# Topic Test 3 – Calculating scientific quantities

## Criteria

### Unit code, name and release number

MSL924003 - Process and interpret data Release 1

### Qualification/Course code, name and release number

MSL60118 Advanced Diploma of Laboratory Operations Release 1

MSL50118 Diploma of Laboratory Technology Release 1

MSL40118 Certificate IV in Laboratory Operations Release 1

MSL30118 Certificate III in Laboratory Skills Release 1

\*\*Amend the qualification box before distributing to the student. The information here should only contain the qualification the student is enrolled in\*\*

## Student details

### Student number

### Student name

## Assessment Declaration

* This assessment is my original work and no part of it has been copied from any other source except where due acknowledgement is made.
* No part of this assessment has been written for me by any other person except where such collaboration has been authorised by the assessor concerned.
* I understand that plagiarism is the presentation of the work, idea or creation of another person as though it is your own. Plagiarism occurs when the origin of the material used is not appropriately cited. No part of this assessment is plagiarised.

### Student signature and Date

Version: *1.0*

Date created: *1 November 2018*

Date modified: *23/04/2019*

For queries, please contact:

*Innovative Manufacturing, Robotics and Science Skills Point*

*TAFE Hamilton Campus*

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This assessment can be found in the: [Learning Bank](https://share.tafensw.edu.au/share/access/searching.do?doc=%3Cxml%2F%3E&in=P7ac4831b-430a-4b8d-8b56-f7b32ed5b9cf&q=&type=standard&sort=rank&dr=AFTER)

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## Assessment instructions

Table 1 Assessment instructions

| Assessment details | Instructions |
| --- | --- |
| **Assessment overview** | The objective of this assessment is to assess your knowledge in calculating scientific quantities as would be required in the workplace. |
| **Assessment Event number** | 3 of 7 |
| **Instructions for this assessment** | This is a written assessment and it will be assessing you on your knowledge of the unit.  This assessment has 17 questions. It is open book and will be conducted as a supervised test.  Assessment feedback is provided at the end of this document. |
| **Submission instructions** | This assessment will be undertaken in the presence of a teacher or assessor. |
| **What do I need to do to achieve a satisfactory result?** | To achieve a satisfactory result for this assessment all questions must be answered correctly. |
| **What do I need to provide?** | You should bring a pen/s, calculator and your Student Workbook. |
| **Due date/time allowed** | You will have two hours to complete this assessment. |
| **Assessment feedback, review or appeals** | Your assessor will provided feedback as set out in the Unit Assessment Guide. Appeals are addressed in accordance with Every Students Guide to Assessment. |

## Short answer

1. **Round off** the *problem* values in the table below correct to the nearest figure shown in the *criteria* column. Record your answer in the *Answer* column.

Table 2 rounding off questions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Question | Problem | Criteria | Answer | Answer correct? |
| a) | 0.003682 | 4 decimal places |  | Yes  No |
| b) | 5.20196 | 2 decimal places |  | Yes  No |
| c) | 463.9 | Round to tens |  | Yes  No |
| d) | 8,420 | to nearest 100 |  | Yes  No |
| e) | 68,420 | to nearest 10 000 |  | Yes  No |
| f) | 4,724,361 | to nearest 1 000 000 |  | Yes  No |

1. Give the number of **significant figures** for each of the *problem* values in the table below and record your answer in the *Answer* column.

Table 3 Significant figures

|  |  |  |  |
| --- | --- | --- | --- |
| Question | Problem | Answer | Answer correct? |
| a) | 478 200 |  | Yes  No |
| b) | 0.01003 |  | Yes  No |
| c) | 3 000 |  | Yes  No |
| d) | 863.9462 |  | Yes  No |
| e) | 21.00 |  | Yes  No |
| f) | 0.00053 |  | Yes  No |

1. Use your skills and knowledge to **transpose** the following formulae to make a new subject.

Table 4 Transpose formula

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Question | Problem | Make this the subject | Answer | Answer correct? |
| a) | V=Lbw | w |  | Yes  No |
| b) | A=πr2 | r |  | Yes  No |
| c) | V2 = m2 + 2as | a |  | Yes  No |
| e) | C1V1=C2V2 | C2 |  | Yes  No |

1. Choose (highlight or circle) the best **estimation** A, B or C for these calculations

Table 5 Estimates

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Question | Calculations | Identify the best estimate below | | | Answer correct? |
| A | B | C |
| a) | 6.93 x 11.2 | 7.76 | 77.6 | 776 | Yes  No |
| b) | 7.82 x 5.03 | 39.3 | 393 | 3930 | Yes  No |
| c) | 0.31 x 0.186 | 5.77 | 0.577 | 0.057 7 | Yes  No |
| d) | 5.91 x 20.14 | 11.9 | 119 | 1 190 | Yes  No |
| e) | 0.00467 x 3.175 | 0.0148 | 0.00148 | 0.148 | Yes  No |

1. **Substitute** the data into the provided formulae and **calculate** the answer correct to the appropriate number of significant figures (which you need to determine).
   1. when *b* =3.4 106 and *h* = 7.0 104

Answer correct  Yes  No

* 1. when h = 5.0 10-1 , m= 3.2 106, v= 2.7 103

Answer correct  Yes  No

* 1. V = *u* + *at* when *u* = 2.7 104, *a* = 5, *t* = 3.0 103

Answer correct  Yes  No

1. Express each ratio in its lowest terms
   1. 132 : 12

Answer correct  Yes  No

* 1. 4.8 : 1.6

Answer correct  Yes  No

* 1. 50g : 0.05kg

Answer correct  Yes  No

1. The ratio of the length of the tail of a mouse to that of the rest of its body is 6:5 and its total length is 132mm. Calculate the length of the tail and the body, expressing your answers in millimetres.

Answer correct  Yes  No

1. An aspirin mixture composed of the three compounds A, B and C in the ratio 7:3:2 has a mass of 2 kg. Calculate the masses of each compound, expressing your answers in kilograms.

Answer correct  Yes  No

1. Liquids A and B are mixed in the ratio 2:7 (by volume). What volume of liquid A would be present in 72 mL of the mixed solution?

Answer correct  Yes  No

1. How much salt is weighed to make 2 L of 8% w/v salt brine?

Answer correct  Yes  No

1. How much 10% w/v salt brine is needed to prepare 200 mL of 2% w/v salt brine?

Answer correct  Yes  No

1. If 40 g of NaCl is dissolved in 2 litres of water what is the %w/v of the solution?

Answer correct  Yes  No

1. Convert each of the following
   1. 8200 µg to g

Answer correct  Yes  No

* 1. 0.000056 km to mm

Answer correct  Yes  No

* 1. 2.9 x 109 nL to ML

Answer correct  Yes  No

* 1. 8.5 m2 to mm2

Answer correct  Yes  No

* 1. 246 µm3 to m3

Answer correct  Yes  No

* 1. 9.4 x 10-5 L to mm3

Answer correct  Yes  No

1. Calculate the volume of stock solution (10 mg/100mL) required to prepare 20 mL of three standard solutions containing 1, 2 and 5 mg/100mL of tartrazine by dilution of the stock with 2-propanol.

Answer correct  Yes  No

1. In the determination of ethanol (%v/v), a brandy sample was diluted 1/5. What is the dilution factor?

Answer correct  Yes  No

1. How much 2M NaOH is required to make up 1000mL of a 0.01M NaOH solution?

Answer correct  Yes  No

1. If there were 120 micro-organisms on a pour plate of a 10-2 dilution, how many micro-organisms were there per mL of the original sample?

Answer correct  Yes  No

## Assessment Feedback

*NOTE: This section* ***must*** *have the assessor signature and student signature to complete the feedback.*

### Assessment outcome

Satisfactory

Unsatisfactory

### Assessor Feedback

Was the assessment event successfully completed?

If no, was the resubmission/re-assessment successfully completed?

Was reasonable adjustment in place for this assessment event?  
*If yes, ensure it is detailed on the assessment document.*

Comments:

### Assessor name, signature and date:

### Student acknowledgement of assessment outcome

Would you like to make any comments about this assessment?

### Student name, signature and date

***NOTE: Make sure you have written your name at the bottom of each page of your submission before attaching the cover sheet and submitting to your assessor for marking.***