



Cambridge Technicals Level 3

Laboratory Skills

05847-05849, 05874 & 05879

Unit 3 Scientific Analysis and Reporting

OCR Report to Centres June 2018

About this Examiner Report to Centres

This report on the 2018 Summer assessments aims to highlight:

- areas where students were more successful
- main areas where students may need additional support and some reflection
- points of advice for future examinations

It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

The report also includes links and brief information on:

- A reminder of our **post-results services** including **reviews of results**
- Link to **grade boundaries**
- **Further support that you can expect from OCR**, such as our CPD programme

Reviews of results

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Grade boundaries

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Unit 3 Scientific Analysis and Reporting

1. General Comments:

This is the first series for the Unit 3 paper. It was good to see that candidates responded well to the combination of open-response questions alongside objective formats. In general, calculations were carried out effectively and the analysis of data seen was relevant. The candidates had been prepared well for this paper and they appeared to be confident when responding to a wide range of scientific topics. The majority of candidates were able to respond to all questions in the time available, and relatively few failed to attempt to answer the questions. Additional pages were rarely used by candidates.

2. Comments on Individual Questions:

1(a) The majority of candidates were able to determine the median of the data provided in Table 1.1. No pattern of alternative responses could be determined.

1(b) Again, most candidates successfully completed the calculation required to identify the mean value. No pattern of alternative responses could be determined, although it was noted that some candidates divided the total value by 12 rather than 13.

1(c) It was most encouraging to see that many candidates were not overtly challenged by the calculation of standard deviation. Many obtained the correct answer and presented it with one decimal place. Unfortunately, some were unable to utilise the equation provided but did, at least, obtain some marks for specific stages completed.

1(d) Many candidates appreciated that the comet is too far away and moving fast. Others correctly noted that it is constantly changing in size due to melting ice or the dispersal of dust particles. Some candidates, however, struggled with this question and made incorrect references to misuse of the telescopes.

1(e)(i) Although many candidates successfully determined the comet surface area, they did not always use the correct units (m^2). A range of responses was accepted, based on the value of pi (π) provided by the type of graphical/scientific calculator used. However, $\pi = 3.14$ was clearly stated in the stem of the question.

1(e)(ii) Again, many candidates successfully calculated the volume (using the formula provided) but failed to show the correct units (m^3). A range of responses was accepted, based on the value of pi (π) provided by the type of graphical/scientific calculator used. However, $\pi = 3.14$ was clearly stated in the stem of the question.

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1(f) A number of candidates were able to rearrange the equation to achieve the orbital radius. Some candidates struggled to balance the equation.

2(a)(i) to (iii) The majority of candidates successfully constructed the graph, showing appropriate units, title and range for both axes. They were also able to plot the values correctly. The outlier was identified correctly, in many cases, but there was some confusion when candidates were required to determine the expected value for this point in relation to the curve drawn.

2(a)(iv) It appeared that many candidates were unable to use the guidance provided for this question. They were not able to determine the intercept value on the x-axis and were, therefore, unable to provide the appropriate explanation.

2(b) Many candidates completed the lines on the graph or created a suitable triangle to show the gradient. However, most did not appreciate that the gradient is based on vertical distance divided by the horizontal distance at the points given. This was a challenging question.

2(c) For this question, candidates frequently expressed the trend correctly as the wider the channel in the track, the lower the acceleration of the ball. Some candidates referred only to a negative correlation. This type of response was allocated one mark only.

2(d) A few candidates understood that the values between 1.0 and 2.0cm would, in general, be half those given earlier in the question. There were some correct references to the next stage in the process. Unfortunately, some candidates were unable to solve the problem in this question.

3(a)(i) Although a number of candidates could not recall the term binomial nomenclature, they did appreciate that generic and specific names were involved.

3(a)(ii) This appeared to be one of the most accessible questions for candidates. They were able to work through the key and to complete all of the stages involved. No pattern of alternative responses was determined.

3(b) This question was much more challenging. Some candidates referred correctly to features such as common length, depth range and nest shape/material but struggled to explain the variance for such features. For example, it was anticipated that common length would relate to the growth patterns of fish, the diet and age.

3(c) Some candidates were able to explain that the fish may differ since they are from different genera and species. This was acceptable but it was anticipated that their shared membership of the family *Labridae* was a source of some similarity.

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4(a)(i) Most candidates correctly observed that the radar gun Y was very accurate and precise. No pattern of alternative responses was seen.

4(a)(ii) The calculation of the range did not present a difficulty for most candidates. This was expressed as either $59.7 - 60.3$ or as 6.0 .

4(a)(iii) The calculation of the interval presented a problem for most candidates. They were credited for references to the individual intervals of 0.2 , 0.4 and 0.2 but the concept of the interval as ± 0.3 was not appreciated.

4(b)(i) The majority of candidates successfully identified the instrument as the type of error. No clear pattern of alternatives was observed.

4(b)(ii) Most candidates failed to see that the limited use of divisions on the speedometer was the key feature for the error.

4(b)(iii) A number of candidates referred correctly to both the method/equipment and results in the two definitions but others struggled to articulate a clear response.

4(c)(i) Many candidates realised that the measurement error was that of reaction time.

4(c)(ii) It was anticipated that candidates would continue to focus on the use of a stopwatch and refer to increasing the distance tested. However, many considered other options, such as automated/digital equipment. This was not creditworthy.

4(c)(iii) It was encouraging to see that many candidates realised that sensitivity related to the use of the stopwatch with the lowest values/higher resolution. No clear pattern of alternative responses was noted.

5(a)(i) The calculation of resistance was straightforward and most candidates were able to do this. It was unfortunate that some did not present their answers to 2 decimal places. Many were also successfully multiplied each resistance value by either 2 or 4 to complete the table.

5(a)(ii) Some candidates considered that Ali was correct. This led to some difficulty when presenting an appropriate explanation for their choice. No clear pattern of alternative responses was observed.

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5(a)(iii) Some candidates realised that Nina's values were required but did not understand that the values should then be tested following a repeat of the experiment. Varied responses were seen with some candidates achieving full marks.

5(b) Most candidates successfully noted that Rob had made assumptions about resistivity and cross-sectional areas. No pattern of alternative responses was seen.

5(c) This question proved to be a challenging question. Candidates found it difficult to articulate a discussion based on the results for the three wires. The key error was the lack of reference to the named wires, X, Y and Z

5(d) Most candidates realised that secondary sources included the internet or books but some, correctly, also referred to other sets of results. The primary source was often identified as the current set of results.

6(a) It appeared that most candidates were not familiar with the protocol for titration. A wide variety of responses were seen for the order of steps and many seemed to obtain one or two marks due to chance.

6(b)(i) Some candidates realised that the dilution of the bleach reduced the concentration. Others correctly referred to the improved effectiveness of the titration. A number of candidates linked the dilution to the hazard of the bleach. This was not acceptable in the context of this question.

6(b)(ii) It was encouraging to see that so many candidates used the equation provided to determine the concentration. However, some failed to obtain full marks because they did not present their answer to 2 significant figures.

7(a) Responses to this question seemed to reflect prior experience of creating temporary microscope slides. It was evident that some candidates had completed this task in the laboratory and were able to identify the correct order of steps. However, some candidates struggled to complete this question correctly.

7(b) Again, the responses reflected the experience of some candidates in the laboratory. Some candidates correctly referred to mounting, fixing and dehydration of specimens. Other students incorrectly described the location of specimens in sterile environments. This was not appropriate for this scenario.

7(c) Most candidates realised that staining enhances the overall quality of the image in terms of organelles, cells and/or tissues.

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8(a) Many candidates successfully determined the percentage developing the condition (as a % of the group studied) in Table 8.1. No clear pattern of alternative responses was noted.

8(b) This question was a multiple choice type question where candidates had to identify the conclusion that could be reasonably concluded from Table 8.1. Candidates found this question challenging.

8(c) Most candidates appreciated that factors such as diabetes and household income may influence the incidence of the neurological diseases listed in Table 8.3. This did not present a difficulty for the majority of candidates.

8(d)(i) Many realistic conclusions were possible for the data in Table 8.3. As a result, most candidates obtained full marks for this question. However, some candidates struggled and drew conclusions that were not supported by the data. Others referred to 'diseases' without qualification and this prevented them from achieving the marking points.

8(d)(ii) A number of limitations was possible for this investigation. Any realistic limitation was creditworthy but some candidates struggled with this question and referred to the way in which the data were presented in the table. It was interesting to see that a number of candidates appreciated that people with a lower income may be forced to live nearer to major roads due to cheaper house prices.

8(d)(iii) The recommendations the candidates suggested were often correctly linked to the identified limitations. This approach was followed successfully by a number of candidates. No clear pattern of alternative responses was observed.

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