

ACTIVITY 3 - MARK SCHEMES

2d

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|---|---|
| M1 (150 – 125) or 25 (cm ³) | |
| M2 (25/150) x 100 = 16.7 (%) | ACCEPT 17 / 16.67 / 16.6̇ |
| OR | |
| M1 100 x (125/150) = 83.3 (cm ³) | ACCEPT 83 / 83.33/ 83.3̇ |
| M2 100 – 83.3 = 16.7 (%) | REJECT 16.6 for M2 |
| M2 is cq on M1 | correct answer (with no working) scores 2 |

5c

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|---|--|
| M1 (change/rise in temperature would be) less | ACCEPT halved IGNORE any quoted temperatures |
| M2 because there is a larger volume/mass of solution/liquid (to be heated) | ACCEPT there is more/twice as much solution/liquid to be heated |
| OR | |
| same (amount of) energy distributed to a larger number of particles | ALLOW acid for solution/liquid REJECT the magnesium has to react with more acid |
| | M2 dep on M1 |

6aii

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| M1 weak forces (of attraction) between molecules / weak intermolecular forces | ACCEPT particles ACCEPT bonds for forces for both M1 and M2 ACCEPT correctly named IMF |
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6bi

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| M1 <u>atoms</u> of the same element | <u>atoms</u> with same atomic number / <u>atoms</u> same number of protons |
| M2 with different masses | different mass numbers / different numbers of neutrons IGNORE references to electrons unless incorrect |

8c

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|---|---|
| M1 $n(\text{CuSO}_4 \cdot 5\text{H}_2\text{O}) = 2.50 \div 250$ OR 0.01 (mol) | mark csq throughout |
| M2 $n(\text{H}_2\text{O}) = 0.01 \times 5$ OR 0.05 (mol) | correct final answer (with no working) scores 3 |
| M3 mass of water = $(0.05 \times 18) = 0.9(0)$ (g) | |
| OR | ACCEPT calculations that use A_r of Cu as 63.5 (giving 0.9(05) (g) as a final answer) |
| M1 5×18 OR 90 | M2 subsumes M1 for all methods |
| M2 $250 \text{ (g)} \rightarrow 90 \text{ (g)}$ | |
| M3 $2.50 \text{ (g)} \rightarrow 0.9(0) \text{ (g)}$ | |
| OR | |
| M1 5×18 OR 90 | |
| M2 $90 \div 250 \times 100 \text{ (\%)} \rightarrow 36 \text{ (\%)}$ | |
| M3 $36 \text{ (\%)} \times 2.50 \text{ (g)} \rightarrow 0.9(0) \text{ (g)}$ | |

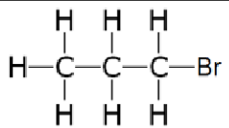
10b

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| M1 (add) (aqueous) silver nitrate / AgNO_3 | IGNORE refs to nitric acid do not award M1 if hydrochloric acid also added |
| M2 white precipitate (forms) | M2 dep on mention of silver nitrate in M1 |

11e

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|---|---|
| M1 (unsaturated) contains a (carbon to carbon) double bond | ACCEPT multiple bonds IGNORE refs to single bonds |
| M2 (hydrocarbon) (compound/molecule/substance) contains (the elements/atoms) hydrogen and carbon... | REJECT element/atom/ mixture for compound/ molecule/substance REJECT ions/molecules for elements/atoms |
| M3 ...only | M3 dep on mention of hydrogen & carbon in M2 ACCEPT other equivalents e.g. solely, just, exclusively |

11fi

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|  | ACCEPT bromine in any position ACCEPT multiple substitutions ACCEPT correct displayed formula given as a product of an equation IGNORE any structural formula eg CH ₃ CH ₂ CH ₂ Br or molecular formula IGNORE H-Br |
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12a

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|-----------|--|---------------------------|--------------------------|---|
| M1 | (Fe) <u>36.8</u> 56 | (Ti) <u>31.6</u> 48 | (O) <u>31.6</u> 16 | Division by atomic number scores 0 |
| M2 | 0.66 | 0.66 | 1.98 | |
| M3 | 1 | 1 | 3 | ACCEPT any number of sig figs except one ALLOW 0.65, 0.65, 1.97 |
| OR | | | | |
| M1 | calculation of M_r of FeTiO ₃ =152 | | | |
| M2 | expression for % of <u>each</u> element e.g. Fe: $56 \div 152 \times 100\%$ | | | |
| M3 | evaluation to show these equal 36.8% Fe, 31.6% Ti, 31.6% O | | | |

12di

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|--|---|
| M1 positive ions/cations/nuclei and delocalised electrons | IGNORE metal ions ALLOW sea of electrons IGNORE free electrons |
| M2 attract (one another) | |
| M2 dep on M1 | any refs to ionic bonding, covalent bonding or IMFs scores zero |

16cii

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| M1 more particles (in same volume of solution) / particles are closer together | ACCEPT ions REJECT atoms / molecules |
| M2 number of (successful) collisions per second increases / particles collide more often | ACCEPT per unit time / per minute ACCEPT collision frequency increases IGNORE any refs to chance of collisions |
| M3 (therefore) rate increases / reaction gets faster | |
| NB refs to particles move faster/have more energy can score M3 only for a correct statement about increase in rate | |