Title

O-Level Topical Chemistry (PAPER-2)

THEORY

Syllabus 2025-2026-2027

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Arrange & Design by

Muhammad Majid Hussain

Legal Advisor

Ch. Muhammad Naseer (Kakuana)
Advocate Hight Court
0300-7658213
Chamber # 26, Randhawa Law Building
Near CPO office Distt. Katchery, Faisalabad.

Mian Zahid Iqbal
Advocate Hight Court
0321-7618063
Chamber # 26, Randhawa Law Building
Near CPO office Distt. Katchery, Faisalabad.

For Complaints/Order

Rabbani Publications
36-Z, Commercial Center, Near Mujahid Hospital, Madina Town, Faisalabad.
0332-6682372, 0300-4537372
(rabanipublications@gmail.com)

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PREFACE

IN THE NAME OF ALLAH, MOST GRACIOUS AND MOST MERCIFUL.

Excellence is not an art. It is the habit of practice. In this regard the concepts learnt can only be assessed when questions are answered. The perfect logical approach to this is to take one step at a time.

Chapter wise learning and sub topic by sub topic its application on exam-based questions provides exclusive comprehension. This booklet is the perfect resource for the practice of complete Chemistry O'Level syllabus 2025-2026-2027. This compilation has been refined by experts who have tried to make this book error free.

The book has been edited and checked to remove possible mistakes. However, constructive criticism is welcome. You may call us for your productive feedback and suggestions at this No. (0332-6682372) . This book is recommended by all renowned Chemistry teachers who contributed to make it effective and fruitful.

This book provides:

- Knowledge with understanding.
- Handling information and solving problems or Experimental skills and investigation.
- Sorted/separated questions or parts of questions, placed in related classified topics.
- Questions in order from the early years to most recent years.
- Answering Key/ Mark Scheme at the end of each topic.
- Actual spacing between consecutive questions and within options as per CAIE format which gives students a genuine feel of attempting questions. In addition to all this; review, feedback and contribution in this booklet by various experienced teachers of the subject belonging to popular school chains makes it a treasured resource for both the teachers and the students.

Special Thanks To
Team Coordinator
Sir Anzar Ahmad
(MSc Chemistry)

in case of any suggestion for improvement Team Head can be contacted at
Cell: 0332-6682372 / Email: rabanipublications@gmail.com

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Quality Policy

- Customer satisfaction is our priority and achieve this goal we will always, work as a team.
- Produce and supply finest quality goods meeting all the specification including Environmental concern and safety
- Every employee will influence to contribute towards
- Quality improvement to sustain through ideas and innovation.

- گاہک کا اطمینان ہماری اولین ترجیح ہے۔
- اپنے مقصد کے حصول کیلئے ہم ہمیشہ بحیثیت ایک ٹیم کام کرتے ہیں۔
- گاہک کی ضروریات اور ماحولیاتی حالات اور احتیاطی تدابیر کہ مدنظر رکھتے ہوئے معیاری اشیاء فراہم کرتے ہیں۔
- ہر فرد اپنے خیالات اور تخلیقات کے ذریعے بہتر کوالٹی اور اس کو برقرار رکھنے کیلئے موثر کردار ادا کرتا ہے۔

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Q9(d)/21/M/J/19

1 Food packaging produces lots of waste.

This waste includes both plastic and glass.

(d) Glass waste is melted and then made into new objects.

Use the kinetic particle theory to describe the changes in movement and arrangement of the particles when a solid becomes a liquid.

.....

.....

.....

.....

..... [2]

Q6(b)/21/O/N/19

2 Ethanoic acid, CH_3COOH, is a weak acid.

(b) Ethanoic acid is solid at 16.0 °C.

Describe the arrangement and movement of the particles in a solid.

arrangement .....

movement .....

[2]

Q6(b)/22/O/N/19

3 Butanoic acid, C_3H_7COOH, is a carboxylic acid.

(b) Describe the movement and arrangement of the particles in liquid butanoic acid.

movement .....

arrangement .....

[2]

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Q3(d)/21/M/J/20

4 The equation for the decomposition of hydrogen peroxide is shown.

$$2H_2O_2 \rightarrow 2H_2O + O_2$$

A sample containing 1.00 mol of hydrogen peroxide is completely decomposed.

This sample releases 98.0 kJ of heat energy.

(d) The rate of decomposition of hot H_2O_2 is greater than that of cold H_2O_2.

Use ideas about particles to explain why.

.....

.....

..... [2]

Q4e(ii)/21/M/J/20

5 The table shows some properties of five esters.

name	structure	relative molecular mass	melting point /°C	boiling point /°C
methyl ethanoate	CH_3COOCH_3	74	–98	57
ethyl ethanoate	$CH_3COOCH_2CH_3$	88	–84	77
propyl ethanoate	$CH_3COOCH_2CH_2CH_3$	102	–95	102
butyl ethanoate	$CH_3COOCH_2CH_2CH_2CH_3$	116	–78	126
pentyl ethanoate	$CH_3COOCH_2CH_2CH_2CH_2CH_3$	130	–71	148

(e) Propyl ethanoate is prepared by the reaction between ethanoic acid and propanol.

$$CH_3CO_2H + CH_3CH_2CH_2OH \rightleftharpoons CH_3COOCH_2CH_2CH_3 + H_2O$$

(ii) The concentration of ethanoic acid is increased.

State and explain, in terms of particles, what happens to the rate of the forward reaction.

.....

.....

.....

..... [3]

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Q7(d)/21/M/J/20

6 Carbon dioxide is a colourless gas found in air.

(d) When warmed, solid carbon dioxide changes directly into a gas. It does **not** become a liquid.

Use the kinetic particle theory to describe the changes in **movement** and **arrangement** of the particles during this change of state.

.....

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..... [3]

Q9(d)/22/M/J/20

7 Sulfur dioxide is a colourless gas which can be found in air.

(d) Liquid sulfur dioxide is stored in cylinders.

When the cylinder is opened the liquid quickly changes into a gas.

Use the kinetic particle theory to describe the changes in **movement** and **arrangement** of the particles when liquid sulfur dioxide becomes a gas.

.....

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..... [2]

RABBANI BROTHERS & SON's

Q4(a)/21/O/N/20

8 This question is about halogens and halogen compounds.

(a) A drop of bromine liquid was placed in a sealed glass jar.

After a time, the colour of the bromine had spread throughout the jar.

Explain this observation in terms of the kinetic particle theory.

.....

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.....

.....

..... [3]

Q6(d(ii)/21/O/N/20

9 (d) Concentrated ethanoic acid, CH_3CO_2H, reacts with calcium.

The products are calcium ethanoate and hydrogen.

(ii) State and explain how the rate of this reaction changes when the experiment is repeated using dilute ethanoic acid.

All other conditions stay the same.

Include in your answer ideas about collisions between particles.

.....

.....

..... [2]

Q8(d(ii)/21/O/N/20

10 (d) Hydrazine, $H_2N - NH_2$, is a colourless liquid.

(ii) The melting point of hydrazine is 2 °C.
The boiling point of hydrazine is 114 °C.

Use this information to suggest why hydrazine is a solid at 0 °C.

.....

..... [1]

RABBANI BROTHERS & SON's

Q8(d(ii)/21/O/N/20

11 (a) A drop of black ink is placed at the bottom of a beaker of water.

After a time, the colour of the ink spreads throughout the water.

Explain this observation in terms of the kinetic particle theory.

.....

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.....

.....

..... [3]

Q2(f)/21/M/J/21

12 Helium, neon, argon, krypton, xenon and radon are noble gases in Group VIII.

(f) A sample of neon has a volume of 21 dm^3 at room temperature and pressure.

(i) The temperature of the sample is increased.

The pressure remains constant.

Describe and explain, using kinetic particle theory, what happens to the volume of the sample.

.....

..... [1]

(ii) The pressure of the sample is increased.

The temperature remains constant.

Describe and explain, using kinetic particle theory, what happens to the volume of the sample.

.....

..... [1]

RABBANI BROTHERS & SON's