

PART IV

Questions 32 to 39 carry a total of 32 marks.

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Question 32

Figure 5 is a scatter plot of data resulting from a study of the operation of a chemical plant. The response variable y , 'stack loss', is the percentage of the incoming ammonia that escapes unabsorbed, and the explanatory variable x is a measure of the air flow through the plant.

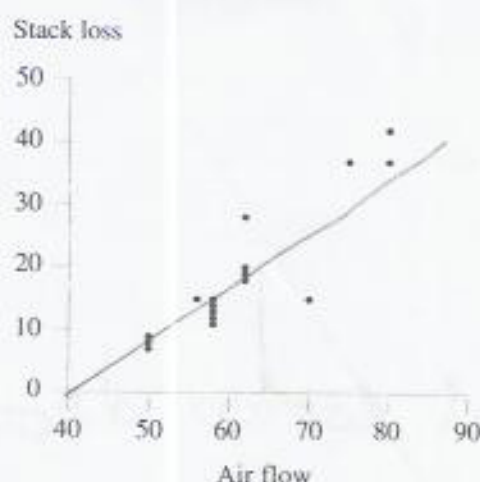


Figure 5

- (a) Explain briefly whether it is reasonable to fit a straight line to these data.

A straight line fit looks reasonable, although for low values of air flow, most points lie below and for high values of air flow most points lie above the line.

- (b) The least squares straight line fitted to these data is

$$y = -44.13 + 1.02x$$

Calculate the estimated mean stack loss when the flow is (i) 65; (ii) 45. Explain why you should put more reliance on one of these estimates than the other.

[5]

i) $y = -44.13 + 1.02 \times 65 = 22.17$

ii) $y = 17.7$

65 lies within the range of air flows sampled, but 45 does not.