

SERIES 46 EXAMS

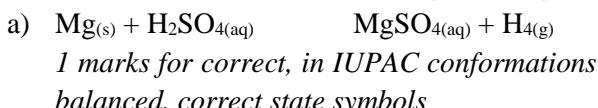
CHEMISTRY PAPER 3 MARKING SCHEME

1. Table 1

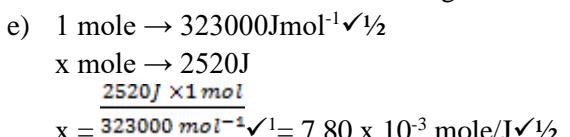
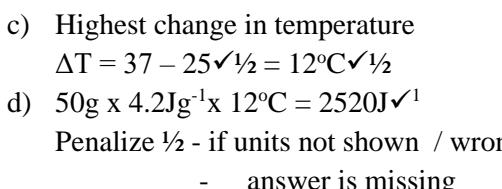
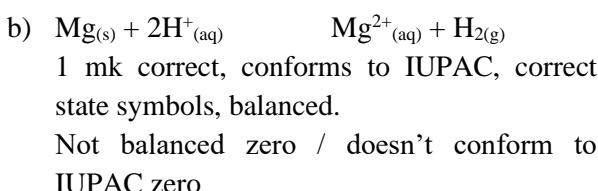
Time (min)	0	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6
Temperature (°C)		25.0		25.0	35.0	29.0	34.0	36.0	37.0	36.5	36.0	36.0	36.0

3 marks for correct values
 2 $\frac{1}{2}$ marks for 10 correct values
 2 marks for 9 correct values
 1 $\frac{1}{2}$ marks for 8 correct values
 1 mark for 7 correct values
 0 mark below 7 correct values

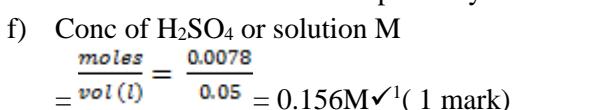
Values must have trend increase – apex – drop



Penalize $\frac{1}{2}$ if no/missing state symbols or wrong state symbols
Zero if it doesn't conform to IUPAC letters joined / capital letters instead small letters and vice versa



Moles of $H_2SO_4(p)$ = 0.0078 moles
 Penalize $\frac{1}{2}$ if units are wrong / missing or the candidates ends at division part only



Penalize $\frac{1}{2}$ if units missing or answer is missing or if the answer is rounded off.

Table II

	1	2	3
F.B.R cm^3	18.2	38.1	18.1
I.B.R cm^3	0.00	20.0	00.0
Titre volume	18.2	18.1	18.1

3 mks if it has the following

- Accuracy / penalize values for all columns / rows
- Consistent in sign figures / decimal places

Penalize;

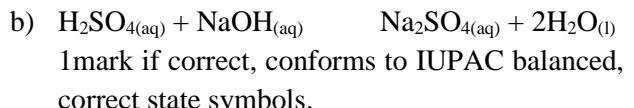
1 mk if values not accurate / penalize by ± 0.2 from each other

$\frac{1}{2}$ mks have no consistence in sig figures

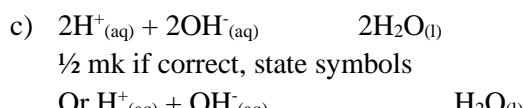
$\frac{1}{2}$ mks have no league values

$\frac{1}{2}$ mk if not subtracted to get titre values.

$$a) \frac{18.2 + 18.1 + 18.1}{2} \checkmark \frac{1}{2} = 18.13 = 18.10 cm^3 \checkmark \frac{1}{2}$$



Penalize $\frac{1}{2}$ if wrong state symbols / missing zero if not balanced, violate IUPAC



d) Moles = morality x vol (l)

$$\frac{0.5 \times 18.1}{1000} = 9.05 \times 10^{-3}$$

 $= 0.00905 \text{ moles} \checkmark^1$

Penalise $\frac{1}{2}$ if answer is rounded off.

e) i) reaction mole $NaOH: H_2SO_4 = 2 : 1 \checkmark \frac{1}{2}$
 moles of H_2SO_4 in $25cm^3$ of
 solution Z = $0.00905 \times \frac{1}{2} \checkmark^1$
 $= 4.525 \times 10^{-3} \text{ moles}$
 $= 0.004525 \checkmark \frac{1}{2}$

If mole reaction ratio is missing penalize $\frac{1}{2}$

ii) If $25cm^3 \rightarrow 0.004525$

$$100cm^3 \rightarrow ? \checkmark \frac{1}{2}$$

$$\frac{100\text{cm}^3}{25\text{cm}^3} \times 0.004525 = 1.81 \times 10^{-2} \text{ moles}$$

$$= 0.0181 \text{ moles}$$

f) $1.81 \times 10^{-2} \text{ moles} + 7.80 \times 10^{-3} \text{ moles}$

Or

0.01810

$+ 0.00780$

$0.02590 = 2.59 \times 10^{-2} \text{ moles}$

g) Conc of H_2SO_4 as solution Z

$$=\frac{\text{moles}}{\text{vol(l)}}=$$

$$25\text{cm}^3 \rightarrow 0.004525$$

2.

	Observation	inference
1	Sparingly soluble in cold water but soluble on warming	Partially soluble salt
i	Vigorous effervescence, colourless gas that burns with pop sound	Hydrogen gas produced H^+ ions present // solution is acidic
ii	Vigour effervescence occurs	CO_2 gas produced H^+ ions // acidic solution
iii	Bromine water not decolorized	$\text{C} = \text{C}$, $\text{C} \equiv \text{C}$ absent
iv	Potassium mangate (VII) not decolorized	$\text{C} \equiv \text{C}$ absent
v	$\text{pH} = \text{S}$	H^+ ions present (-COOH) acidic present

$$1000\text{cm}^3 \rightarrow ?$$

$$\frac{0.004525}{25} \times 1000 = 0.181 \text{ moles}$$

$$\text{conc} = \frac{\text{moles}}{\text{vol(l)}} = \frac{0.181}{1} = 0.181M$$

Penalize $\frac{1}{2}$ if units missing or are wrong

M must be capital, penalize if M is small letter