

## **A level Physics B**

**H557/03** Practical skills in physics

### **Question Set 6**

- 1 (a) An experiment is carried out to find the half-life of a solid radioactive isotope **X** which emits beta radiation.

Describe **two** safety precautions necessary for handling such a material in the laboratory.

[2]

- (b) (i) The results obtained from the experiment are given in the table below.

Time $t/s$	Count rate/Bq	Corrected count rate $A/Bq$	$\ln(A/Bq)$
25	9.2	8.0	2.08
50	7.5	6.3	1.84
75	6.0	4.8	1.57
100	4.8		1.28
125	4.1	2.9	
150	3.4	2.2	
175	3.0		0.59
200	2.7	1.5	0.41
225	2.4	1.2	0.18

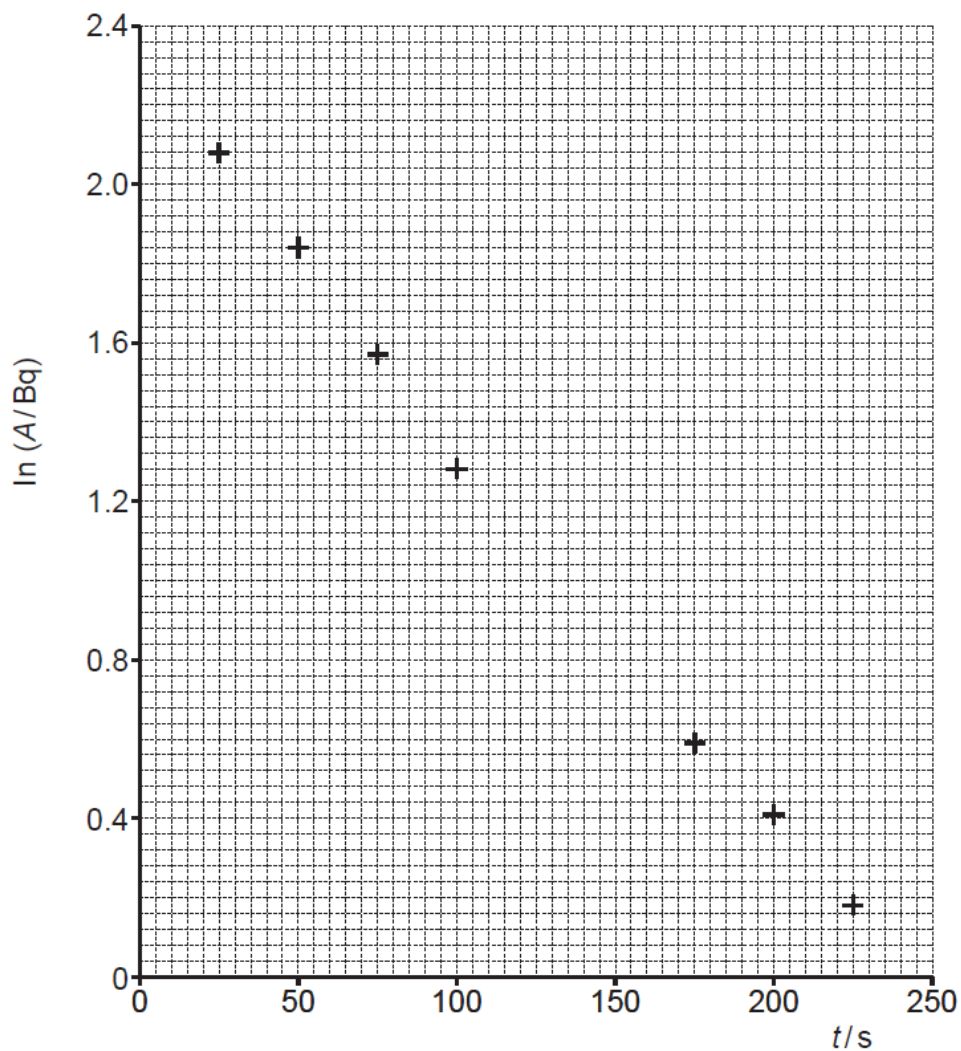
Explain what is meant by “Corrected count rate” **and** complete this column in the table.

[2]

- (ii) Complete the fourth column of the table by calculating the missing values for  $\ln(A/Bq)$ .

[1]

- (iii) A graph of  $\ln(A/\text{Bq})$  ( $y$ -axis) and  $t$  ( $x$ -axis) is drawn in **Fig. 1**. Plot the remaining points on the graph and draw the line of best fit.



**Fig. 1**

[2]

- (iv)\* Use your graph to find the value of half-life for the radioactive isotope **X** and explain the advantages of using  $\ln(A/\text{Bq})$  against  $t$  over an  $A$  against  $t$  graph to find half-life.

[6]

**Total Marks for Question Set 6: 13**

---

# OCR

Oxford Cambridge and RSA

## **Copyright Information**

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website ([www.ocr.org.uk](http://www.ocr.org.uk)) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge