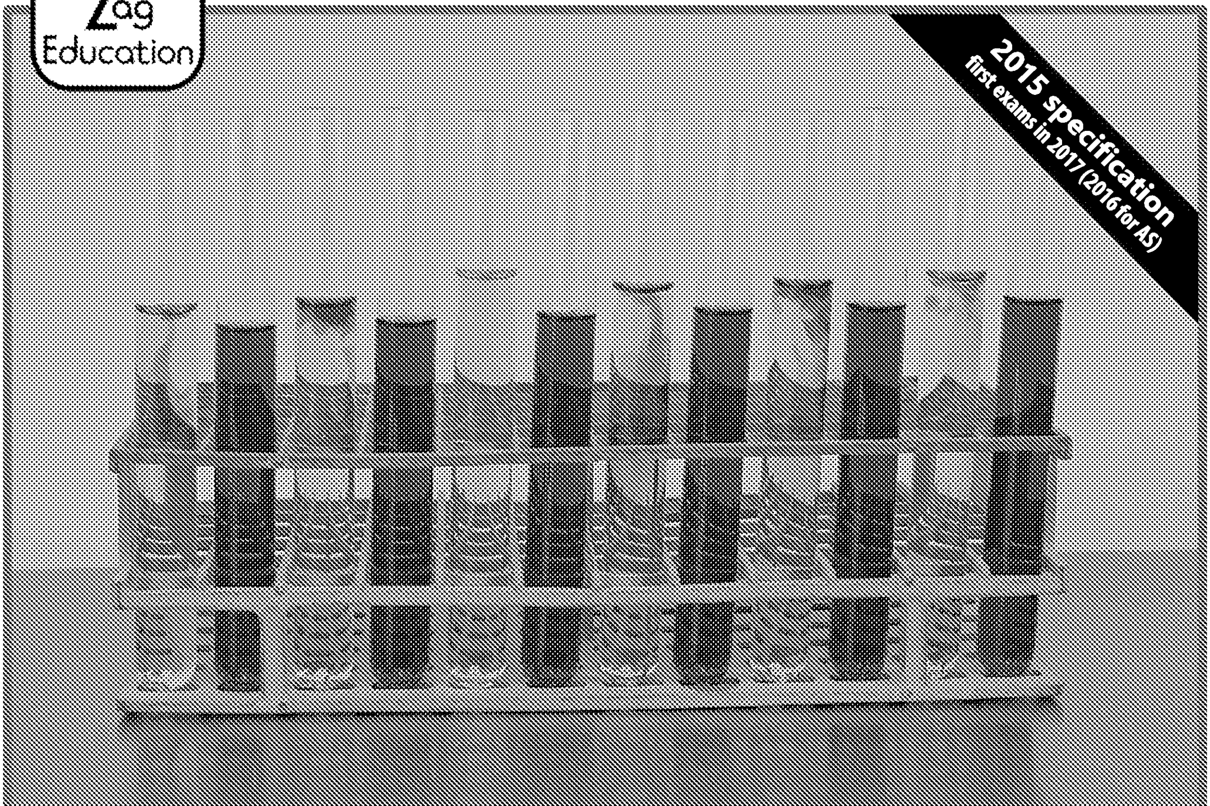
Chemistry

A Level | OCR A | H432



Topic Tests

For OCR A Chemistry A Level Year 2

zigzageducation.co.uk

POD 6103

Contents

Teacher's Introduction

These topic tests have been designed to help comprehensively test your students' knowledge and understanding of the **OCR A Level Chemistry A (Year 2)** specification.

Each topic test closely follows the content of the specification and includes:

- **Factual questions**: Some simpler factual questions are included to ensure that all the content and basics are covered, and to allow weaker learners access to some marks.
- **Short-answer questions**: These are not in exam style, and the purpose of these is to test different elements, knowledge and skills from the specification in a variety of styles.
- **Exam-style questions**: Where appropriate, topics may contain one or more exam-style questions, to prepare students for what they might meet in the exam, and to test exam skills.

Mathematical and practical skills are also covered in these Topic Tests.

Tests have been designed to take between 30 and 40 minutes to complete, and average between 25 and 35 marks. Please note that some longer specification topics have been split and shorter topics have been combined to allow a realistic number of marks for a possible homework task (see table below).

Topic Number	Number of Marks
5.1.1	39
5.1.2	30
5.1.3 (Part 1)	22
5.1.3 (Part 2)	23
5.2.1	25
5.2.2	20
5.2.3 (Parts 1 and 2 combined)	(27 + 6) = 33
5.3.1 (Part 1)	30
5.3.1 (Part 2)	21
5.3.2	20
6.1.1 (Part 1)	21
6.1.1 (Part 2)	23
6.1.2	22
6.1.3	21
6.2.1 and 6.2.2 combined	(7 + 22) = 29
6.2.3	23
6.2.4	21
6.2.5	20
6.3.1	29
6.3.2	37

The topic tests are suitable for a classroom assessment, revision aid or homework task and are, therefore, suitable for use immediately after a topic is completed in class or at the end of teaching the course.

The number of marks awarded for each question is clearly shown, allowing the students to gauge the level of detail they will require for their answers. Full answers are included in the mark scheme, also making this a suitable tool for students to use independently.

Diagrams and graphs have been designed with photocopying in mind.

It is recommended that students have access to a periodic table and a calculator to complete the questions.

We hope you find these tests useful during your teaching.

November 2015

5.1.2: How Far?

1. Define the term 'mole fraction'.

2. What is meant by 'partial pressure'?

3. Give the expression for the equilibrium constant K_c for the reaction H

4. Calculate the equilibrium constant for the following reaction: A + B ⇌ concentrations were calculated at [A] = 0.061, [B] = 0.058, [C] = 0.391. S any relevant unit for K_c.

5. The forward reaction of a system at equilibrium is an exothermic proc temperature of this reaction is raised? How does this control the posit reason for your answer.

6. How does the addition of a catalyst to a reaction alter K_c?

7. What is the effect on the equilibrium constant K_c if the concentrations are doubled?

8. A homogeneous equilibrium system was set up for the following reac

$$2\,A\,(g) + B\,(g) \rightleftharpoons 2\,C\,(g) + 3\,D\,(g)$$

The system has a total pressure of 300 atm and a total of 200 moles of fractions of each gas are: A = 0.25, B = 0.125, C = 0.25 and D = 0.375.

a) Calculate the partial pressure for each gas in the system.
b) Construct the equilibrium expression in terms of K_p for this reacti
c) Calculate a value for K_p for this reaction. Include the units for K_p
d) What will happen to the position of equilibrium for this reaction system is increased?

Preview of Questions Ends Here

Mark Scheme

5.1.1: How Fast?

1. a) The change in the amount of a substance ÷ time taken for that change (1
   b) The power to which the reactants' concentration is raised in a rate equat
   c) The time it takes for half of the reactants in a chemical reaction to be use
   d) The slowest step in a multi-step reaction (1)
   e) The numerical constant of proportionality (k) which is found in a rate eq

2. A = Second order (1) B = First order (1) C = Zero order (1)

3. a) Rate = (0.2 – 0.15) / (4 – 0) = 0.0125 mol dm^{-3} s^{-1} (1)
   b) 7 seconds (accept any answer from 6 to 8 seco
   c) Half-life is constant at 7 s and so the rea ion is first order (1)
   d) $k = \frac{\ln 2}{t_{\frac{1}{2}}}$
   e) $k = \frac{\ln 2}{7} = 0.099$ (

4. a) Z er and Second order (1)
   b) Fr gradient of the graph

5. Initial rates method – measure the time taken for a change to occur in the rea evolution of a gas, formation of a precipitate, etc. Change one variable (i.e. co Use these measurements of time to calculate rate (1).

6. a) Rate = k [ICl] [H_2] (3) (1 mark for each order and 1 mark for correctly pla
   b) 2 $dm^3 mol^{-1} s^{-1}$ [Accept $mol^{-1} dm^3 s^{-1}$] (1)

7. Increasing temperature will increase the rate constant (1). The rate of reactio be a greater number of particles with sufficient energy to overcome the activ

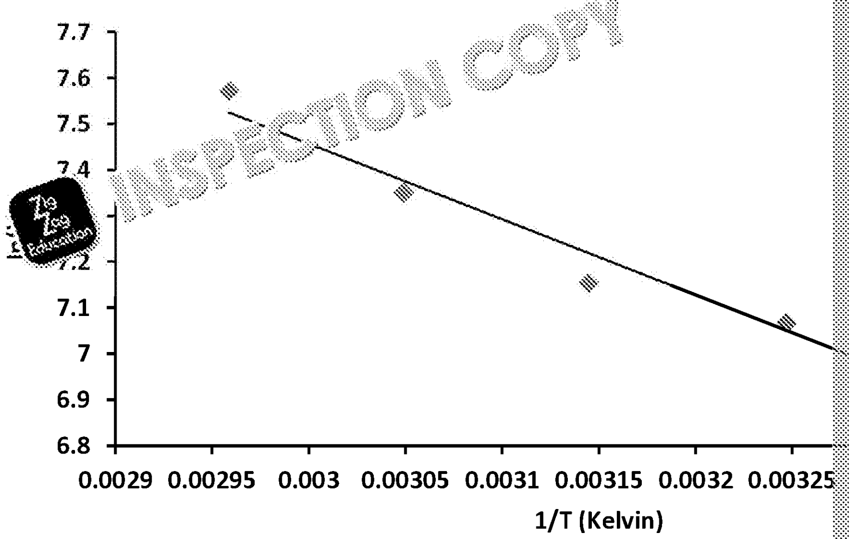
8. Rate = k[A] (2)

9. $(CH_3)_3C\text{-}Br \rightarrow (CH_3)_3C^+ + Br^-$ (1)
   $(CH_3)_3C^+ + OH^- \rightarrow (CH_3)_3C\text{–}OH$ (1)

10. Conversion of temperature to 1/T (1) conversion of k to ln(k) (1)
    Students expected to plot a graph of ln(k) against 1/T to produce a straight li
    Activation energy calculated from gradient of graph. Finding gradient (2). A
    may vary significantly. For best results plot graphs using a computer packag
    Plot of graph (using Excel) returns equation y = –1644.7x + 12.391
    Gradient = $-E_a/R$ (1)

    Ea = Gradient x (–R) = 13674.03 J = 13.67$kJmol^{-1}$ (1)

    Sample graph plotted below.



Preview of Answers Ends Here