Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Kinetics

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Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Mark Schemes

Q1.

(a) q = 500 × 4.18 × 40

Do not penalise precision.

1

= 83600 J

Accept this answer only.
Ignore conversion to 83.6 kJ if 83600 J shown.
Unit not required but penalise if wrong unit given.
Ignore the sign of the heat change.
An answer of 83.6 with no working scores one mark only.
An answer of 83600 with no working scores both marks.

1

(b) Moles (= 83.6 / 51.2) = 1.63

Using 77400 alternative gives 1.51 mol
Allow (a) in kJ / 51.2
Do not penalise precision.

1

Mass = 1.63 × 40(.0) = 65.2 (g)

Allow 65.3 (g)
Using 77400 alternative gives 60.4 to 60.5
Allow consequential answer on M1.
1 mark for M_r (shown, not implied) and 1 for calculation.
Do not penalise precision.

2

(c) Molarity = 1.63 / 0.500 = 3.26 mol dm–3

Allow (b) M1 × 2
Using 1.51 gives 3.02

1

(d) Container splitting and releasing irritant / corrosive chemicals

*Must have reference to both aspects; splitting or leaking (can be implied such as contact with body / hands) **and** hazardous chemicals.*
Allow 'burns skin / hands' as covering both points
Ignore any reference to 'harmful'.
Do not allow 'toxic'.

1

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(e) (i) $4Fe + 3O_2 \rightarrow 2Fe_2O_3$

Allow fractions / multiples in equation.

Ignore state symbols.

1

(ii) Iron powder particle size could be increased / surface area lessened

Decrease in particle size, chemical error = 0 / 3

Change in oxygen, chemical error = 0 / 3

1

Not all the iron reacts / less reaction / not all energy released / slower release of energy / lower rate of reaction

Mark points M2 and M3 independently.

1

Correct consequence of M2

An appropriate consequence, for example

- *too slow to warm the pouch effectively*
- *lower temperature reached*
- *waste of materials*

1

(f) (i) Conserves resources / fewer disposal problems / less use of landfill / fewer waste products

Must give a specific point.

Do not allow 'does not need to be thrown away' without qualification.

Do not accept 'no waste'.

1

(ii) Heat to / or above 80 °C (to allow thiosulfate to redissolve)

Accept 'heat in boiling water'.

If steps are transposed, max 1 mark.

1

Allow to cool before using again

Reference to crystallisation here loses this mark.

1

[14]

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Q2.

(a) Number / proportion / percentage / fraction of molecules

Ignore "particles"

1

(b) None ***OR*** no effect ***OR*** no change

1

(c) **X**

1

(d) **Answers in either order**

M1 collision ***OR*** collide

Mark independently

M2 collision / molecules / particles

Ignore "correct" amount of energy

with the activation energy

OR with $E \geq E_{act}$

OR with sufficient /enough energy

OR with the minimum energy

OR with the correct orientation

2

(e) A small increase in temperature results in many more / much higher proportion of / a lot more / significantly more molecules / particles / collisions with $E \geq E_{act}$ / energy greater than the activation energy / sufficient energy / enough energy / minimum energy to react
(compared with a small increase in concentration)

Not just "more molecules with $E \geq E_{act}$"

*The answer must convey that the increase is **significant***

Accept reference to "atoms", "molecules", "particles"

Ignore "species"

1

[6]

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