$

(where length is measured in thousandths of millimetres and time in seconds).

What does the slope in this regression equation measure? In what units is β_1 measured? *slope = $\Delta y / \Delta x$*

- (b) This result was used to predict the length of an ice crystal one hour after introduction to the chamber. The predicted length was 485.2 thousandths of a millimetre, with 90% prediction interval (382, 588.3). Comment on the usefulness of these numbers.

*β_1 in mm/s
1000 mm/s*

[4]