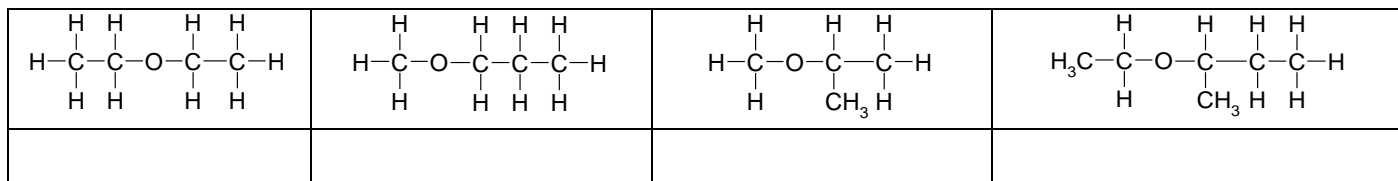


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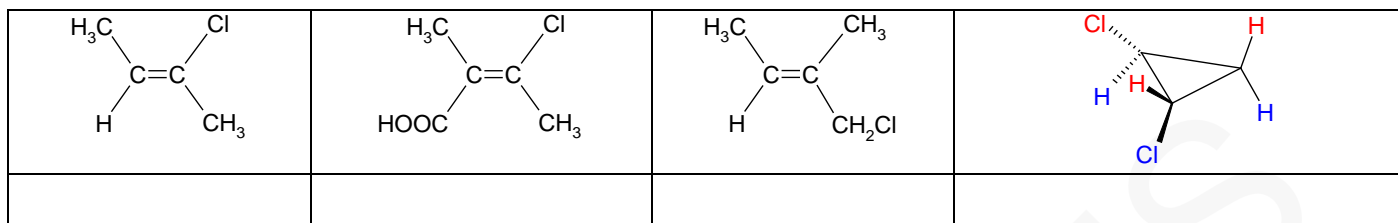
1 Name the following compounds:

[4]



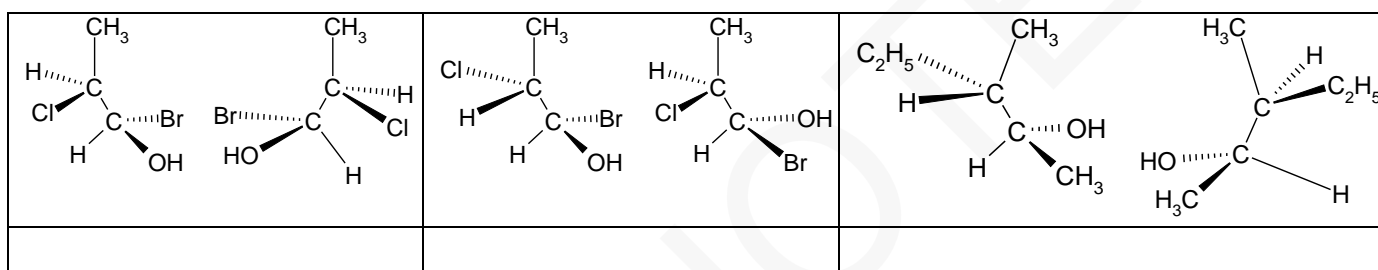
2 Classify the following as *E* or *Z* isomers

[4]



3 Classify each of the following pairs as enantiomers or diastereomers:

[3]



4 (a) State the reagents and conditions for reduction of an aldehyde or ketone

[2]

.....

(b) State the reagents and conditions for reduction of a carboxylic acid

[2]

.....

(c) Give the structural formulae of the organic products formed when the following compounds undergo reduction under appropriate conditions.

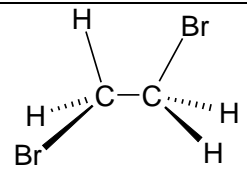
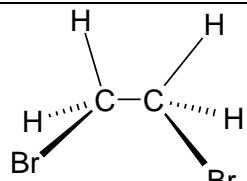
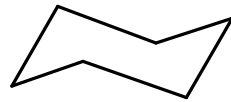
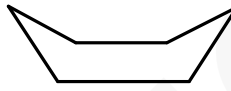
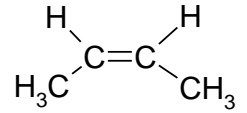
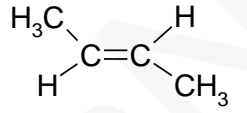
[3]

	product
$\begin{array}{ccc} \text{H} & \text{H} & \text{O} \\   &   &    \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{H} \\   &   & \\ \text{H} & \text{CH}_3 & \end{array}$	
$\begin{array}{ccccccc} \text{H} & \text{H} & \text{O} & \text{H} & \text{H} \\   &   &    &   &   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\   &   & &   &   \\ \text{H} & \text{CH}_3 & & \text{H} & \text{H} \end{array}$	
$\begin{array}{cccc} \text{H} & \text{OH} & \text{H} & \text{O} \\   &   &   &    \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\   &   &   & \diagdown \\ \text{H} & \text{H} & \text{H} & \text{O}-\text{H} \end{array}$	

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- 5 Describe using chemical equations and giving essential conditions how nitrobenzene can be converted to phenylamine. [4]

- 6 Classify each of the following pairs as conformational or configurational isomers:

- 7 (a) Draw clear diagrams showing the enantiomers of 2-chlorobutane. [2]

- (b) Using one of the enantiomers from part a describe the  $S_N2$  mechanism of 2-chlorobutane with sodium hydroxide solution. Clearly show the stereochemistry of the molecules. [4]

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- (c) 2-chlorobutane can also undergo an  $S_N1$  reaction with sodium hydroxide solution. Explain why this reaction is described as *non-stereospecific*. [2]
- .....
- .....

- (d) Classify each of the following solvents as protic/aprotic polar or non-polar. [5]

water	methanol	propanone	tetrachloromethane	$(CH_3)_2SO$

8 But-1-ene undergoes an addition reaction with hydrogen chloride

- (a) (i) draw the full structural formula of but-1-ene. [1]

- (ii) explain whether but-1-ene can form *cis-trans* isomers. [1]
- .....
- .....

- (b) (i) Deduce the **full** structural formula of the two isomers formed when but-1-ene reacts with hydrogen chloride and predict which will be the major product [2]


- (ii) Draw the mechanism of the reaction of but-1-ene with hydrogen chloride to form the major product, using curly arrows to represent the movement of electron pairs. [3]

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(iii) Explain the formation of a major and a minor product in the reaction.[3]

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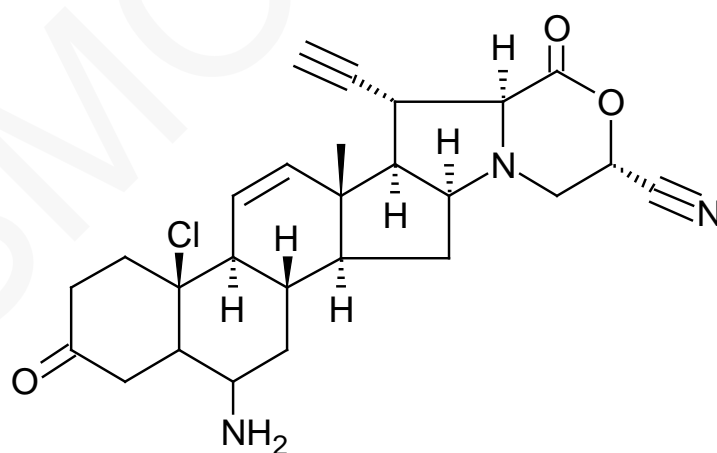
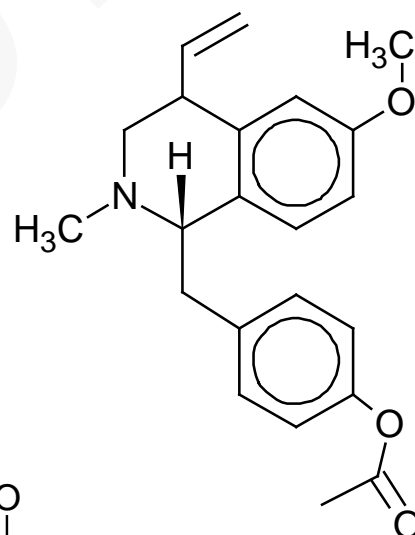
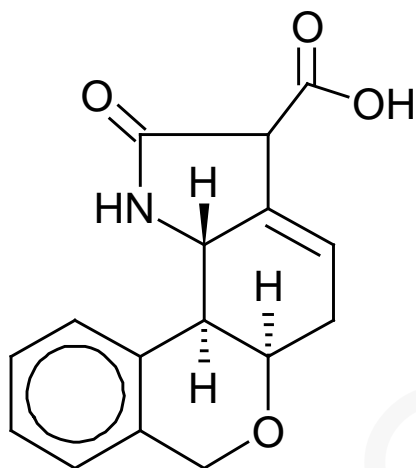
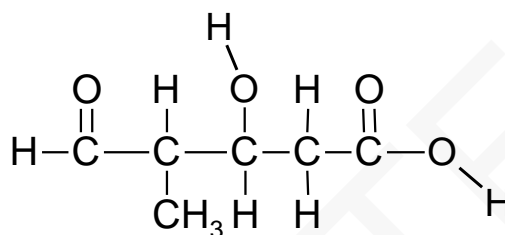
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9 (a) Deduce the molecular formulae of each of the molecules shown [3]

(b) Deduce the names of the functional groups present in each of the following molecules. [12]



(c) Only some H atoms are shown in these diagrams. Explain the significance of the wedge and dashed bonds to certain H atoms. [2]

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