SERIES 51 EXAMS

# MARKING SCHEME

## 233/3 CHEMISTRY PP3

**Table 1**

| Time(sec) | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Temp.($^0$C) | 27.0 | 28.0 | 29.0 | 30.0 | 30.5 | 31.0 | 31.5 | 32.0 | 31.5 | 31.0 | 30.5 |

CT – 1 AC – 1
Trend – 1 DC – 1

**Table 2**

| | (I) | (II) | (III) |
|---|---|---|---|
| Final burette reading(cm$^3$) | 24.5 | 24.4 | 24.6 |
| Initial burette reading(cm$^3$) | 0.0 | 0.0 | 0.0 |
| Volume of solution used(cm$^3$) | 24.5 | 24.5 | 24.6 |

AT – 1 DC – 1
AC – 1 PA – 1

(i) $\left(\frac{24.5+24.4+24.6}{3}\right)$ cm$^3$ FA – 1

= <u>24.5cm$^3$</u>

Alternatively

Any two or three close values averaged of ± 0.1 range.

ii)(I) No. of moles = $\frac{Molarity \times volume\ used}{1000}$ or $\frac{ans\,(i) \times 0.3}{1000}$ ✓½

= $\left(\frac{0.3 \times 24.5}{1000}\right)$ moles✓½ Ans✓½

= <u>0.00735 moles</u>✓½

(II) Mole ratio = 1 : 1

Hence no. of moles = <u>0.00735 moles</u> or ans ii (I)✓

(III) If in 25cm$^3$ = 0.00735moles

Therefore 100cm$^3$

= $\frac{100cm3 \times 0.00735moles}{25}$ ✓½ or $\frac{ii(I) \times 100}{25}$

<u>= 0.0294 moles</u>✓½

(IV) No. of moles = $\frac{Molarity \times volume\ used}{1000}$

= $\frac{0.7\ X\ 50}{1000}$ ✓½

= 0.035moles✓½

(V) Moles of HCl = (0.035 – 0.0294) moles
= 0.0056moles or 0.035 – ans (III)

(VI) $Mg_{(s)} + 2HCl_{(aq)} \rightarrow MgCl_{2(aq)} + H_{2(g)}$✓ or ½ x ans(v)

Mole ratio = 1 : 2

No. of moles of Mg = (½ x 0.0056) moles ✓½
= 0.0028moles✓½

C. ΔTemp. = (33- 27)K✓
= 6K. Accept the student value.

-Heat change - MCΔT.
= (50 x 4.2 x 6)j✓ or 50 x 4.2 x student value
= 1260j✓

-No. of moles of HCl used 0.0056 moles
If 0.0056 moles = 1260j
Therefore 1mole

$$= \frac{1\ mole\ x\ 1260j}{0.0056\ moles}$$ ✓

= 225,000j
=225Kj $mol^{-1}$✓ (Penalize ½ mrk for wrong sign and ½ mrk for wrong units used)

| 2(a) | Observation | Inferences |
|---|---|---|
| | Colourless liquid/ liquid condenses on the cooler parts of test tube✓½<br>Gas produced forms white fumes with HCl✓½ | Hydrated salt or compound contains water of crystallization.<br>Ammonia gas✓½ ($NH4^+$) present |
| b(i) | White ppt insoluble in excess aqueous ammonia✓½ | $Pb^{2+}$ or $Al^{3+}$ present✓(combined) one of them½. Penalize for contradictory ion½ |
| (ii) | No white ppt / no white solid✓½ | $Pb^{2+}$ absent.✓ $Al^{3+}$ present but it is tied to earlier mentioned |
| (iii) | White ppt / solid✓ | $SO_4^{2-}$ present. Penalize completely any other ion mentioned. |
| 3a) | White solid dissolves to √ ½ form a colourless solutions. | E is a non –polar compound. √ ½ |
| | i) pH> √ ½<br>Reject Ph range. | Neutral solution√ ½ |
| | (ii) No effervescence/No bubbles√ ½ | $H^+$ absent√ ½ |
| b) | i) Effervescence/Bubbles of a gas. √ ½ | R-COOH present or H+ or $H_3O$+ or present alkanoic acid any √ ½ |
| | ii) Does not turn to green or Orange colour remains/ persists. | Alcohol Absent/ R-OH absent√ ½ |
| | iii) Bromine water not decolourised or colour of bromine water persists√ 1 | C=C or -C≅C-√ 1 absent. Should mention both. |