Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Physical

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 25 Marks **Time : 25 Minutes**

Mark Schemes

Q1.

(a) **M1** (Re)weigh the empty boat

1

M2 In order to calculate the (exact) mass of salicylic acid added to the reaction mixture

1

(b) 10 cm^3 measuring cylinder (if volume given – allow between 10 to 50 cm^3)
Or a 10 cm^3 pipette

Or burette / graduated pipette

Or 10 cm^3 syringe

1

(c) Corrosive

Allow skin burn / permanent eye damage
Ignore irritant / toxic

1

(d) LHS + $(CH_3CO)_2O$ RHS + CH_3COOH

1

(e) **M1** Amount salicylic acid = $^{6.01}/_{138}$ = 4.36×10^{-2} mol

Allow conseq from wrong mole ratio in (d)
Must show and state that ethanoic anhydride is in excess

1

M2 Mass $(CH_3CO)_2O$ = 10.5 × 1.08 = 11.34 g

1

M3 Amount $(CH_3CO)_2O$ = $^{11.34}/_{102}$ = 1.11×10^{-1} mol

For M4/M5 ecf from M1/M3

1

M4 $(CH_3CO)_2O$ is in excess

1

M5 Mass aspirin = M1 × 0.841 × 180 = 6.59 g

Allow 2 sf or more.

1

(f) **M1** Value lower

1

M2 Range of values

Downloaded from www.merit-minds.com

For M2 allow mpt not sharp or a larger range of melting points

1

(g) **M1** (Ethanol is flammable so) use a water bath to heat / do not use a Bunsen burner

Must give practical step, not just state hazard

1

M2 Heat to temp below bp (so ethanol does not boil away)

Allow use min vol solvent

1

(h) To remove any soluble impurities

Allow To avoid aspirin dissolving (small amount cold solvent used)

Allow To remove/(wash away) any ethanolic solution on the product.

1

(i) Pure product will have (larger) crystals / needle-like crystals / lighter in colour

Allow whiter, less grey, more crystalline, less powdery, shinier, single colour

Must be tied to pure product

Allow opposite points tied to the crude product

1

[16]

Downloaded from www.merit-minds.com

Q2.

(a) **M1** Amount $CO_2 = {}^{1.89}/_{44} = 0.043$ = mol C

1

M2 Amount $H_2O = {}^{0.643}/_{18} = 0.0357$ mol

1

M3 Amount H = 0.036 x 2 = 0.0714 mol

1

M4 Amount O = ${}^{0.913}/_{16} = 0.057$ mol

1

	C	H	O
	0.043	0.0714	0.057
M5	1	1.66	1.33
	3	5	4

1

Alternate method

M1 *mass C = 1.89 – (1.89 x* $\frac{32}{44}$*) = 0.515 g*
M2 *mass H = 1.5 – (0.515 + 0.913)*
M3 *= 0.0715 g*

OR mass ***M2*** *H = 0.643 – (0.643 x* $\frac{16}{18}$*)*
M3 *= 0.0714 g C H O*

	C	H	O
M4	$\frac{0.515}{12} = 0.043$	$\frac{0.0715}{1} = 0.0715$	$\frac{0.913}{16} = 0.057$
M5	1	1.66	1.33
	3	5	4

(b) **M1** Amount $H_2O = {}^{0.26}/_{18} = 0.014$ mol

1

M2 Amount $H_3Y.xH_2O = {}^{3}/_{210} = 0.014$ mol
or
Amount of $H_3Y = 2.74/192 = 0.014$ mol
(hence ratio 1:1)

1

Common alternate method
M1 *Amount* $H_3Y\ .xH_2O = {}^{3}/_{210} = 0.0143$ *mol*

M2 $M_r\ xH_3Y = \frac{2.74}{0.0143} = 192$
$M_r\ H_2O = 210 - 192 = 18$
(hence x= 1)

(c) 2(-) Hydroxy

1

(d) Number of peaks = 4
Allow Four

1

[9]

Downloaded from www.merit-minds.com