

# UNITY SECONDARY SCHOOL

## 2018 Mid-Year Examination

### 1 EXP Science

### Marking Scheme

#### PAPER 1 (30 marks)

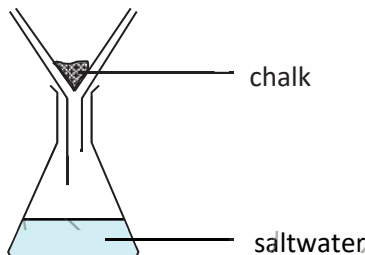
|   |   |    |   |    |   |    |   |    |   |    |   |
|---|---|----|---|----|---|----|---|----|---|----|---|
| 1 | D | 6  | C | 11 | C | 16 | D | 21 | B | 26 | C |
| 2 | D | 7  | D | 12 | C | 17 | C | 22 | B | 27 | D |
| 3 | A | 8  | D | 13 | D | 18 | B | 23 | A | 28 | A |
| 4 | D | 9  | C | 14 | C | 19 | B | 24 | B | 29 | C |
| 5 | A | 10 | C | 15 | A | 20 | B | 25 | D | 30 | B |

#### PAPER 2 Section A: Structured Questions (40 marks)

\*1m minus for entire paper if units not given

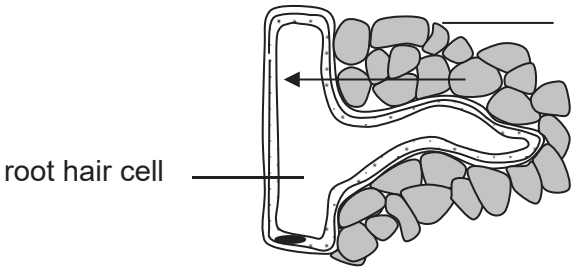
|    |     |      |                                                                                                                                                                                   |                                |
|----|-----|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| A1 | (a) | (i)  | Corrosive                                                                                                                                                                         | 1                              |
|    |     | (ii) | Splash/rinse her eyes with plenty of running water from the tap.                                                                                                                  | 1                              |
|    | (b) |      | Burette and pipette (measuring cylinder and beaker not accepted) (zero for spelling errors)                                                                                       | 1<br>1                         |
|    | (c) |      | Heat is given off and <u>the beaker feels hot.</u>                                                                                                                                | 1                              |
|    | (d) |      | <u>Heat/evaporate the solution</u> to ensure that <u>all the solvent water is completely boiled off/ to dryness</u> and a pure dry sample of sodium chloride will be left behind. | 1<br>1                         |
| A2 |     |      | A: cork<br>B: turpentine<br>C: water<br>D: lead<br>E: mercury<br>F: gold                                                                                                          | 1m for every 2 correct answers |
| A3 | (a) |      | Electrolysis/ passing electricity through it (decomposition by <u>strong heating</u> → B.O.D)                                                                                     | 1                              |

|    |     |  |                                                                                                                                                                                                                                                                                                                                                    |        |
|----|-----|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|    | (b) |  | <p><b><u>Sodium chloride</u></b> is a compound which <b><u>can be broken down by chemical methods</u></b>.</p> <p><b><u>Sodium</u></b> being an element <b><u>cannot be broken down into simpler substances by any methods</u></b>.</p> <p>(Others properties not accepted as the difference must be applicable to all elements and compounds)</p> | 1<br>1 |
| A4 | (a) |  | Displacement of water/ measuring cylinder method                                                                                                                                                                                                                                                                                                   | 1      |
|    |     |  | <p>Volume of metal= V-30</p> <p>Density = M/(V-30)</p> <p>(Award marks if student present it in words using the given information "M", "V" and "30".</p> <p>(as long as the "M", "V" and "30" not used, minus 1 mark.</p>                                                                                                                          | 1<br>1 |
|    | (b) |  | Lower the object gently to <b><u>avoid water from splashing out/ reading at eye level/ prevent parallax error/ ensure that the object is fully submerged</u></b> .                                                                                                                                                                                 | 1      |
|    | (c) |  | <b><u>Tie the metal weight to the styrofoam block</u></b> and immerse completely into the water                                                                                                                                                                                                                                                    | 1      |
| A5 | (a) |  | <b><u>Inappropriate</u></b> because steel has a <b><u>high density</u></b> , aircrafts should be made of relatively <b><u>low density material</u></b> such as <b><u>aluminium</u></b> , which provides the aircraft the buoyancy to fly.<br>or                                                                                                    | 1<br>1 |
|    |     |  | <b><u>Appropriate</u></b> as <b><u>steel is strong and hardness</u></b> , hence it is <b><u>able to withstand the high pressure and forces</u></b> when flying at high speed/ <b><u>able to carry a heavy load</u></b> .                                                                                                                           | 1<br>1 |
|    | (b) |  | <b><u>Inappropriate</u></b> because <b><u>wood is a poor conductor of heat</u></b> hence it will take a long time for the food to be cooked.                                                                                                                                                                                                       | 1      |
|    |     |  | A more appropriate material will be <b><u>steel</u></b> as it is a <b><u>good conductor of heat</u></b> and <b><u>food will be cooked faster</u></b> .                                                                                                                                                                                             | 1      |
|    | (c) |  | <b><u>Appropriate</u></b> because granite is <b><u>strong and hard hence able to withstand scratches and carry heavy load./</u></b><br>It is also a <b><u>poor conductor of heat</u></b> and feels cool when walked on even on a hot day.                                                                                                          | 1<br>1 |

|    |                    |       |                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |    |                    |    |           |    |                   |                  |
|----|--------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|----|--------------------|----|-----------|----|-------------------|------------------|
| A6 | (a)                |       | The function of the flagellum is for <u>motility/ ability to move without help for the cells.</u>                                                                                                                                                                                                                                                                                                                   | 1           |             |    |                    |    |           |    |                   |                  |
|    | (b)                |       | Cell X has characteristics of <b><u>both animal and plant cell.</u></b><br><br><b><u>The absence of cell wall/ a large central vacuole /presence of flagellum indicates the characteristics of an animal cell.</u></b><br><br><b><u>The presence of chloroplasts indicates that it has characteristic of a plant cell.</u></b>                                                                                      | 1<br>1<br>1 |             |    |                    |    |           |    |                   |                  |
|    | (c)                |       | Cell X contains <u>chloroplasts</u> which <b><u>absorbs light energy/ traps sunlight from the sun to make food</u></b> through photosynthesis.<br><br>(All key words must be present for marks to be awarded)                                                                                                                                                                                                       | 1           |             |    |                    |    |           |    |                   |                  |
| A7 | (a)                |       |  <p>Correct set-up;</p> <ul style="list-style-type: none"><li>- Proportion of funnel and mouth of flask must fit</li><li>- Funnel tip must be 'open'</li><li>- filter paper (tip to be 'closed')</li></ul> <p>Correct label for "chalk"; (residue not accepted)</p> <p>Correct label for "saltwater"; (filtrate not accepted)</p> | 1<br>1<br>1 |             |    |                    |    |           |    |                   |                  |
|    | (b)                | (i)   | Simple <b><u>Distillation</u></b>                                                                                                                                                                                                                                                                                                                                                                                   | 1           |             |    |                    |    |           |    |                   |                  |
|    |                    | (ii)  | <table><tr><td>P:</td><td>Thermometer</td></tr><tr><td>Q:</td><td>distillation flask</td></tr><tr><td>R:</td><td>Condenser</td></tr><tr><td>S:</td><td>Distillate/ water</td></tr></table>                                                                                                                                                                                                                          | P:          | Thermometer | Q: | distillation flask | R: | Condenser | S: | Distillate/ water | 1m for 2 correct |
| P: | Thermometer        |       |                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |    |                    |    |           |    |                   |                  |
| Q: | distillation flask |       |                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |    |                    |    |           |    |                   |                  |
| R: | Condenser          |       |                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |    |                    |    |           |    |                   |                  |
| S: | Distillate/ water  |       |                                                                                                                                                                                                                                                                                                                                                                                                                     |             |             |    |                    |    |           |    |                   |                  |
|    |                    | (iii) | R <b><u>condenses</u></b> the <b><u>water vapour</u></b> into a <b><u>liquid/water.</u></b><br>(All key words must be present for marks to be awarded)                                                                                                                                                                                                                                                              | 1           |             |    |                    |    |           |    |                   |                  |
| A8 | (a)                |       | The larger <b><u>the volume</u></b> of ice cubes, the <b><u>longer the time taken</u></b> for it to melt.<br>(size of ice cube <b><u>NOT accepted</u></b> )<br>(Give marks as long as student make a connection using volume and time)                                                                                                                                                                              | 1           |             |    |                    |    |           |    |                   |                  |
|    | (b)                |       | Volume of ice cubes                                                                                                                                                                                                                                                                                                                                                                                                 | 1           |             |    |                    |    |           |    |                   |                  |
|    | (c)                |       | Time taken for the ice to melt                                                                                                                                                                                                                                                                                                                                                                                      | 1           |             |    |                    |    |           |    |                   |                  |
|    | (d)                |       | Time taken would increase.                                                                                                                                                                                                                                                                                                                                                                                          | 1           |             |    |                    |    |           |    |                   |                  |
| B1 | (a)                | (i)   | <u>10.02 cm</u>                                                                                                                                                                                                                                                                                                                                                                                                     | 1           |             |    |                    |    |           |    |                   |                  |

|    |     |       |                                                                                                                                                                                                                                                                                                                                                                           |                                      |                                  |                     |
|----|-----|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------|---------------------|
|    |     | (ii)  | 10.02 x 10.02 x 10.02 = 1006.012 cm <sup>3</sup>                                                                                                                                                                                                                                                                                                                          |                                      |                                  | 1 (ecf)             |
|    |     |       | Density = 40/1006.012<br>= 0.0397 g/cm <sup>3</sup> (3 s.f)                                                                                                                                                                                                                                                                                                               |                                      |                                  | 1 (ecf)<br>1(ecf)   |
|    |     | (iii) | It will <b>float</b> , the cube is <b>less dense than the liquid</b> .                                                                                                                                                                                                                                                                                                    |                                      |                                  | 1                   |
|    | (b) | (i)   | Mass of iron = 0.01kg x 1000g<br>= 10 g<br>Volume of iron = 10/19.32<br>= 0.518 cm <sup>3</sup> (3 s.f)                                                                                                                                                                                                                                                                   |                                      |                                  | 1                   |
|    |     | (ii)  | Mass of silver = 20g/1000g<br>= 0.02 kg<br>Volume of silver = 0.02/10500<br>= 0.0000019 m <sup>3</sup><br>0.0000019 m <sup>3</sup> x 1000000 cm <sup>3</sup> = 1.90 cm <sup>3</sup> (3 s.f)<br><br>(award 1 mark as for working showing unit conversion of either mass→0.02kg or density → 10.5 g/cm <sup>3</sup> or volume →1.90 cm <sup>3</sup> )                       |                                      |                                  | 1<br><br>1          |
|    |     | (iii) | Density of the necklace = (10 + 20) / (0.518 + 1.90)<br>= 12.4 g/cm <sup>3</sup> (3 s.f)                                                                                                                                                                                                                                                                                  |                                      |                                  | 1(ecf)<br>1(ecf)    |
|    |     |       | (minus 1 mark for whole question if answers not in 3sf or missing units)                                                                                                                                                                                                                                                                                                  |                                      |                                  |                     |
| B2 | (a) | (i)   | 14 °C                                                                                                                                                                                                                                                                                                                                                                     |                                      |                                  | 1                   |
|    |     | (ii)  | Increases with temperature                                                                                                                                                                                                                                                                                                                                                |                                      |                                  | 1                   |
|    |     | (iii) | Solubility of calcium chloride increases at a slower rate as compared to potassium chloride.                                                                                                                                                                                                                                                                              |                                      |                                  | 1                   |
|    | (b) | (i)   | Increase the temperature of water/<br>Grind the potassium chloride into powder/<br>Stir the solution                                                                                                                                                                                                                                                                      |                                      |                                  | 1<br>[any 1 for 1m] |
|    |     | (ii)  | Temperature: Increase in temperature allow the solute particles to <b>spread faster</b> throughout the solvent.<br>or<br>Size: Smaller pieces of solute have <b>larger surface area to volume ratio in contact</b> with solvent so it dissolves faster.<br>or<br>Stir: Stirring allows solute particles to <b>spread evenly throughout</b> the solution at a faster rate. |                                      |                                  | 1                   |
|    | (c) | (i)   | Filter the mixture/ Filtration<br>Left it to stand for some time<br>Shine light through the mixture<br>[any 2 for 2 m]                                                                                                                                                                                                                                                    |                                      |                                  | 1<br><br>1          |
|    |     | (ii)  | Method                                                                                                                                                                                                                                                                                                                                                                    | Mixture A                            | Mixture B                        | 1                   |
|    |     |       | Filtration                                                                                                                                                                                                                                                                                                                                                                | No residue left on the filter paper. | Residue left on the filter paper |                     |

|    |     |       |                                                                                                                                                                                                                                                       |                                            |                                                   |                          |
|----|-----|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------|--------------------------|
|    |     |       | Left it to stand                                                                                                                                                                                                                                      | Solution remains colourless and homogenous | Chalk powder settled at the bottom of the mixture | 1<br>[any 1 for 1m]      |
|    |     |       | Shine light through                                                                                                                                                                                                                                   | Light can be seen clearly                  | Light cannot be seen clearly                      |                          |
|    |     | (iii) | Mixture B                                                                                                                                                                                                                                             |                                            |                                                   | 1                        |
| B3 | (a) | (i)   | Solubility is the <u>amount of solute</u> that can <u>dissolve in a given volume of solvent at a given temperature</u> .                                                                                                                              |                                            |                                                   | 1                        |
|    |     | (ii)  | Volume of water OR<br>mass of antacid used OR<br>type/ brand of antacid OR<br>type of solvent used OR<br>size of beaker<br><b>Not accepted:</b> material of beaker/ location where beaker is placed/temperature of water/ particle size of antacid    |                                            |                                                   | 2<br><br>(any 2 correct) |
|    |     | (iii) | Experiments 1 & 3 OR<br>Experiments 2 & 4;                                                                                                                                                                                                            |                                            |                                                   | 1                        |
|    |     | (iv)  | The <u>time taken</u> for the antacid <u>to dissolve will be lesser / it dissolve faster</u> .<br>The faster the rate of stirring, <u>the faster the rate of dissolving</u> ;                                                                         |                                            |                                                   | 1<br><br>1               |
|    | (b) | (i)   | Approximate mass of unknown solid<br>= 100 g x 4<br>= 400 g<br>Density of unknown solid<br>= 400 ÷ 500<br>= 0.8 g/cm <sup>3</sup>                                                                                                                     |                                            |                                                   | 1<br><br>1               |
|    |     | (ii)  | <u>Float in water</u> as<br><br><u>density of the unknown solid is lower than the density of water./ density of water is higher than the density of the unknown solid.</u>                                                                            |                                            |                                                   | 1<br><br>1               |
| B4 | (a) |       | - similarity: both are specialized cells/ both cells are elongated/ have a nucleus<br><br>- difference: cell <b>A</b> has no cell wall while cell <b>B</b> has cell wall/ cell <b>A</b> has many small vacuoles but cell <b>B</b> has a large vacuole |                                            |                                                   | 1<br><br>1               |
|    | (b) | (i)   | <b>A:</b> cell wall<br><b>B:</b> vacuole                                                                                                                                                                                                              |                                            |                                                   | 1<br>1                   |
|    |     | (ii)  | - store water and nutrients for the cell to survive                                                                                                                                                                                                   |                                            |                                                   | 1                        |
|    |     | (iii) | - control movement of substances in and out of the cell<br>- plant may not be protected from its surroundings                                                                                                                                         |                                            |                                                   | 1<br>1                   |

|  |     |      |                                                                                                                                                                            |        |
|--|-----|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|  | (c) | (i)  |  <p>(arrow must start from soil and point into the root hair cell)</p>                   | 1      |
|  |     | (ii) | <ul style="list-style-type: none"> <li>- elongated shape to <b><u>increase surface area-volume ratio</u></b></li> <li>- <b><u>absorb more water/ easily</u></b></li> </ul> | 1<br>1 |

