



TEST CODE **02212020**

**FORM TP 2010152**

MAY/JUNE 2010

**CARIBBEAN EXAMINATIONS COUNCIL**

**ADVANCED PROFICIENCY EXAMINATION**

**CHEMISTRY**

**UNIT 2 – Paper 02**

*2 hours 30 minutes*

**READ THE FOLLOWING INSTRUCTIONS CAREFULLY.**

1. This paper consists of SIX compulsory questions in TWO sections.
2. Section A consists of THREE structured questions, one from each Module. Section B consists of THREE extended response questions, one from each Module.
3. For Section A, write your answers in the spaces provided in this booklet. For Section B, write your answers in the answer booklet provided.
4. All working must be shown.
5. The use of silent, non-programmable calculators is permitted.
6. A data booklet is provided.

SECTION A

Answer ALL questions in this section.

Write your answers in the spaces provided in this booklet.

MODULE 1

THE CHEMISTRY OF CARBON COMPOUNDS

1. Figure 1 shows a reaction scheme.

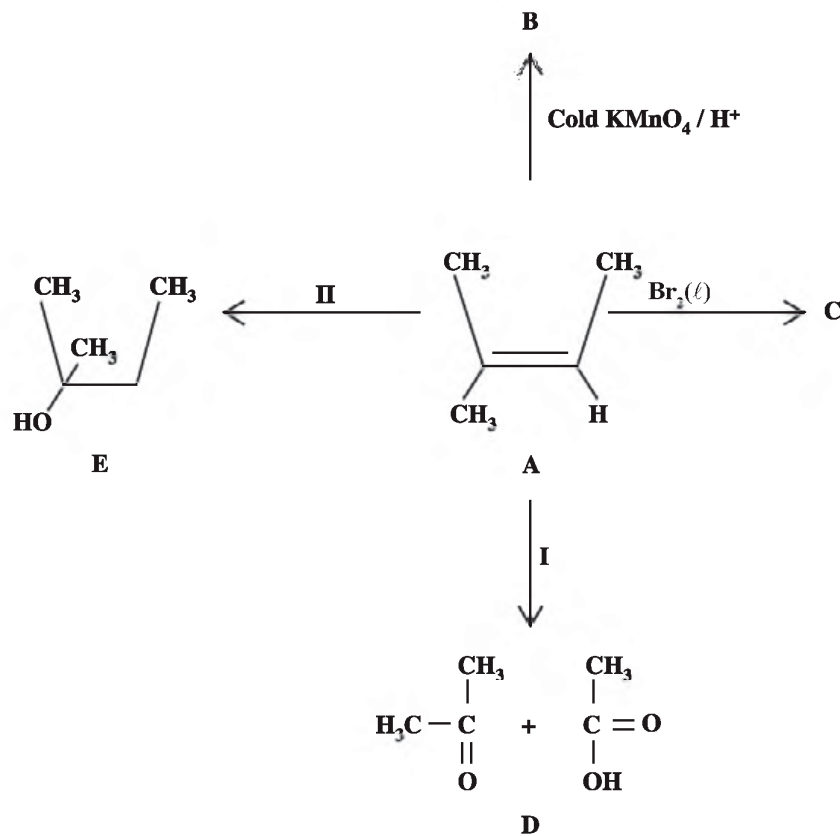


Figure 1. Reaction scheme

(a) State the reagents and/or conditions necessary for EACH of the following reactions:

(i) I (from A D

[ 2 marks]

A E

[ 2 marks]

EACH

B

C

[2 marks]

A

[ 1 mark ]

A O T

[ 1 mark ]

N ONE

[ 1 mark ]

A

[ 1 mark ]

C

D

[ 2 marks]

[ 1 mark ]

N

[ 2 marks]

Total 15 marks

MODULE 2

ANALYTICAL METHODS AND SEPARATION TECHNIQUES

2. EACH

E

[ 3 marks]

$$T = \frac{1}{\nu} = \frac{1}{c/\lambda}$$

TABLE 1: PROPERTIES OF ELECTROMAGNETIC RADIATION

Wavelength (m)	Frequency (Hz)	Type of Electromagnetic Radiation
(i) _____	$3 \times 10^{13}$	(iii) _____
3.16	(ii) _____	(iv) _____

[ 4 marks]

/  
200  
X TH EE  
/

X

C

[ 3 marks]

C

/

T O  
/

[ 2 marks]

C EACH

$$\frac{T}{v} = 1 \times 10^1 \times v \times 10$$

[ 1 mark ]

T

[ 2 marks]

Total 15 marks



MODULE 3

INDUSTRY AND THE ENVIRONMENT

3.

H

T O

H

[ 2 marks]

EACH

[ 2 marks]

ONE

[ 2 marks]

A

H

T

- (i) Briefly outline TWO factors that are responsible for acid rain in industrialized,

[ 2 marks]

T O

[ 2 marks]

GO ON TO THE NEXT PAGE

A

P 2 NO

[ 1 mark ]

(ii) Name ONE reagent that you would use, to confirm the claim of contamination  
EACH

P 2

NO

[ 2 marks]

P 2 NO

P 2

NO

[ 2 marks]

Total 15 marks

## SECTION B

Answer ALL questions in this section.

Write your answers in the separate answer booklet provided.

## MODULE 1

## THE CHEMISTRY OF CARBON COMPOUNDS

4. A B



E A B [ 2 marks]

N T O OTH [ 2 marks]

A B

A [ 2 marks]

B AN B NO [ 3 marks]

E [ 2 marks]

T C H<sub>1</sub>

[ 4 marks]

Total 15 marks

## MODULE 2

### ANALYTICAL METHODS AND SEPARATION TECHNIQUES

5. (a) Mass spectrometry is used to measure particular characteristics of a given molecular sample. State THREE characteristics of a molecule that mass spectral data can be used to determine. [ 3 marks]
- (b) Figure 2 shows the mass spectrum for a haloalkane containing chlorine.

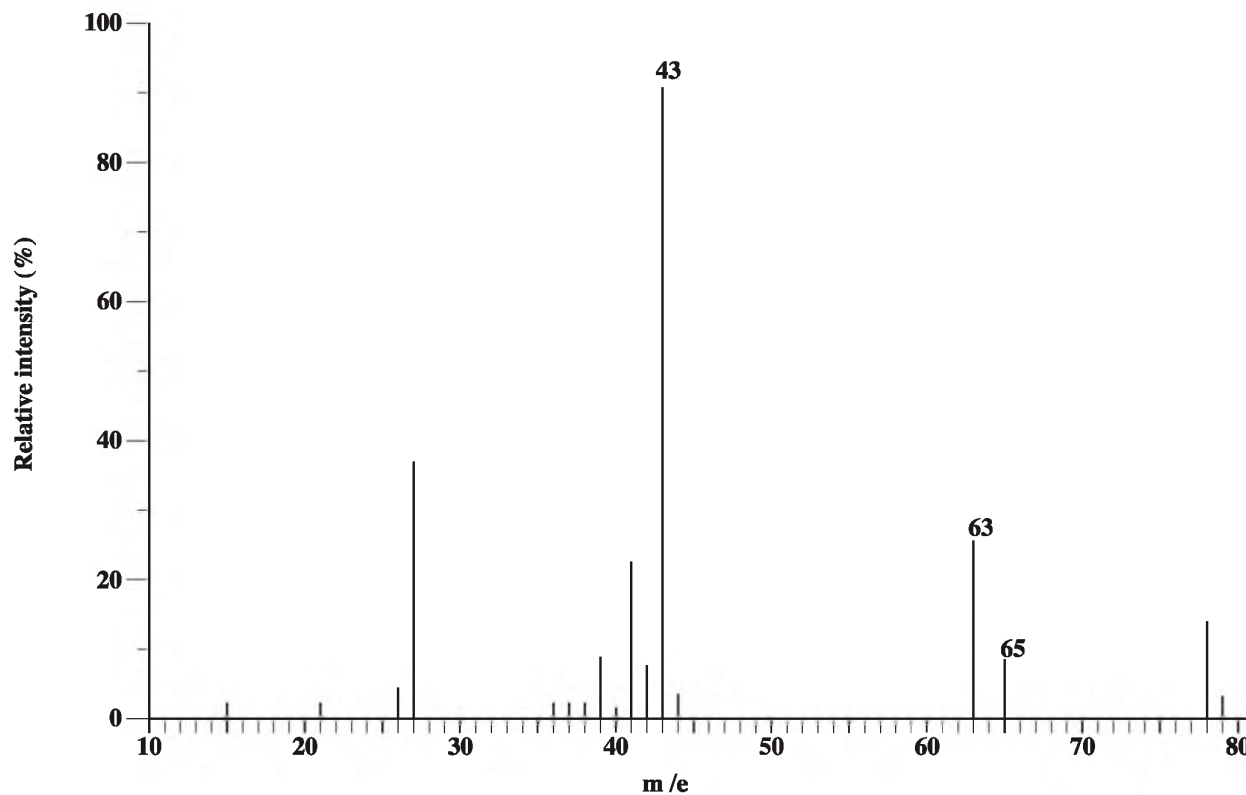


Figure 2. Mass spectrum for a haloalkane containing chlorine

- (i) What is the  $m/e$  ratio of the  $M$  and  $M + 1$  peak? [ 2 marks]
- (ii) Deduce the formula of the fragments at  $m/e$  ratios: 43, 63 and 65. [ 3 marks]
- (iii) Hence, deduce the formula of the  $M$  and  $M + 1$  molecular ion species and name the compound. [ 3 marks]

GO ON TO THE NEXT PAGE

1

C

2 2

[ 2 marks]

A

T O

[ 2 marks]

Total 15 marks

MODULE 3

INDUSTRY AND ENVIRONMENT

6.

A

H

P

T



[ 2 marks]

H

[ 1 mark ]

[ 2 marks]

C

[ 2 marks]

A

H

P

[ 2 marks]

T N  
T E  
C E C  
C T 2 ONE EACH ONE  
EACH

**TABLE 2: POLLUTANT, SOURCE AND EFFECT**

Pollutant	Source	Polluting Effect
NO		
PO		
P <sup>2</sup>		

[ 6 marks]

Total 15 marks

END OF TEST