A level - Evaluations (OCR)

<u>All</u> OCR, AS & A2, Evaluations take the same form. (All of this information is given to you in the Practical Skills Handbook)

1. You will probably be asked to find the percentage uncertainty in a piece equipment used. (If it's area or volume, don't forget the x2 or x3)

First state the limitations of the equipment – protractor to the nearest degree, ruler to the nearest mm, stopwatch to 1/10 sec. DO NOT go for half a gradation.

The percentage uncertainty in the equipment is found from:

The limitation of the equipment x 100 / the reading from the equipment

(It may be that the limitation of the measuring device is not the only factor. Potentially the dimension being measured could affect the uncertainty)

Or. You may be asked to work out the largest percentage uncertainty in a set of data.

Find the greatest range, i.e. the highest to lowest from any row of data, halve it, then divide this by the lowest reading (or perhaps the lowest average)

The percentage uncertainty in the data is found from:

The difference in reading x 100 / the smallest reading

2. You will be given a graph and probably be expected to add a 'worst acceptable straight line'. Using the <u>gradients</u> of the line of best fit and the 'worst acceptable straight line':

The percentage uncertainty is found from:

Difference in gradients x 100 / original gradient (usually the 'best fit' gradient)

Or. You may be asked to prove the shape / relationship of the graph

If asked to show that the graph is exponential, you are looking for a constant ratio. Choose a number of adjacent readings:

Reading 3 / Reading 4, Reading 4 / Reading 5. If the value is constant the relationship may be exponential.

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3. You will be asked to find the percentage difference between an experimental value and an 'accepted' value.

The percentage difference is found from:

Difference between the two values x 100 / the 'accepted' value

4. You will be asked to comment on the reliability of the experiment (2 marks!):

Comment on the scatter of the points on the graph (little scatter = better reliability). Discuss and compare the percentage uncertainties and percentage differences calculated previously and/or look at the range of readings either side of a calculated average.

- 5. The last questions will usually say:
 - Indentify two limitations
 - Explain how these two limitations can be improved
 - (One limitation will almost <u>always</u> be *parallax* and require the presence of a fixed, fiducial, point (and the movement of your head) to improve the experiment. The other often relates to 'thickness' of equipment whether electrical wires, string or other equipment, even the difficulty of measuring something that is moving. 'Human error' is not usually acceptable whereas the difficultly of taking a reading and pushing a button at the same time are. Look sensibly at the 'quality' of the equipment (NOT "we could have used better stuff") and external factors such as temperature or background light. Increasingly a <u>detailed</u> discussion of how you might use a datalogger or a video camera can be used.
 - Discuss the impact on an experimental value This means <u>state</u>: 'if a goes up, b goes down' <u>not</u> '"it will have an impact". Often the gradient of a line will be unchanged but the line will be shifted along an axis. Be specific !

This requires <u>5</u> distinct bullet points and no waffle.