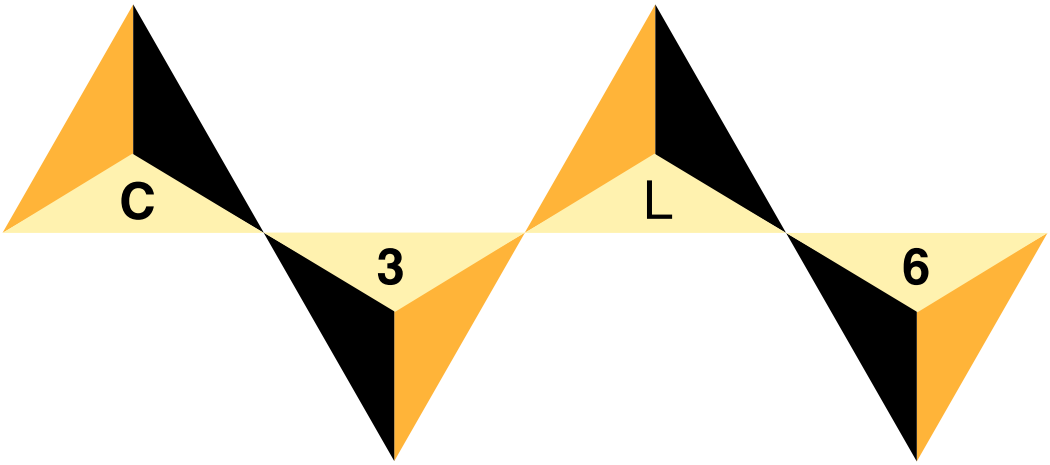


Cambridge Chemistry Challenge Lower 6th

June 2022
Student Answer Booklet

In order to print your certificate, we need to store your name, school, and mark in a database: these details are only viewable by your school and our committee. Your participation in the competition indicates that you are happy for us to do this. If you wish to withdraw your consent, please contact your teacher who will be able to delete your data from our database.

Student name _____

School _____

Date of exam _____ Tick box if held online ☐

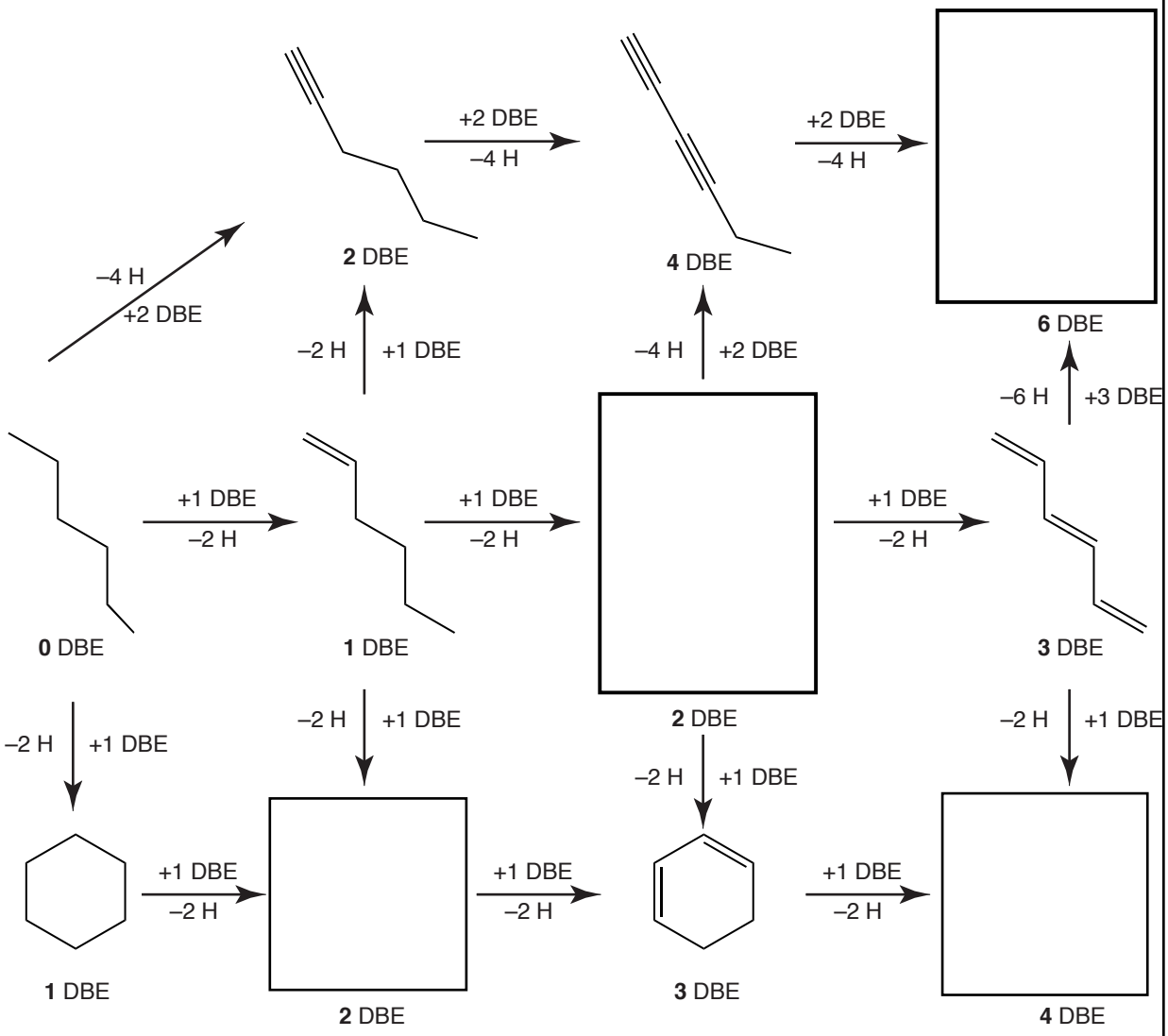
School year (eg year 12) _____

Signature _____

	p2	p3	p4	p5	p6	p7	p8	p9	Total
mark									

Marks available

1(a) (i) Complete the diagram below by filling in the missing structures. 1/2



1/2

1

(ii) Number of DBE Dame Bond has: (Circle the correct answer.)

004 005 006 007 008 009 1/2

1(b) General formulae for:

(i) an alkene or cycloalkane	(ii) an alkyne
(iii) a cycloalkene	(iv) a tri-alkyne

1

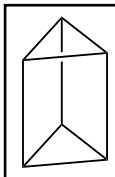
1

(v) hydrocarbon containing n carbons with x DBE 1/2

1(c) Expression for the number of DBE in the hydrocarbon with formula CnHy 1

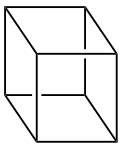
Marks available

1(d) Number of DBE in:

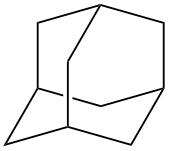


prismane

1

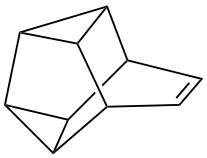


cubane



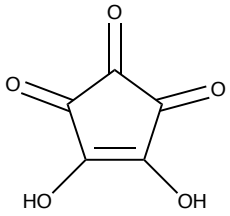
adamantane

1



snoutene

1(e)

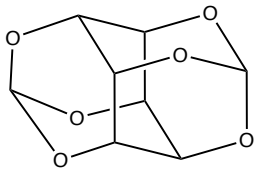


croconic acid

Number of DBE:

Formula:

1

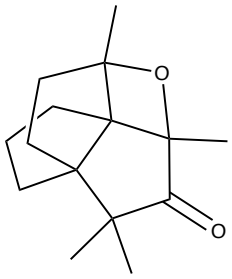


hexaoxadiamantane

Number of DBE:

Formula:

1



dichrocephone-B

Number of DBE:

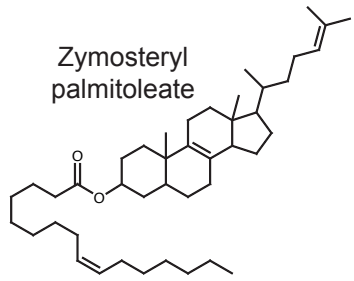
Formula:

1

Marks available

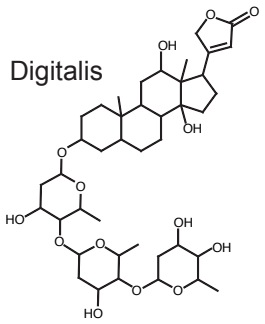
1(f)

Zymosteryl palmitoleate



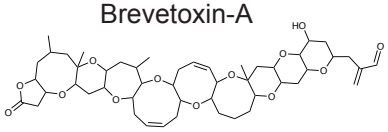
Number of DBE:	Formula: C_{43} H___ O___	2

Digitalis



Number of DBE:	Formula: C_{41} H___ O___	2

Brevetoxin-A



Number of DBE:	Formula: C_{49} H___ O___	2

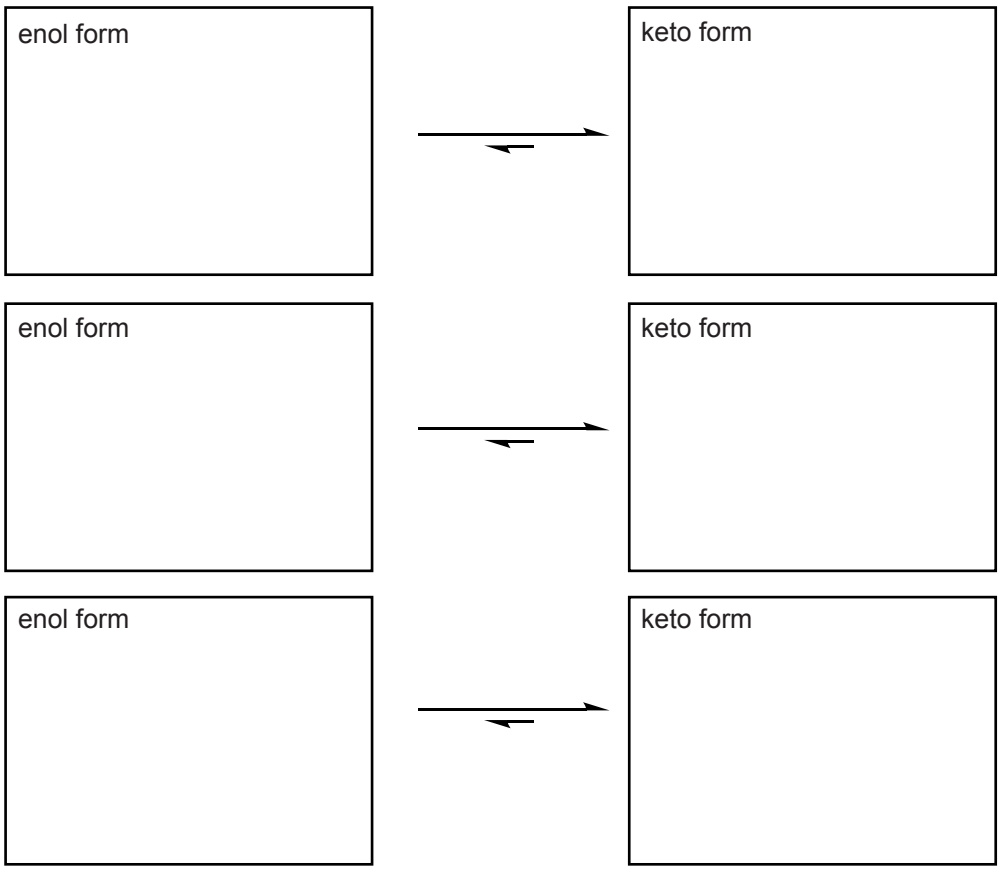
1(g) Complete the table of functional group combinations for 2 DBE.

DBE	Rings	C≡C	C=C	C=O	Alcohols	Ethers
2						

5

Marks available

1(h) THREE keto-enol isomers of C_3H_6O

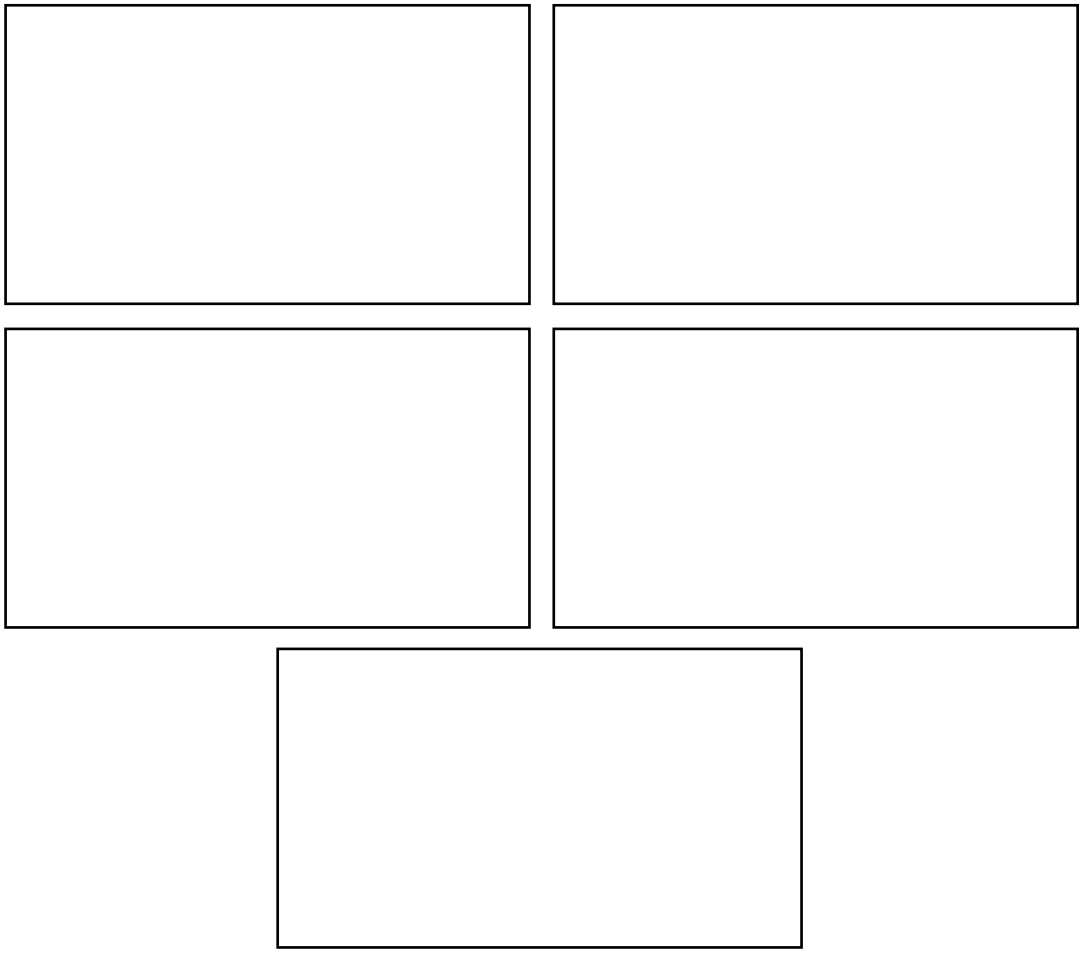


1

1

1

1(i) The structure(s) that could possibly correspond to each of the spectra:



2 for each correct structure

Marks available

2(a) (i) Electron configuration:

$1s^2\ 2s^2$ ... — 1

(ii) Gain: — Lose: — 1

2(b) Empirical formula: — 1

2(c) (i) Dot & Cross: — (ii) Angle: — 2

(iii) Structure — 1

2(d) (i) Phases:

P = **Q =** **R =** — 1

(ii) Temperature: Pressure / kPa: — 2

(iii) Unique property: — 1

(iii) Most likey structure (tick one): — 1

a) mixture of aluminium and chloride ions

b) a molecule of Mr 133.33

c) a molecule of Mr 266.66

Marks available

2(e) (i) Equation for the formation of **B**:

2

(ii) Dot & cross diagram for **B**:

1

(ii) Average bond energy in **A**:

2

Average bond energy in **B**:

3

Marks available

2(f) (i) Decomposition reaction:

1

2(g) x = 6, y = 0

formula: pH:

1

x = 4, y = 2

formula: pH:

1

x = 0, y = 4

formula: pH:

1

2(h)

3

Marks available

2(j) (i)

Formula:

5

(ii) Formula of anion:

1

(iii) Structure of mellitic acid:

(iv) Structure of mellitic anhydride:

Formula: DBE:

4