

# 233/3 CHEMISTRY

## PAPER 3



### SERIES 15 EXAMS

#### 1. Table 1

	I	II	III
FINAL BURRETE RADING (CM <sup>3</sup> )	20.0	20.0	20.0
INITIAL BURRETE READING(CM <sup>3</sup> )	0.0	0.0	0.0
VOLUMEF SOUTION (CM <sup>3</sup> )	20.0	20.0	20.0

CT 1mk

D.P 1mk

Ac ( $\pm 0.1$  of S.V  $\rightarrow$

1MK,  $\pm$  S.V  $\rightarrow$  1/2 MK

P.A 1mk

F.A 1mk

a)i) Average volume  $\frac{20.0 + 20.0 + 20.0}{3} = 20.0\text{cm}^3$

ii)  $\text{g/dm}^3 = \text{Mol /dm}^3 \times \text{R.m.m}$

$7.3\text{g/dm}^3 = \text{Mol/dm}^3 \times 36.5 \text{ v1}$

$\text{Mol/dm}^3 = \frac{7.3}{36.5} = 0.2\text{Mv1}$



Mole ratio 1:1

Moles of M used

$100\text{cm}^3 \longrightarrow 0.2 \text{ moles}$

$20\text{cm}^3 \longrightarrow \frac{20 \times 0.2}{1000} = 0.04 \text{ moles v1}$

Mole of solution M equals moles of solution K

$$0.004 \times 40 = 0.16 \text{ v1}$$

Table II

	I	II	III
FINAL BURRETE RADING (CM <sup>3</sup> )	12.0	12.0	12.0
INITIAL BURRETE READING(CM <sup>3</sup> )	0.0	0.0	0.0
VOLUMEF SOUTION (CM <sup>3</sup> )	12.0	12.0	12.0

**CT** 1mk

**D.P** 1mk

**Ac** ( $\pm 0.1$  of S.V  $\rightarrow$ )

1MK,  $\pm 0.2$  S.V  $\rightarrow$  1/2 MK

**P.A** 1mk

**F.A** 1mk

a) Average volume of solution W

$$\frac{12.0 + 12.0 + 12.0}{3} = 12.0 \text{ cm}^3$$

b)i) Moles of solution W

25cm<sup>3</sup> of solution K HAS 0.004 MOLES

Mole ratio 2:1v1

Moles of solution W = 0.0002 moles v1

ii) Moles of sodium W in 100cm<sup>3</sup>

$$12 \text{ cm}^3 \longrightarrow 0.002 \text{ moles v1}$$

$$100 \text{ cm} \longrightarrow \frac{100 \times 0.0002}{12} = 0.01667 \text{ moles v1}$$

iii) Moles per litter in the original

0.01667 moles in 25cm<sup>3</sup>

$$25 \text{ cm}^3 \longrightarrow 0.01667 \text{ v1}$$

$$100\text{cm}^3 \longrightarrow \frac{1000 \times 0.01667}{25} = 0.6668 \text{ Mol/dm}^3 \text{ v1}$$

## 2. Table

Volume of water (cm <sup>3</sup> )	Temperature at which Crystals first appear (°C)	Solubility g/100g of H <sub>2</sub> O
4	70.0	100.00v $\frac{1}{2}$
6	56.0	66.67v $\frac{1}{2}$
8	49.0	50.0v $\frac{1}{2}$
10	40.0	40.0v $\frac{1}{2}$
12	35.0	33.33v $\frac{1}{2}$

Complete table - 1mk (temperature column)

Trend -  $\frac{1}{2}$  (temperature reducing)

Decimal place  $\frac{1}{2}$  (whole number consistently or one d.p. the number being 0 or 5)

Accuracy -  $\frac{1}{2}$  mk  $\pm 2^{\circ}$  C of school value

Solubility calculations -  $\frac{1}{2}$  mk each up to 2  $\frac{1}{2}$  mks

a) Graph -

Labeling of axes  $\frac{1}{2}$  mk

Scale (at least  $\frac{3}{4}$  -  $\frac{1}{2}$  mk

Plots - 1 mk

Shape (smooth curve) -  $\frac{1}{2}$  mk

b) showing on graph -  $\frac{1}{2}$  mk

correct reading -  $\frac{1}{2}$  mk

c) showing on graph -  $\frac{1}{2}$  mk

correct reading -  $\frac{1}{2}$  mk

3 i)

I

**Observations**

-Blue litmus paper turns  $\checkmark$   $\frac{1}{2}$

No effervescent

**Inferences**

$Mg^{2+}$ ,  $Ca^{2+}$ ,  $Pb^{2+}$ ,  $Zn^{2+}$  may be present

Award 1mk if at least 3 correct ions mentioned

II

**Observations**

White ppt  $\checkmark$   $\frac{1}{2}$  soluble  $\checkmark$   $\frac{1}{2}$  in

Excess

**Inferences**

$Zn^{2+}$  present

Award the mark for the inference if the observation is scored fully

III

**Observations**

White PPT  $\checkmark$   $\frac{1}{2}$

**Inferences**

$SO_3^{2-}$ ,  $SO_4^{2-}$ ,  $CO_3^{2-}$ , MAY BE PRESENT

Award 1mk if all the three ions are correctly mentioned

IV)

**Observations**

-While ppt /remains does

not Dissolve $\checkmark$ 1

**Inferences**

$SO_4^{2-}$  Present

Award only if mentioned in III



N:B In all case, penalize fully if letters of ions are joined , Wrong charges are given , wrong symbols of elements etc

-Penalize fully in case of contradicting ions mentioned

