

233/3 CHEMISTRY PRACTICAL MARKING SCHEME

1. Table 1 5 mks - distributed as follows.

a) Complete table 1 mark

Conditions

i) Complete table with 3 titrations 1 mark

ii) Incomplete table with 2 titrations ½ mark

iii) Incomplete table with 1 titrations 0 mark

Penalties

i) Wrong arithmetic

ii) Inverted table

iii) Burette readings beyond 50cm³ unless explained e.g. 60cm³ (50 + 10)

iv) Unrealistic titre values i.e. values below 1.0cm³ and hundreds.

Note: **Penalise ½mk ONCE** for each or all of the above.

b) Use of decimals 1 mk (Tied to 1st and 2 rows only)

i) Accept either 1st and 2nd decimal places consistently otherwise penalise fully if whole numbers are used.

ii) Accept 2 decimal places if only 2nd dec. place is 0 or 5.

iii) Accept inconsistency of zeros.

c) Accuracy (1 mark)

Compare any of the titre values of the candidate with the school value.

Conditions.

i) If any is within ± 0.1 of S.V. 1 mark

ii) If outside ± 0.1 but within ± 0.2 of S.V. ½ mark

iii) If none is within ± 0.2 of S.V. 0 mark

d) Principles of averaging 1 mark

- Values averaged must be shown and must be within ± 0.2 of each other.

Conditions.

i) If 3 consistent values averaged 1 mark

ii) If 3 titrates done and only 2 possible and averaged 1 mark

iii) If 2 titrations done and are consistent and averaged 1 mark

iv) If 3 consistent titrations but only 2 averaged 0 mark

v) 3 inconsistent titrations averaged 0 mark

vi) 2 inconsistent titrations averaged 0 mark

Penalties

i) Penalise ½m for arithmetic outside ± 2 units in the second dec. place.

ii) Penalise ½mk if no working is shown but the answer is correct.

iii) Accept rounding off in the 2nd dec. place otherwise penalise ½mk if value is rounded off to the 1st dec. place.

Note:

i) Where values divide exactly to whole number or to 1 dec. place accept for full credit

ii) Section I must be marked before the mark is transferred on the table.

e) Final accuracy 1 mark (tied to correct averaged titre)

i) If within ± 0.1 of S.V. 1 mark

ii) If outside ± 0.1 but within ± 0.2 of S.V $\frac{1}{2}$ mark

iii) If beyond ± 0.2 of S.V 0 mark

Note: If wrong values are averaged, pick the correct values, if any (especially the set that gives the candidate maximum credit), average following the principles of averaging and award accordingly.

i) $\frac{1}{2}$ mk for wrong or missing units

ii) Rounding off of answer to less than 3 dp. unless figures divide to whole no. 1 dec of a dec.

iii) Accept error of ± 2 in the 3rd decimal.

Calculations

b) Concentration of R m RFM gl R of ion Concentration gl OR l mol or m R 5 .084 42 42 5 .10250
10001000 ? 250 5 .105 .05 .0250 1000 845 .101 1 1 ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ?

Conditions / penalties

Note: All the figures above must be used intact otherwise penalise FULLY (0mk) moles 0125.05
.01000 25 ? ? ?

c) i) Moles of soln R in 25cm^3

ii) Mole ratio of Q : R = 1 : 1

? Moles of Q in the averaged titre = Ans (c) above

Note:

i) Accept the transfer of answer c(i) to c(ii) intact even if wrong transfer it is wrong answer in (c) otherwise penalise $\frac{1}{2}$ mk

for wrong transfer the answer. ans Correct above i AnsC a Ans ? ? ?) () (1000

d) Molarity of Q

Table II : Procedure II 5 mks (Distributed as follows)

a) Complete table 3 marks

Conditions

10 to 8 readings 3 marks

7 to 5 readings 2 marks

4 readings 1 mark

Less than 4 readings . . 0 mark

Penalty - Penalise $\frac{1}{2}$ mk for every reading which is beyond 40°C and $\frac{1}{2}$ mk for every reading below 10°C .

b) Decimals $\frac{1}{2}$ marks

i) Accept whole numbers or decimal to only 1 dec. place consistently used

ii) If 1 dec. place is used it must be (0 or 5)

Penalise FULLY if any of the two conditions are not met.

c) Accuracy $\frac{1}{2}$ mk (Tied to the first entry)

? 1st reading should be within $\pm 2^\circ\text{C}$ of school value otherwise if outside ± 2 penalise FULLY.

d) Trend 1 mk (split into two ½ s)

- i) Readings between 0 and 120 seconds must ALL be constant for ½mk otherwise penalise FULLY.
- ii) Readings between 180 and 300 seconds must drop continuously or a drop followed by the lowest constant temperature readings.

Graph 3 mks (distributed as follows)

a) Scale ½ mk

Both axes must cover at least 4½ full squares otherwise penalise FULLY.

b) Labelling of axes ½ mark

Both axes must be correctly labelled otherwise if only is correctly labelled or both are incorrectly labelled (interchanged) penalise fully.

c) Plotting 1 mark

- i) If at least 7 readings are correctly plotted1 mark
- ii) If only six readings are correctly plotted½ mark
- iii) If less than six readings are correctly plotted . . . 0 marks

d) Lines : 1 mark (split into two and s)

- i) 1st straight line touching constant points extrapolated to 150 seconds ½
- ii) 2nd straight line rising and extrapolated to touch 150 seconds. ½

Note: penalise ½ mk for each straight line not extrapolated to touch 150 seconds,

GRAPH. Chemistry paper 1, 2&3 Top grade predictor publishers Page | 349 ans Correcti c p
mole above i c Ans p of moles moles 1000))((0179 .01 1 1000))((0179 .00179
.0845.1

b) Showing on the correct graph 2½

Change in temperature = lowest extrapolated temp. 2½ - The constant temp.

= Correct answer 2½

Conditions and penalties.

i) Ignore the sign on the temperature change, but the expression (Lowest extrapolated temp - constant) must be intact.

(As $\Delta T = T_{\text{final}} - T_{\text{initial}}$) otherwise penalise fully if that condition is not met.

ii) Penalise ½ mark if wrong or missing unit ($^{\circ}\text{C}$) 1½ marks

CALCULATIONS

c) i) Mass of solution = $1\text{gcm}^{-3} \times 35\text{cm}^3 = 35\text{g}$ 2½

(reject answer if wrong working or working not shown but answer is correct)

$q = 35\text{g} \times 4.2\text{Jg}^{-1}\text{K}^{-1} \times \text{ans (b)} = \text{correct answer}$ 2½ **2 marks**

Conditions / penalties

i) Accept ans(b) even if it was wrong but used intact.

ii) Ignore the sign but if given must be +ve otherwise reject the negative sign.

iii) Penalise ½mk if no. or wrong unit used.

C (ii) Molar heat changed

OR

Mole of P used

Conditions / Penalty

i) Penalise ½ mark if -ve sign is shown otherwise ignore if no sign is given

ii) Penalise ½ mark for missing or wrong units (kJmol^{-1})

2. OBSERVATION

a)

i)

INFERENCES

Colourless liquid formed on the cooler ½ parts / colourless vapour condenses on the cooler parts of test tube Reject colourless solution/liquid condenses

Hydrated / water of crystallisation (Tied to colourless liquid ½ / vapour condenses)

ii)

Gas produced turns litmus paper blue ½ and blue litmus remains blue. (Award ½mk if both correct changes in litmus are mentioned) Reject blue litmus remains the same / unchanged

Basic gas / NH_4^+ ½ (tied to red litmus turning blue only)

iii)

Brown/black/grey residue. Conditions: Award ½mk each for any two correct to a maximum of two (max 1 mark)

b

Pale green solution formed ½

Fe^{2+} , ½ Cu^{2+} ½ Penalise ½ mk for any wrong ion to a max of 1 mk

Solid A dissolves 1/2 to form a colourless solution 1/2	- Soluble salt/polar compound 1/2 Fe^{2+}, Fe^{3+}, Cu^{2+} absent 1/2
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Test 2

Observations	Inferences
White precipitate 1/2 dissolves in excess to form a colourless solution. 1/2	Zn^{2+} present 1

Test 3

Observations	Inferences
White precipitate 1/2 dissolves in the acid 1/2	SO_4^{2-} absent 1/2 SO_3^{2-} , CO_3^{2-} present 1/2

3. (a)

Observations	Inferences
Acidified potassium manganate (VII) solution is decolourised/ Acidified potassium manganate (VII) solution changes from purple to colourless $\frac{1}{2}$ NB: Candidate should mention both the initial colour and the final colour except when they use the word decolourised .	$=C=C=$, $-C\equiv C-$ present $\frac{1}{2}$ or Unsaturated organic compound REJECT: Unsaturated hydrocarbon

(b)

Observations	Inferences
Acidified potassium dichromate (VI) turns from orange to green. $\frac{1}{2}$	ROH present REJECT: $=C=C=$, $-C\equiv C-$ mentioned as present.

(c)

Observations	Inferences
Effervescence/ bubbles/fizzing $\frac{1}{2}$ REJECT: Fizzling/hissing	H^+ /RCOOH present $\frac{1}{2}$ REJECT: H^+ or H_3O^+ present mentioned on their own without RCOOH.