

Practice Question Set For A-Level

Subject : Chemistry

Paper-2 Topic: Rate Equations

Name of the Student: _____

Max. Marks : 25 Marks

Time : 25 Minutes

Mark Schemes

Q1.
C

[1]

Q2.

- (a) Power (or index or shown as x in []^x) of concentration term (in rate equation) **(1)**

1

- (b) 2 **(1)**

1

- (c) (i) Order with respect to **A**: 2 **(1)**

Order with respect to **B**: 0 **(1)**

- (ii) Rate equation: (rate =) $k [A]^2$ **(1)**

Allow conseq on c(i)

Units for rate constant: $\text{mol}^{-1} \text{dm}^3 \text{s}^{-1}$ **(1)**

conseq on rate equation

4

[6]

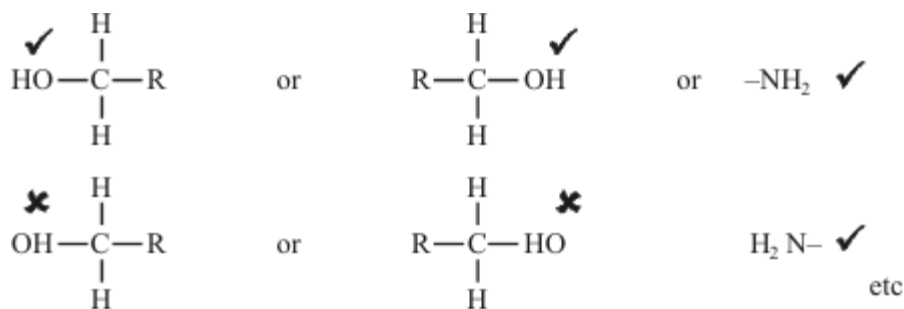
Organic points

- (1) Curly arrows: must show movement of a pair of electrons, i.e. from bond to atom or from lp to atom / space e.g.



- (2) Structures

penalise sticks (i.e. ) once per paper



Penalise once per paper

allow CH₃— or —CH₃ or  or CH₃
or H₃C—

Q3.

- (a) Order with respect to iodine: 0 **(1)**
Overall order: 2 **(1)**

2

(b) Rate constant: $k = \frac{2 \times 10^{-5}}{(1.5) \times (3 \times 10^{-2})} = 4.4(4) \times 10^{-4}$ **(1)**

Units: $\text{mol}^{-1} \text{dm}^3 \text{s}^{-1}$ **(1)**

3

- (c) Appears in rate equation **(1)**

OR implied by mention of concentration or order

does not appear in (stoichiometric / overall) equation (1)

2

(d) $\text{pH} = -\log_{10} [\text{H}^+]$ **(1)**
 $= 1.25$
 $[\text{H}^+] = 0.056(2)$ **(1)**

$\therefore \text{rate} = (4.44 \times 10^{-4}) \times (1.50) \times (0.0562)$

$= 3.75 \times 10^{-5}$ **(1)** ($\text{mol dm}^3 \text{s}^{-1}$)

(3.7 — 3.8)

Can score all 3 conseq on k from part (b)

3

[10]

Q4.
D

[1]

Q5.
C

[1]

Q6.

- (a) (i) (Experiment 1 $\rightarrow$ 2) [A] doubled, ([B] constant,) rate doubled **(1)**
stated or shown numerically

- (ii) 2 **(1)**
or shown as ... [B]²

2

(b) (i)
$$k = \frac{9.30 \times 10^{-5}}{(0.75)^2 \times (1.50)} = 1.1(0) \times 10^{-4}$$
(1) **(1)**

units of k: mol⁻² dm⁶ s⁻¹ **(1)**

- (ii) rate = $(1.10 \times 10^{-4}) \times (0.20)^2 \times (0.10)$
= $4.4(1) \times 10^{-7}$ (mol dm⁻³ s⁻¹)
(1) for the answer

Ignore units

Conseq on (i)

Upside down expression for k scores zero in (i) for 9073

but rate = $9073 \times (0.2)^2 \times (0.1) = 36(.3)$

conseq scores (1) in (ii)

4

[6]