Module 2 : Fundamental Data Analysis

Read text book pages 6 to 15 first then work through the questions showing **all working in full**.

Q1 Resistance =V/I

 Resistance is measured in Ohms and 1Ω = 1VA-1

 Show that the units of resistance are also JsC-2

Q2 A circle has a radius of 4.5m Calculate the angle at the centre if the arc length is 1.5m

Q3 An LP record spins at 33⅓ revolutions per minute. Convert this into radians per second (rad s-1)

Q4 Convert each of the following numbers into standard form with 3 significant figures.

 a) 7/3 b) 100,000 c) 0.000023455 d) 127567/231

Q5 Convert each of the following quantities into standard form with 2 significant figures.

 a) 506 mm b) 123 GHz c) 1MJ d) 0.2 nm

Q6 Measure the thickness of the paper used for the AS Physics text book.

 Describe how you minimised the uncertainty in your measurements.

 Calculate the uncertainty in your value. Show your working.

 Quote your answer with both percentage uncertainty and then with an absolute uncertainty.

Q7 Measure the area of the paper used for the AS Physics text book’s front cover.

 Describe how you minimised the uncertainty in your measurements.

 Calculate the uncertainty in your value. Show your working.

 Quote your answer with both percentage uncertainty and with an absolute uncertainty.

Q8 Measure the volume of the Year 1 and AS Physics text book.

 Describe how you minimised the uncertainty in your measurements.

 Calculate the uncertainty in your value. Show your working.

 Quote your answer with both percentage uncertainty and with an absolute uncertainty.

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| --- | --- | --- | --- |
| 22 | 28 | 24 | 23 |
| 25 | 68 | 24 | 25 |
| 26 | 31 | 30 | 25 |
| 26 | 21 | 23 | 25 |
| 28 | 27 | 26 | 23 |
| 32 | 24 | 32 | 28 |

Q9 Calculate the mean value, spread, range and percentage uncertainty of the following set of measurements.

Q10 Draw a table or spider diagram to summarise the meaning of each of the following terms used in the science of measurement. Use diagrams and examples where appropriate. Words in **bold** are on specification so likely to come up in exams.

 **resolution** **sensitivity** stability **response time**

 **zero error** noise calibration **systematic error**

 absolute uncertainty **uncertainty** outlier range

 spread inherent variation mean **accuracy**

 precision estimate line of best fit dot-plot magnitude median validity intercept

 gradient percentage uncertainty distribution estimate