

Name:

Target grade:

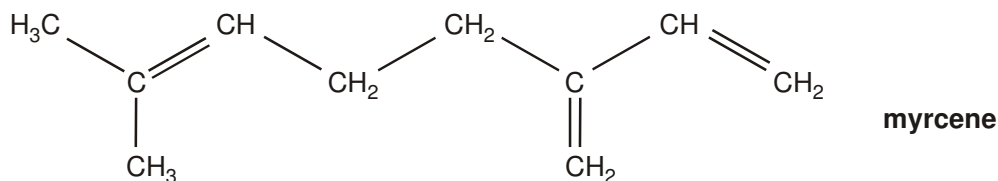
Mark: / 40

Actual grade:

Percentage:

Homework 8 - Synthesis

1. Myrcene is a naturally-occurring oil present in bay leaves. It can be used in perfumes to give a spicy character. The structure of myrcene is shown below.



- (a) Name the functional group present in myrcene.

.....

[1]

- (b) Information about the structure of myrcene can be obtained by reacting it with bromine to produce the **saturated** organic compound **A**.

- (i) State the colour change you would see when bromine reacts with myrcene.

from to

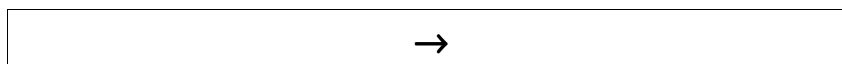
[2]

- (ii) Circle **two** words from the following list that best describe what is happening in the reaction of myrcene with bromine.

addition electrophilic elimination nucleophilic radical substitution

[2]

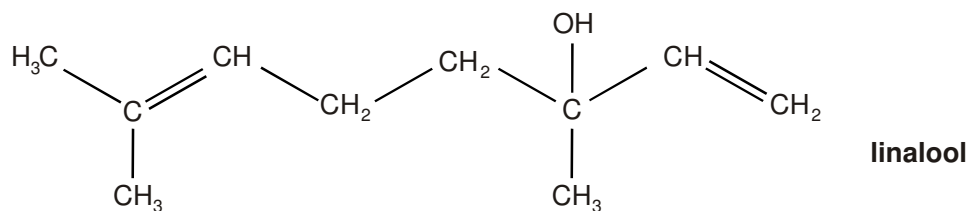
- (iii) Write a balanced equation for the reaction of myrcene, C₁₀H₁₆, with bromine to produce the **fully saturated** compound **A**. Use the molecular formulae of the molecules.



[2]

Name:

- (c) Myrcene can be used to make linalool, which is used for flavouring foods. The structure of linalool is shown below.



- (i) Name the molecule that would need to be added to myrcene to form linalool.
-
- [1]
- (ii) The linalool molecule contains an alcohol functional group. Is this alcohol group primary, secondary or tertiary? Explain your answer.
-
-
- [2]
- (iii) What, if anything, would you expect to happen if linalool were heated with acidified potassium dichromate(VI) solution? Explain your answer.

.....

.....

.....

[2]

- (d) Linalool could be converted back to myrcene.

- (i) What **type** of reaction would need to be carried out to convert linalool back to myrcene?

.....

[1]

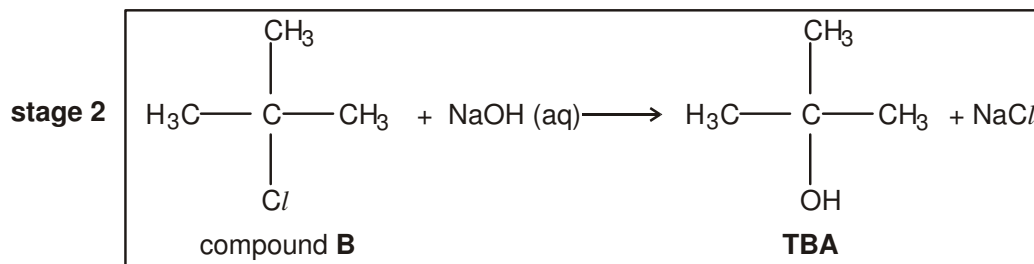
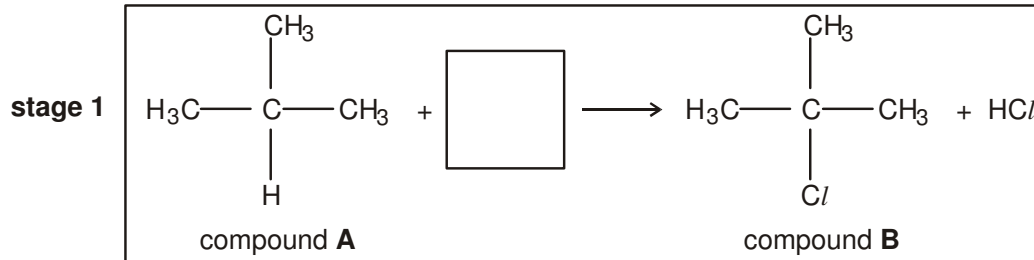
Name:

(ii) What reagent(s) and conditions would be required for this reaction?

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

[3]
[Total 16 marks]

2. An additive sometimes used in petrol is TBA. TBA can be made from compound A in two stages.



(i) In the box in **stage 1**, write the formula of the reagent needed to make compound **B**.

[1]

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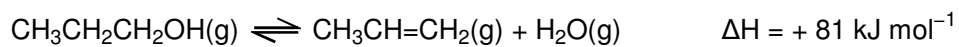
(ii) Give the systematic name of compound B [1]

(iii) Give the conditions used to carry out stage 2 in the laboratory.

.....

[2]
[Total 4 marks]

3. (a) The equation below represents the reaction that occurs when propene forms from propan-1-ol.



Underline the term below that describes the type of reaction occurring in the equation above

addition **elimination** **hydrolysis** **substitution**

[1]

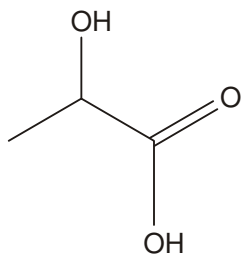
(b) Give the reagents and conditions required for the reaction represented by the equation in (a).

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

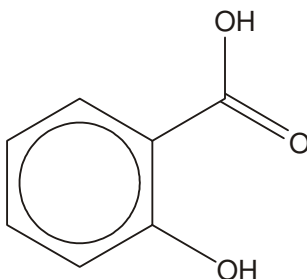
[3]
[Total 4 marks]

Name:

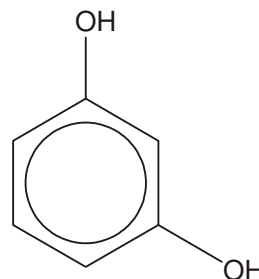
4. A chemical peel is a solution used to improve and smooth the texture of facial skin by removing its damaged outer layers. Jessener's Peel contains compounds **A**, **B** and **C**, whose structures are shown below.



A



B



C

A student is provided with three solutions **P**, **Q** and **R**.

Each of these solutions contains one of the compounds **A**, **B** or **C** dissolved in water.

She performs two chemical tests on each solution **P**, **Q** and **R**. Her results are given in the table below.

test	P	Q	R
addition of neutral iron(III) chloride solution	purple solution	yellow-brown solution	purple solution
addition of sodium carbonate solution	no reaction	fizzing	fizzing

- (i) Identify which compound, **A**, **B** or **C**, is present in each of the solutions **P**, **Q** and **R**.

P contains

Q contains

R contains

[1]

Name:

(ii) Give a reason for each of your answers in (i).

P

.....

.....

Q

.....

.....

R

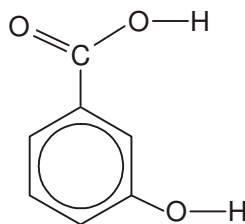
.....

.....

[3]

[Total 4 marks]

5. An organic compound found in soil is 3-hydroxybenzoic acid.



3-hydroxybenzoic acid

(i) What name is given to a hydroxyl group attached to a benzene ring?

.....

[1]

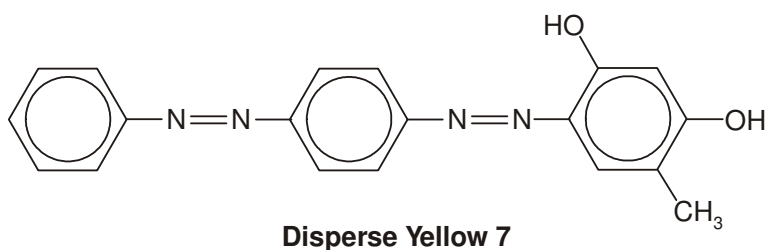
Name:

- (ii) Give the structural formula of the salt formed when 3-hydroxybenzoic acid reacts with sodium hydroxide solution. Show ionic charges.

[2]

[Total 3 marks]

6. The dye *Disperse Yellow 7* dyes polyesters but not cotton.



- (a) (i) Suggest the reagents and conditions that might be used to substitute another CH₃ group into one of the aromatic rings in *Disperse Yellow 7*.

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

[3]

- (ii) Explain why this is described as a *substitution* reaction.

.....
.....

[2]

Name:

- (iii) Circle a word in the list below that describes the mechanism of this substitution reaction.

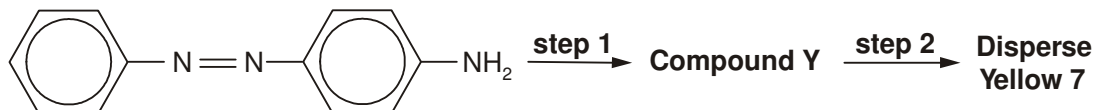
electrophilic

radical

nucleophilic

[1]

- (b) Disperse Yellow 7 can be made by the following route.



- (i) In **step 1**, the amine group is reacted with cold nitrous acid. Name the **type** of compound that is formed (**compound Y**).

.....

[1]

- (ii) In **step 2**, **compound Y** is *coupled* with another reagent. Draw the structure of this reagent.

[2]

[Total 9 marks]