

Chemistry
Standard level
Paper 2

Practice paper

Topic: Organic Chemistry

Chemistry

Standard level

Paper 2

Specimen paper

1 hour 15 minutes

Instructions to candidates

- Answer all questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is [40 marks].

1. Consider the following four-step reaction sequence starting from but-1-ene:
But-1-ene → Compound A → Butan-2-ol → Butanone

(a) State the reagent and conditions required to initially convert but-1-ene directly into Compound A (2-bromobutane).

[2]

.....
.....
.....
.....

(b) Classify the reaction type that converts Compound A (2-bromobutane) into butan-2-ol.

[1]

.....
.....

(c) The final step oxidizes butan-2-ol into butanone. Explain what would occur if identical oxidizing conditions were applied directly to butanone.

[1]

.....
.....

2. Methane reacts with chlorine gas in the presence of ultraviolet (UV) light.

(a) Formulate the two propagation steps utilizing free radicals for this overall reaction.

[2]

.....
.....
.....
.....

(b) Suggest one specific termination step that produces a trace alkane product other than methane.

[1]

.....
.....

3. But-2-ene is an unsaturated hydrocarbon that reacts readily with various reagents.

(a) Deduce the structural formula of the product formed when but-2-ene reacts with bromine water.

[1]

(b) Describe the specific color change observed in the reaction mixture during this test. [1]

.....

.....

(c) State the reagent and catalyst required to convert but-2-ene into butane. [2]

.....

.....

.....

.....

4. C_4H_9OH exists as several structural isomers.

(a) Draw the full structural formula for consecutive unbranched isomers: an unbranched primary alcohol and an unbranched secondary alcohol.

[2]



5. The empirical formula of benzene is CH.

(a) Outline the structural evidence from X-ray crystallography that disproves the historical Kekulé model (cyclohexa-1,3,5-triene) for benzene.

[2]

.....

.....

.....

.....