**P1**

**MARKING SCHEME**

**CHEMISTRY**

**Paper 3**

**Q 1:** Table 1 (5mks)

The marks are distributed as follows

**A**: Complete table (4mks)

(i) Complete table with 3 titration done. (1mk)

(ii) Incomplete table with 2 titration done. (½mk)

(iii) Incomplete table with 1 titration done. (0mk)

Penalties

(i)Wrong arithmetic (subtraction of the initial from final burette readings)

(ii) Inverted table

(iii) Burette reading beyond 50cm3 unless explained e.g. 50.0cm3 + 12.0cm3 = 62.0cm3

(iv)Unrealistic titre values i.e. hundred or below 1.0

**Note**

Penalize ½ mk for each to a maximum of ½ mk. i.e. penalize ½mk once

**B** Use of decimals (1mk)

(i) Accept only 1 or 2 decimal places used consistently otherwise penalize FULLY. i.e award 0 mk

(ii) If 2 decimal places are used, the second decimal place **must** be either a “0” or “5” otherwise penalize FULLY.

(iii) Accept inconsistency in the use of zeros as initial burette readings e.g 0, 0.0, 0.00

**C**: Accuracy (1mk)

Compare the candidate’s titre values with school value (SV) and tick (✓) the chosen value earn a mark.

CONDITIONS

1. If at least one value is within + 0.10cm3 of the S.V award 1mark.
2. If no value is within + 0.10cm3 of the school value, but at least one value is within + 0.20cm3 of the S.V award ½ mark
3. (iii) If no value is within + 0.20cm3 of the S.V award 0 mark

**Note:**

If there is arithmetic error in the table, compare the S.V with worked out correct value and award accordingly.

**D.** Principles of averaging (1mk)

Values averaged MUST be shown and MUST be within + 0.20 of each other.

CONDITIONS:

(i) If 3 titration are done and consistent and averaged (1mk)

(ii) If 3 titrations are done and only two are consistent and averaged. (1mk)

(iii) If only two titrations are done and consistent are averaged. (1mk)

(iv) If 3 titrations are possible but only 2 are averaged (0mk)

(vi) If only 2 titration done are inconsistent and are averaged. (0mk)

(vii) If only 1 titration done. (0mk)

PENALTIES

1. Penalize ½mk for wrong arithmetic in average titre if error is outside +2 units in the 2nd decimal place.
2. Penalize ½mk if no working is shown but answer given is correct
3. Penalize FULLY if no working and answer given is wrong
4. Accept rounding off answer (average titre) to 2 decimal places e.g 12.6666 to 12.66 or 12.67, 21.3333 to 21.33. Otherwise penalize mk for rounding off to 1dp or a whole number.

**Note:**

1. Accept answer (average titre) to 1dp or a whole if it works out exactly and credit FULLY.
2. Question 1 a (i) MUST be marked before the marking for averaging is awarded in table (1)

**E.** FINAL ANSWER (1mk)

(Tied to correct average titre)

Compare the candidates CORRECT AVERAGE TITRE in S.V. and

(i) If within + 0.010 of the S.V (1mk)

(ii) If NOT within + 0.10 of the S.V but within + 0.20 then award ½mk

(iii) If beyond + 0.20 of the S.V. (0mk)

**Note:**

(i) Where there are 2 possible pairs of titres(can be averaged, use the pair that is closed to the S.V. and credit accordingly e.g if S.V = 24.0 and the titres are 23.8, 23.6 and the candidate averages 23.8 +23.6

2

Pick 23.8 + 23.9 = 23.85 so as to credit ½mk of the candidates titre which would score 0 mk .

2

Also if a candidates titre were 24.3, 24.1 and the same S.V = 24.0 and the candidate average

24.3 + 24.1 = 24.2

2

Pick 24.1 + 23.9 = 24.0cm3 to credit 1mk

2

Instead of ½ mk, if the candidates averaging titre is used.

If wrong values are averaged pick the correct values (if any) following the principles of averaging, average then award according.

1 b) ( Average titre x 0.2 )✓½

1000

= Ans. ✓½

c) Mole ratio 1:1✓½

= Ans. In b✓½

d) (250cm3 x Ans. In c) ✓½ or 40 x Ans. In c✓½

25

=Ans. ✓

e) (1000 x Ans. In (d)) ✓or 4 x Ans. In (d) ✓

250

= Ans. ✓

f) MQVQ = MRVR

= MQ x 25 =Ans. In (e) x 250✓

25

= Ans. (e) x 10✓

=Ans. ✓

**Q2.** Award s a follows:

- Complete table (1mk)

- Decimal (accept whole numbers or 1 d.c.p. where decimal place is 5 or 0) for 1mk

- Accuracy (within + 2 of school value) for 1 mk otherwise award 0mrk

- Trends (change in temperature must be positive) 1mk

a) Temp. of solution C + Temp. of solution D✓½ = Ans. 2(a) ✓½

2

b) H+(g) + OH-(G) H2O✓

c) DH = 100 x 4.2✓ x DT = Ans. ✓ 2 ( c) KJ

d) 1000cm3 contains 2 moles

therefore 50cm3

= 50 x 2 ✓½= 0.1moles ✓½

1000

e) 0.1moles evolved Ans. 2 (c) KJ

Therefore 1 mole

= 1 x 2 (c ) KJ✓= Ans. ✓2 (e) KJ / mole

0.1

f)

✓

Energy

Reaction path

**Q3.** a)

|  |  |
| --- | --- |
| **Observations** | **Inferences** |
| a) Solid partially dissolve to form colourless filtrate✓½ and white residue  b) No white precipitate✓½  c) Whit✓½ ppt. which dissolve on warming.  Penalize fully if heating mentioned for warming.  d) – Formation of a colourless✓½ gas which turn blue✓½ litmus paper red and red litmus paper remains red. ✓½  - Put off burning spirit✓½  - Yellow residue when hot. ✓½  - White residue when cold. ✓½  e) Effervescence✓½ / bubbles of a colourless✓½ gas formed.  (i) white ppt✓½. soluble excess✓½  (ii) White ppt. ✓½ soluble in excess✓½ | **-** Absence of coloured ions Fe2+, Fe3+, cu.  3 ions mentioned✓  2 ions “✓½  1 ion “✓0  Absence of ions. Al3+,Zn2+, Pb2+, Mg2+, Ca2+ Ba2+   * + 3 ions mentioned✓   + 2 ion s “✓½   + 1 ion “✓0   **NB**: Mentioned presence of NH+4, Na+, K+ does not contradict but does not earn a mark.  Presence of cl-✓½  -CO32- ✓½present  - Zn2+ ✓½present  Co2-3, SO2-3 ✓ any for 1mk  Zn2+ Pb2+, Al3+ ions present   * + 3 ions mentioned   + 2 ions mentioned   + 1 ion mentioned   Zn2+ ✓confirmed |