

# Reverse Reacts + Dynamic Equilibrium

## Mark Scheme

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Chemistry
Exam Board	AQA
Topic	5.6 Rate + Extent Chemical Change
Sub-Topic	Reverse Reacts + Dynamic Equilibrium
Difficulty Level	Standard Level
Booklet	Mark Scheme

Time Allowed: 29 minutes

Score: /29

Percentage: /100

Grade Boundaries:

M1.(a) (i) covalent 1

(ii) increases the rate of reaction 1

(b) (i) the reaction is reversible 1

(ii) at lower pressure the molecules will be further apart 1

so there will be fewer collisions per unit time  
*accept frequency of collisions lower* 1

(iii) as the temperature increases, the yield of the reaction increases 1

(iv) 2 molecules / volumes become 4 **or** more molecules / volumes **of**  
product than reactant 1

(c) Marks awarded for this answer will be determined by the Quality of Communication (QoC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best-fit' approach to the marking.

**0 marks**  
No relevant content

**Level 1 (1 – 2 marks)**  
Candidate has written about some basic points from the table but has not added any extra knowledge. Candidate may have included advantages **or** disadvantages.

## Level 2 (3 – 4 marks)

Candidate has attempted an evaluation using points from the table and their own knowledge. Candidate has included advantages **and** disadvantages.

## Level 3 (5 – 6 marks)

Candidate has given an evaluation that includes both advantages and disadvantages. Candidate has clearly linked points from the table with their own knowledge and uses appropriate scientific terminology.

### examples of the points made in the response

#### Advantages of using hydrogen:

- its combustion only produces water
- combustion of hydrogen does not produce carbon dioxide **or** does not contribute to climate change
- petrol requires much more oxygen to burn so partial combustion is possible producing carbon monoxide
- combustion of hydrogen does not produce any particulates **or** does not contribute to global dimming
- petrol comes from a non-renewable source **or** there are renewable ways of producing hydrogen, eg electrolysis of water.

#### Disadvantages of using hydrogen:

- hydrogen has to be stored at high pressure **or** risk of explosion or larger volume needed for storage.
- much less energy produced from the combustion of hydrogen **or** need to refuel more often
- most methods of producing hydrogen need fossil fuels.

6

[13]

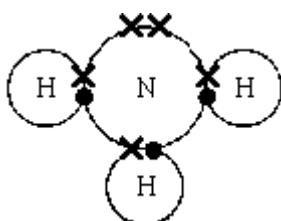
M2. (i) reversible (reaction)

1

(ii) (yield of ammonia) increases

1

(iii)



1

[3]

- M3.** (a) endothermic (reaction)  
*accept thermal decomposition* 1
- (b) gives out heat (energy)  
*accept exothermic (reaction)* 1
- turns blue  
*accept goes to hydrated copper sulphate* 1
- [3]
- 
- M4.** (a) (i) ammonia and hydrogen chloride  
*both required either order*  
*accept formulae if correct in every detail* 1
- (ii) ammonium chloride /  $\text{NH}_4\text{Cl}$   
*do not credit ammonia chloride* 1
- (iii) the fumes / gases / are poisonous / toxic  
*or ammonia and hydrogen chloride are*  
*poisonous / toxic / lethal*  
*accept just ammonia is poisonous / toxic*  
*accept just hydrogen chloride is*  
*poisonous / toxic*  
*accept vapour is poisonous / toxic*  
*do not credit just fumes are dangerous*  
*or harmful* 1

- (iv) nitrogen  
*do not credit N/N<sub>2</sub>*  
1
- hydrogen  
*do not credit H/H<sub>2</sub>*  
1
- molecule  
*do not credit compound **or** mole*  
1
- covalent  
*accept single / molecular*  
1
- (b) (i) proton  
neutron  
electron  
***either** all three correct  
**or** one or two correct  
however do not credit a response  
which is repeated*  
2
- (ii) protons and neutrons  
*both required in either order*  
1

[10]