



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION, INNOVATION,
SCIENCE AND TECHNOLOGY DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

APPLIED CHEMICAL TECHNOLOGY

MODULE: Chemical Analysis II

PAPER NO: 501/23/M02

DURATION: 3 Hours

JUNE 2026 EXAMINATION

REQUIREMENTS

Data Booklet

INSTRUCTIONS TO CANDIDATE

- 1. Answer any five (5) questions.**
- 2. Each question carries twenty (20) marks.**

QUESTION 1

- a) Describe the test-tube reactions used to confirm the presence of various organic functional groups in a given sample specifying the reagents, reaction conclusions and expected observations
- i) Aldehydes (3marks)
 - ii) Ketones (3marks)
 - iii) Alkenes (3marks)
 - iv) Tertiary alcohols (3marks)
- b) Name the following complexes
- i) $K_3[Fe(CN)_6]$ (3marks)
 - ii) $[Cu(NH_3)_4(H_2O)_2]Cl_2$ (3marks)
 - iii) $[Al(H_2O)_6]$ (2marks)

QUESTION 2

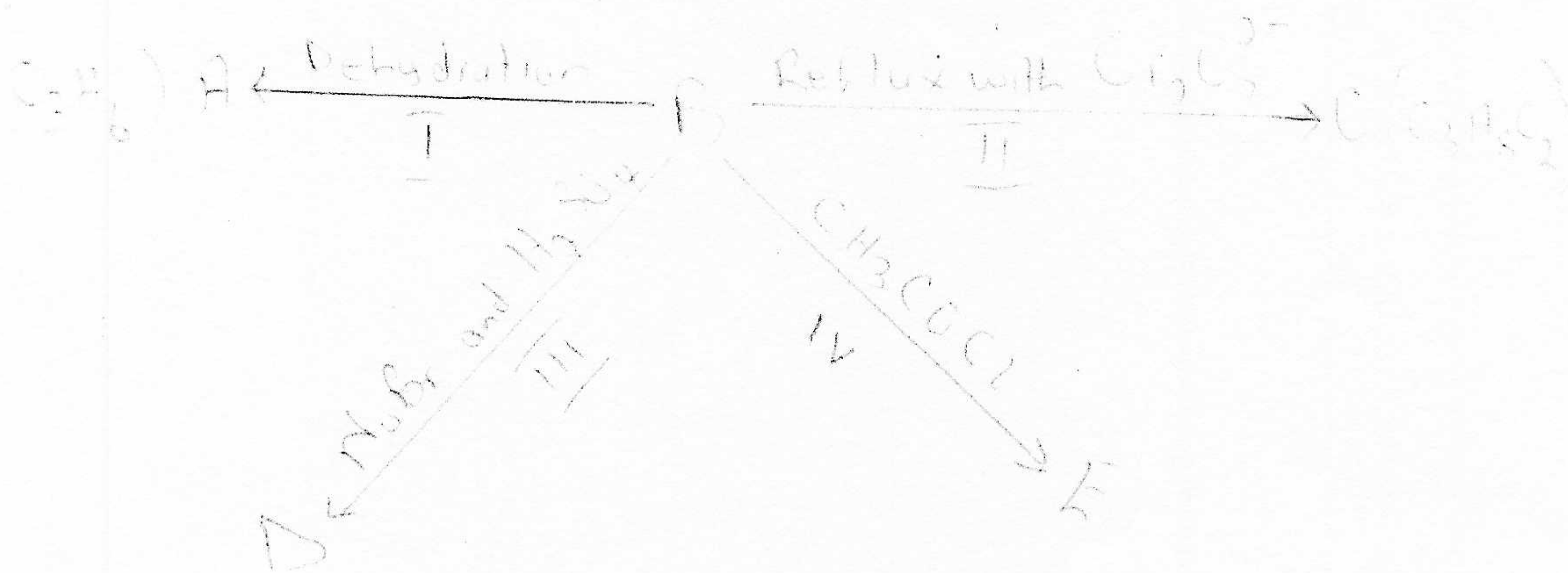
With the aid of a well-labelled flow diagram, describe the Solvay process
(20marks)

QUESTION 3

- a) A solution is prepared by dissolving $CuCl_2$ in water and the solution appears blue-green. You are tasked with analysing this solution to determine the concentration of $Cu(II)$ ion the solution outline a suitable method of analysis. (15marks)
- b) Explain why $[Cu(H_2O)_6]^{2+}$ is blue in colour (5marks)

QUESTION 4

The diagram below shows reactions of an organic compound A to the final product E



- a) Name compounds A, B, C, D and E (5marks)
- i) Name the reaction II (1mark)
- ii) Write an equation for reaction IV (3marks)
- iii) Name suitable reagents and conditions that can be used in place of CH_3COCl in reaction IV (2marks)
- b) Outline a laboratory test for differentiating 1° , 2° and 3° amines (9marks)

QUESTION 5

- a) Compare and contrast dyes and pigments (10marks)
- b) Discuss the applications of pigments (10marks)

QUESTION 6

Discuss any four analytical methods used to analyse organic compounds (20marks)

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