GRADE 12 REVISION
MATTER AND MATERIALS: ORGANIC MOLECULES - MEMORANDUM

ONE-WORD ANSWERS: NOMENCLATURE

1. Alcohols
2. Ketones
3. Ethene
4. Haloalkanes
5. Hydrocarbons
6. Alkynes
7. Methanal
8. Functional group
9. Ethyne
10. Propan-2-one
11. Ketones
12. Alcohols
13. Functional group
14. Alkynes
15. Haloalkane
16. Structural isomers

ONE-WORD ANSWERS: PHYSICAL PROPERTIES

17. Viscosity
18. Vapour pressure
19. Vapour pressure
20. Intermolecular forces
21. Londen forces / Van der Waals forces

ONE-WORD ANSWERS: ORGANIC REACTIONS

22. Hydrohalogenation
23. Esterification
24. Cracking
25. Cracking
26. Hydrohalogenation
27. Dehydrohalogenation
28. Hydration
29. Dehydration
30. Halogenation

MULTIPLE CHOICE QUESTIONS: NOMENCLATURE

1.	D	2.	A	3.	B	4.	C
5.	A	6.	B	7.	B	8.	C
9.	A	10.	B	11.	D	12.	D
13.	B	14.	C	15.	B	16.	C
17.	B	18.	C	19.	C	20.	D
21.	B	22.	D	23.	A	24.	D

MULTIPLE CHOICE QUESTIONS: PHYSICAL PROPERTIES

25.	A	26.	D	27.	A

MULTIPLE CHOICE QUESTIONS: ORGANIC REACTIONS

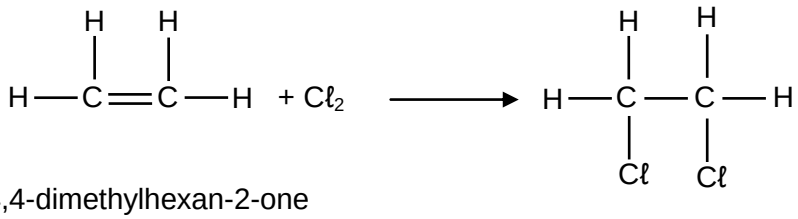
28.	C	29.	A	30.	C	31.	A
32.	C	33.	C	34.	A	35.	C
36.	B	37.	B	38.	B		

STRUCTURED QUESTIONS: NOMENCLATURE

QUESTION 1

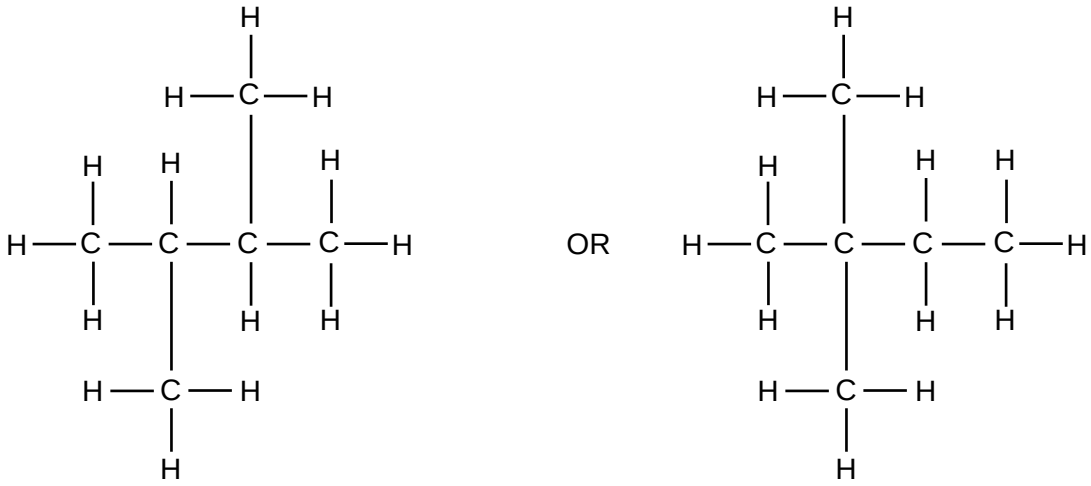
1.1 Alkenes

1.2



1.3 4,4-dimethylhexan-2-one

1.4



QUESTION 2

2.1

2.1.1 A

2.1.2 D & F

2.1.3 D

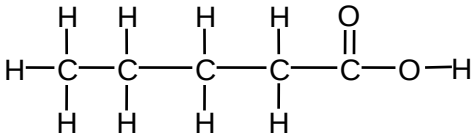
2.1.4 E

2.1.5 B

2.2

2.2.1 2-methylbut-1-ene

2.2.2



2.3

2.3.1 Pleasant odour

2.3.2 Ethanol

2.3.3 Ethyl propanoate

QUESTION 3

3.1

3.1.1 D

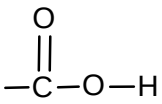
3.1.2 C

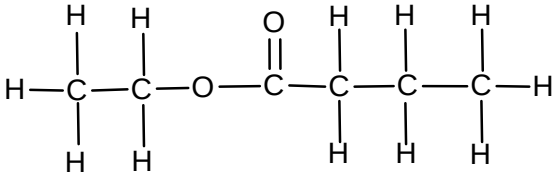
3.2

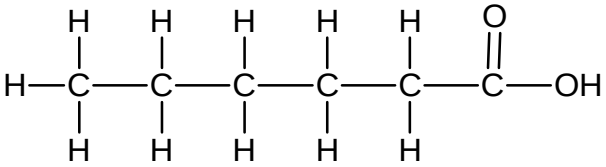
3.2.1 4-methylpentanal

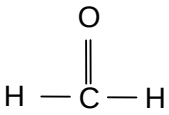
3.2.2 prop-1-yne

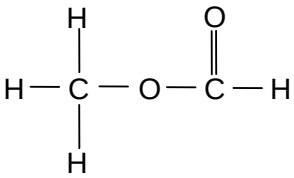
3.3 H_2O / water
CO_2 / carbon dioxide

3.4
3.4.1 

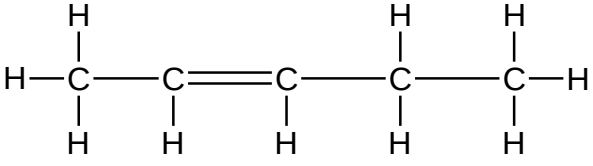
3.4.2 Esters
3.4.3 Butanoic acid
3.4.4 

QUESTION 4
4.1 Alkanes
4.2 2,4-dimethylhexane
4.3 4-fluoro-3-methylcyclopentene
4.4 4-methylpent-2-yne OR 4-methyl-2-pentyne
4.5 

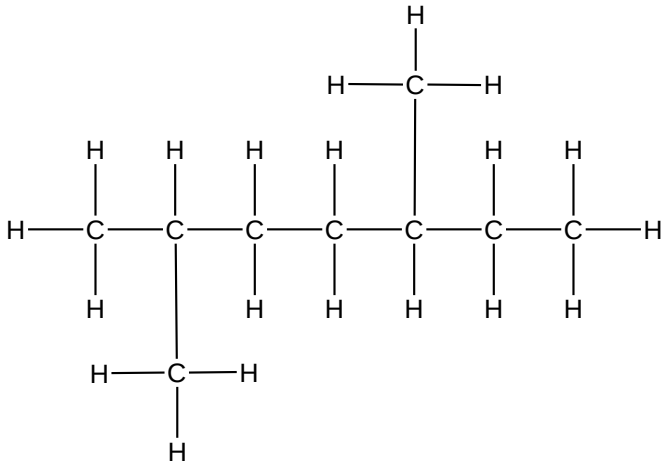
QUESTION 5
5.1
5.1.1 A
5.1.2 D
5.2
5.2.1 1-bromo-2-methylpropane
5.2.2 2,4-dimethylhexane
5.3 

5.4 Ethanoic acid
5.5 

QUESTION 6
6.1
6.1.1 E 6.1.2 A 6.1.3 A
6.1.4 F 6.1.5 A OR D 6.1.6 C

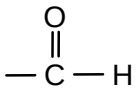
6.2
6.2.1 

6.2.2



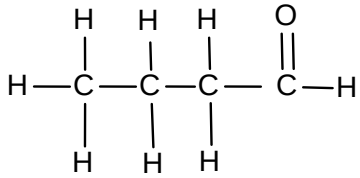
6.3
6.3.1 Carbonyl (group)
6.3.2 2-methylpropan-1-ol OR 2-methyl-1-propanol

QUESTION 7
7.1
7.1.1

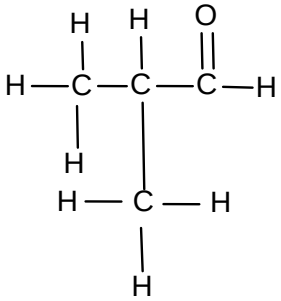


7.1.2 Ketones

7.1.3



OR



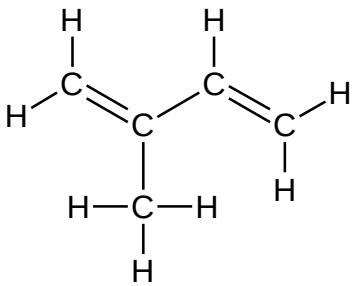
7.1.4 1-bromo-2-chlorocyclopentane
7.2 Tertiary

QUESTION 8

8.1	Ketones	8.2	Butane	8.3	Haloalkane
8.4	Aldehydes	8.5	Haloalkane	8.6	Hydrolysis
8.7	But-1-ene	8.8	Ethyne	8.9	Hydrohalogenation

QUESTION 9
9.1 Unsaturated
Not all C-C bonds are single bonds.
OR
Contains C-C double bonds.

9.2



9.3 Any TWO:
- Destruction of indigenous forests
- Global warming (due to destruction of forests)
- Rubber is not biodegradable – pollutes environment
- Pollutes environment when improperly disposed of / Burning of rubber releases toxic gases (into environment)

9.4 Any TWO:
- Job creation
- Used to make tyres
- Used to make gloves for medical industry
- Any example of useful items produced from rubber

QUESTION 10

10.1

10.1.1 A & E

10.1.2 D

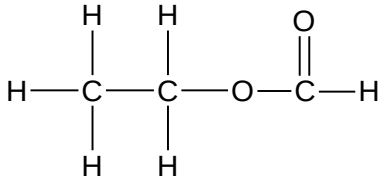
10.2

10.2.1 1-bromo-2-methylpropane

10.2.2 2,4-dimethylhexane

10.3

10.3.1



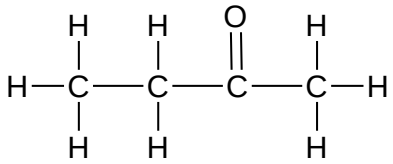
10.3.2 Esters

10.3.3 Ethanol

10.4

10.4.1 Aldehydes

10.4.2



QUESTION 11

11.1

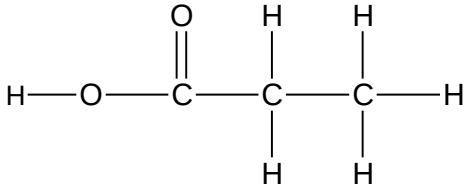
11.1.1 ethyl propanoate

11.1.2 1-ethyl-2-methylcyclohexane

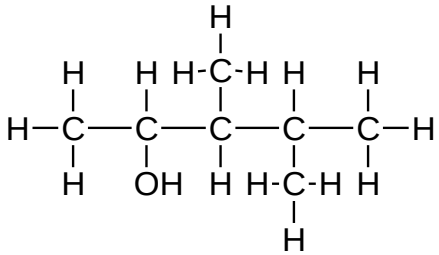
11.1.3 penta-1,4-diene
OR
1,4-pentadiene

11.2

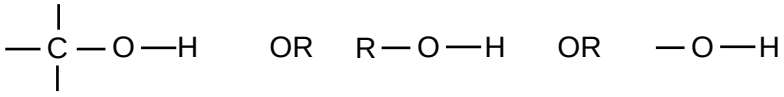
11.2.1

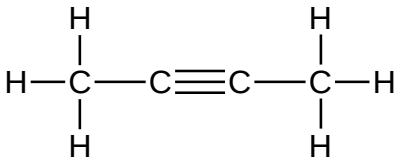
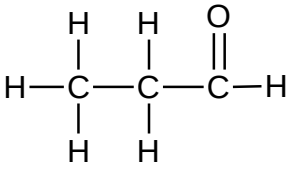
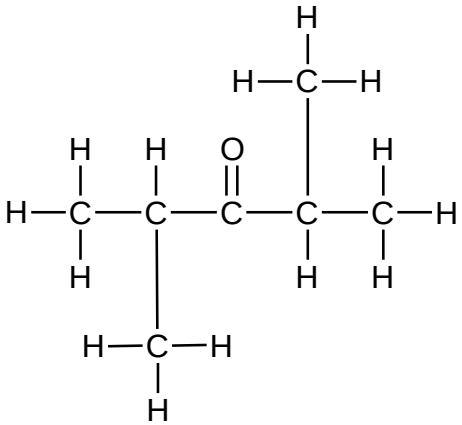


11.2.2



11.3
11.3.1 Ketones
11.3.2 Esters
11.4 Carbonyl (group)
11.5 E & F
Molecules consist of hydrogen and carbon atoms only.
11.6 F
Contains multiple (double and triple) bonds.
OR
All the carbon atoms are not bonded to the maximum number of (hydrogen) atoms.
11.7 $C_nH_{2n+1}COOH$

QUESTION 12
12.1
12.1.1 Alkenes
12.1.2 Carboxylic acids
12.2 A & C
Molecules consist of hydrogen and carbon atoms only
12.3 A & C
Contains multiple (double and triple) bonds.
12.4
12.4.1 1,2-dibromocyclohexane
12.4.1 Butanoic acid
12.4.2 Ethyl hexanoate
12.5
12.5.1 

12.5.2 
12.5.3 
12.5.4 
12.6 F & J
Same molecular formulae, different structural formulae.
12.7 C_nH_{2n-2}

STRUCTURED QUESTIONS: PHYSICAL PROPERTIES

QUESTION 13

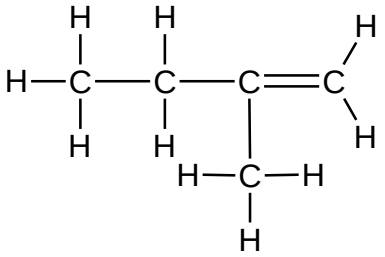
13.1

13.1.1 (An organic) compound/substance/ molecule which contains/consists of carbon and hydrogen (atoms only).

13.1.2 C_5H_{12}

13.1.3 Any TWO:
Speeds up the reaction/Increase reaction rate.
Reaction runs at a lower temperature/energy.
Cost is reduced/better safety.

13.1.4



13.1.5 Addition/hydrogenation

13.2

13.2.1 Compounds have the same molecular formula, but different structural formulae.

13.2.2 From A to C:
Boiling points decrease from A to C.
Branching increases./Molecules become more compact./Molecules become more spherical./Decrease in surface area (over which the intermolecular forces act.)
Decrease in (strength) of intermolecular forces.
Less energy needed to overcome intermolecular forces.
OR
From C to A:
Boiling points increase from C to A.
Less branching./Molecules become less compact./Molecules become less spherical./Increase in surface area (over which intermolecular forces act.)
Increase in (strength) of intermolecular forces.
More energy needed to overcome intermolecular forces.

13.2.3 (Branched chains have weaker intermolecular forces) therefore they (burn) react faster.
OR
Branched chains have higher vapour pressures.

QUESTION 14

14.1

14.1.1 Fuels

14.1.2 C_nH_{2n+2}

14.2

14.2.1 Boiling point

14.2.2 Chain length/Molecular size/Molecular mass

14.2.3 Criteria for conclusion:
- Dependent and independent variables correctly identified.
- Relationship between the independent and dependent variables correctly stated.

Examples:
• Boiling point increases with increase in chain length/molecular size/molecular mass.
• Boiling point decreases with decrease in chain length/ molecular size/molecular mass.
• Boiling point is proportional to chain length/molecular size/molecular mass.

14.3 Pentane
OR
Hexane

14.4 $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

14.5 Lower than

- Structure:
  Isomers have more branching/ more compact or spherical molecules / smaller surface areas over which the intermolecular forces act.
- Intermolecular forces:
  Weaker intermolecular forces/less intermolecular forces
- Energy:
  Less energy needed to overcome intermolecular forces.

QUESTION 15

15.1 Gaseous (phase)
Boiling point lower than room temperature./lower than 298 K.

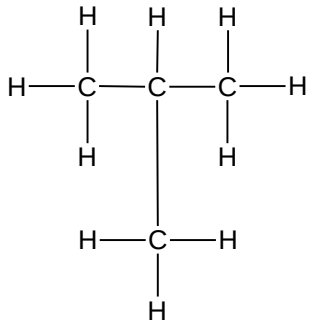
15.2 Boiling point increases with molecular size.
Van der Waals forces / intermolecular forces increase with molecular size.
More energy needed to break intermolecular forces.

15.3 Alcohols have a higher boiling point than corresponding alkanes.
Hydrogen bonds (together with Van der Waals forces) between alcohol molecules are stronger than Van der Waals forces between alkane molecules.
More energy needed to break (hydrogen) bonds between alcohol molecules.
OR
Alkanes have a lower boiling point than the corresponding alcohols.
The Van der Waals forces between alkane molecules are weaker than the hydrogen bonds (together with Van der Waals forces) between alcohol molecules.
Less energy needed to break forces between alkane molecules.

15.4

15.4.1 Compounds that have the same molecular formula but different structural formulae.

15.4.2



QUESTION 16

16.1 (Structural) isomers

16.2

16.2.1 Boiling point

16.2.2 Branching

16.2.3 Number of C atoms
OR Molecular or molar mass or molecular formula / C_5H_{12}

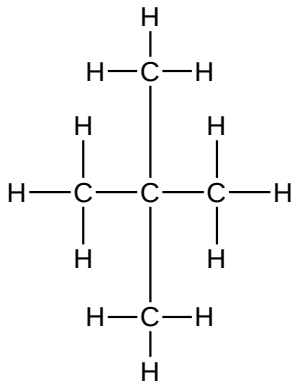
16.3 Saturated
No carbon-carbon double (or triple) bonds.
OR
Only single bonds between C atoms.
OR
No multiple bonds.

16.4

16.4.1 A

16.4.2 Pentane

16.5
16.5.1

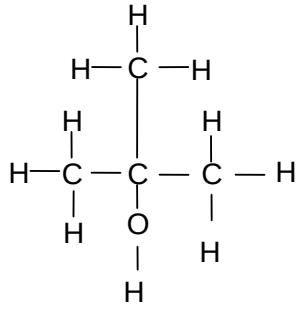


16.5.2 Most branching / Molecules most compact or spherical / Smallest surface area (over which intermolecular forces act.).
Least / weakest intermolecular forces.
Least energy needed to overcome intermolecular forces.

16.6 C
Lowest boiling point

QUESTION 17

17.1 D
17.2
17.2.1



17.2.2 D
17.3
17.3.1 Criteria for investigative question:
The dependent and independent variables are stated.
Asks a question about the relationship between dependent and independent variables.
Example:
What is the relationship between viscosity / flow time and chain length / number of C atoms / molecular mass / molecular size / molar mass / surface area / number of electrons / alcohols?

17.3.2 C
Longest flow time

17.3.3 Increase in chain length / molecular mass / molar mass / molecular size / surface area from A to C.
Increase in (strength of) intermolecular / Van der Waals / dispersion / London / forces

17.3.4 C
17.4 D
17.5 The more branched /more compact /more spherical alcohol / E has a smaller surface area (over which the intermolecular forces act).
Decrease in (strength of) intermolecular forces / Van der Waals / dispersion / London /forces reduces resistance to flow (and thus lower viscosity).

QUESTION 18

18.1 Saturated
Contains only carbon-carbon single bonds.
OR
No carbon-carbon double or triple bonds.
OR
Each carbon bonded to four other atoms.

18.2 Aldehydes

18.3

18.3.1 Ethanal

18.3.2 Ethanol

18.4 Relative molecular mass/molecular size

18.5

18.5.1 Boiling point

18.5.2 Type of organic compound/type of homologous series/type of functional group

18.6 Between alkane molecules/molecules of compound A/propane molecules are weak Van der Waals forces/intermolecular forces.
Between alcohol molecules/molecules of compound C/ethanol molecules are (weak Van der Waals forces as well as) strong hydrogen bonds.
More energy needed to overcome intermolecular forces between alcohol molecules/ethanol molecules/molecules of compound C.

18.7 Compound B
Lower boiling point/weaker intermolecular forces

QUESTION 19

19.1

19.1.1 Gas

19.1.2 Lower than
Isomers of A:
More branching/Molecules more compact./Smaller surface area (over which the intermolecular forces act.)
Weaker/less intermolecular forces.
Less energy needed to overcome intermolecular forces.
OR
Lower than
A is less branched./has less compact molecules./has larger surface area (over which intermolecular forces act).
Stronger/more intermolecular forces.
More energy needed to overcome intermolecular forces.

19.1.3 $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$

19.1.4 Compound B contains a carbonyl group/O atom (bonded to C atom) and is a polar (molecule)/dipole.

19.2

19.2.1 Compound D: Two sites for hydrogen bonding/forms dimers
Compound C: One site for hydrogen bonding
Both compounds have hydrogen bonding (between molecules).
Compound D has two sites for/stronger/more hydrogen bonding.

19.2.2 (Compound) C
Lowest boiling point

QUESTION 20

20.1 The temperature at which the vapour pressure of a liquid is equal to the external (atmospheric) pressure.

20.2 A (propane)

20.3 Butane

20.4
20.4.1 Compounds with the same molecular formula, but different structural formulae.
20.4.2 Compound C / 2-methylbutane is more branched/more compact/more spherical/has a shorter chain/has a smaller surface area.
Weaker intermolecular forces/ Van der Waals forces/dispersion forces/London forces.
Less energy needed to overcome intermolecular forces.
OR
Compound B / Pentane is less branched/has a longer chain/less compact/less spherical/has a larger surface area.
Stronger intermolecular forces / Van der Waals forces.
More energy needed to overcome intermolecular forces.
20.5 The Van der Waals forces in B (pentane) are weaker than the hydrogen bonds in D (pentan-1-ol) and requires less energy to break.

QUESTION 21
21.1 Higher than
21.2 Between alcohol molecules are strong hydrogen bonds.
Between alkane molecules are weak Van der Waals forces/London forces/ dispersion forces/intermolecular forces.
More energy needed to overcome intermolecular forces in alcohols.
OR less energy needed to overcome intermolecular forces in alkanes.
21.3 Methanol
21.4 • Shortest chain length. / Smallest surface area. / Least C atoms / Smallest molecule / Smallest molecular mass.
• Weakest (strength of) intermolecular forces / Van der Waals forces / dispersion forces / London forces.
• Least energy needed to overcome intermolecular forces.
21.5 Butan-1-ol

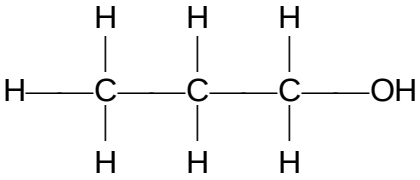
QUESTION 22
22.1 Hydroxy (group) 4.2
22.2
22.2.1 Boiling point
22.2.2 Chain length
22.3 Criteria for conclusion:
Dependent and independent variables correctly identified.
Correct relationship between dependent and independent variables
Examples:
- The longer the chain length the higher the boiling point.
  Boiling point increases with increase in chain length.
- Boiling point decreases as chain length decreases.

22.4 Any value between 96 °C and 138 °C (actual: 117 °C)
22.5
22.5.1 (Alcohol) D
22.5.2 (Alcohol) A
22.6 Butan-1-ol
- Hidroxy group (OH-) present.
- H-bonding / strong intermolecular forces present.
- More energy needed to overcome intermolecular forces.

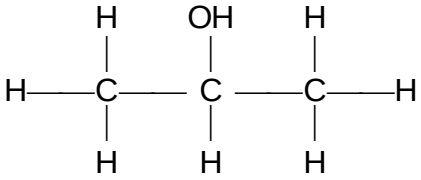
22.7 Ethanol

QUESTION 23
23.1 Alcohols are flammable.

23.2
23.2.1



propan-1-ol



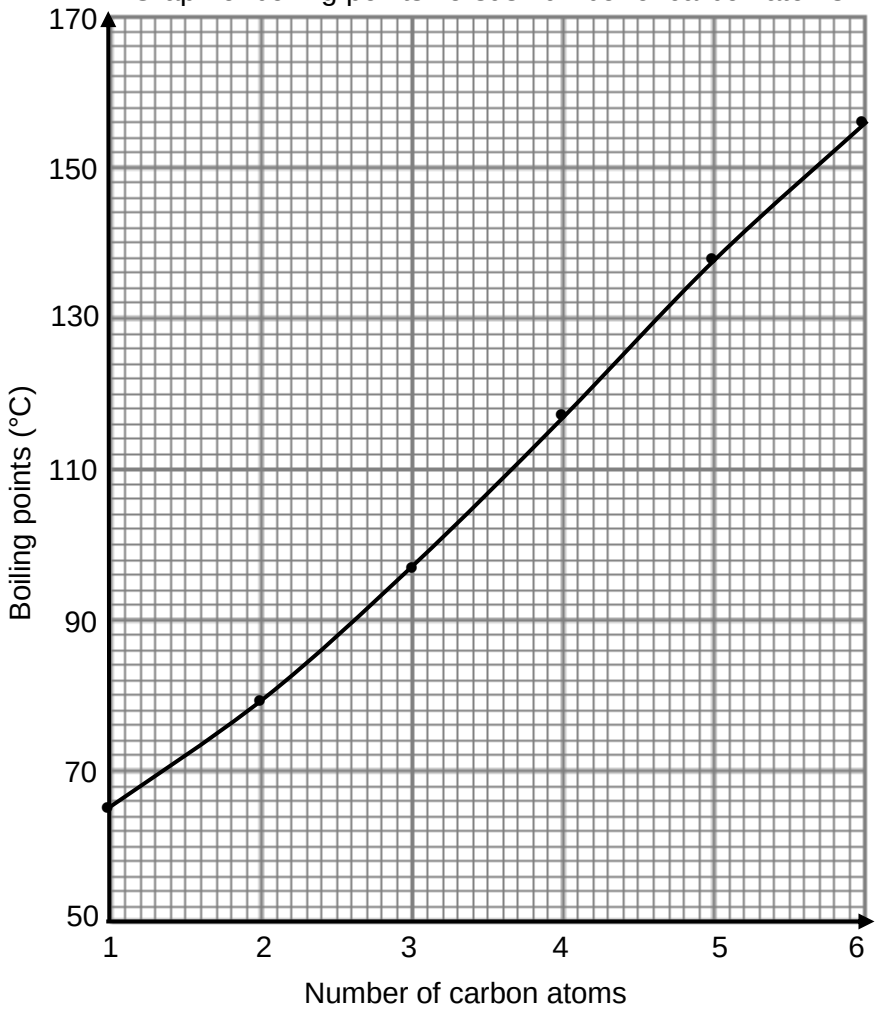
propan-2-ol

23.2.2 propan-1-ol
23.2.3 The position of the OH-group in the chain will affect the intermolecular forces.
23.3
23.3.1 The boiling point of the alcohols will increase with molecular mass. / The larger the molecular mass of a member of the same homologous series/alcohol, the higher the boiling point.
23.3.2 Don't heat alcohols over an open flame
23.3.3 Measuring cylinder
Thermometer
8 containers e.g. test-tubes/beakers/flasks
Heat source e.g. hot plate/(accept Bunsen burner)
23.3.4 Measure equal volumes of the eight alcohols and transfer it to separate containers.
Heat samples of each compound (in a water bath) until it boils.
Measure the temperature with a thermometer at boiling point.

QUESTION 24

24.1 High energy of combustion. / Combustion releases huge amounts of energy. / Highly exothermic.

24.2 Graph of boiling points versus number of carbon atoms



24.3 Boiling point increases with number of carbon atoms.
24.4 Van der Waals forces between alcohol molecules increase with increase in molecular size
24.5 Hydrogen bonds between alcohol molecules are stronger than Van der Waals forces between molecules of alkanes.
24.6 Petrol has a low boiling point, vapourises easily / is volatile / explosive / flammable / easily combustible / vapours have a higher density than oxygen and when swallowed vapours can cause suffocation.
24.7 Ethanol can be produced by fermentation of plant material e.g. maize and sugar cane.
Alkanes are fossil fuels which are non-renewable.

QUESTION 25

25.1 Alkanes
25.2
25.2.1 2,2-dimethylpropane
25.2.2 Pentane
25.3 Criteria for investigative question:
- The dependent and independent variables are stated.
- Asks a question about the relationship between dependent and independent variables.

Examples:
- What effect does a decrease/increase in branching (of carbon chains) have on boiling points (of compounds A, B and C)?
- What is the relationship between branching (of carbon chains) and boiling point?

25.4
25.4.1 Branching (of carbon chains)
25.4.2 Boiling point
25.5 (Relative) molecular mass / Molar mass
25.6 To make the investigation fair./ For a fair test.
OR
To have only ONE independent variable.
25.7 Criteria for conclusion:
- The dependent and independent variables are stated.
- Answers the investigative question by referring to the relationship between dependent and independent variables.

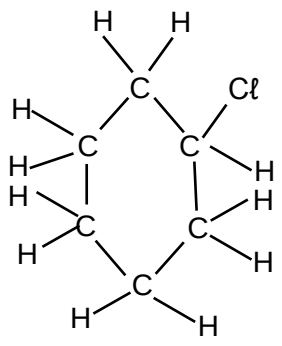
Examples:
Boiling point increases with decrease in branching.
OR
Boiling point decreases with increase in branching.

25.8 From A to C:
- Increase in chain length. / Increase in surface area. / Decrease in branching. / Molecules less spherical. / Molecules less compact.
- Increase in (strength of) intermolecular forces / Van der Waals forces / dispersion forces / London forces.
- More energy needed to overcome intermolecular forces.

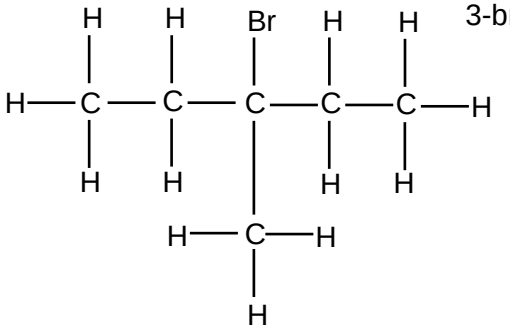
25.9 A

STRUCTURED QUESTIONS: ORGANIC REACTIONS

QUESTION 26

26.1
26.1.1 

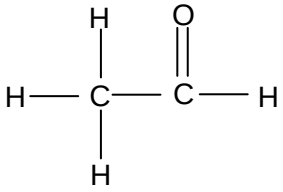
Chlorohexane

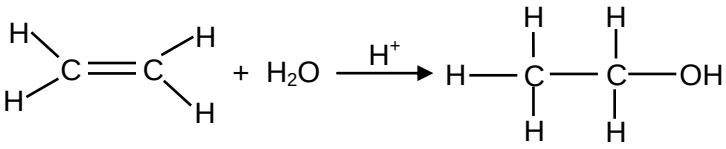
26.1.2  3-bromo 3-methylpentane

26.2.1 Substitution
26.2.2 CH_3-CH_2-CH_2OH
26.3
26.3.1 Dividing longer chains of hydrocarbons into shorter chains.
26.3.2 To obtain a larger percentage usable products from larger fractions crude oil. / Shorter chains (which burn more evenly). / Shorter chains are blended with fuel to enrich fuel.
26.3.3 Boiling point increases with increasing molecular mass.
Van der Waals forces increases with increasing molecular mass.
26.3.4 (a) gas
(b) liquid

QUESTION 27

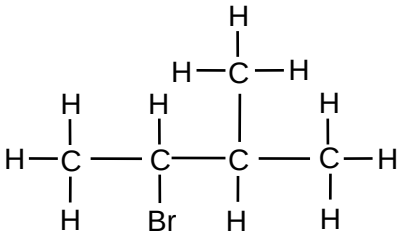
27.1 ethanal – aldehydes
ethanoic acid – carboxylic acids

27.2 

27.3 

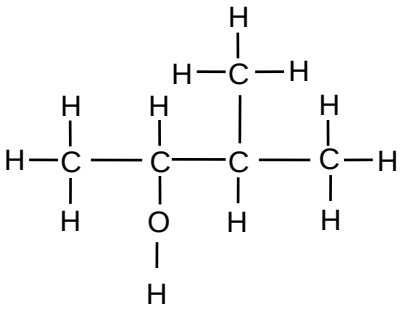
27.4 Any additional intake of alcohol will increase the blood alcohol level which may then lead to either loss of coordination / severe poisoning / damage to organs e.g. the liver.

QUESTION 28

28.1
28.1.1 Haloalkanes
28.1.2 

28.2
28.2.1 Substitution OR Hydrolysis

28.2.2

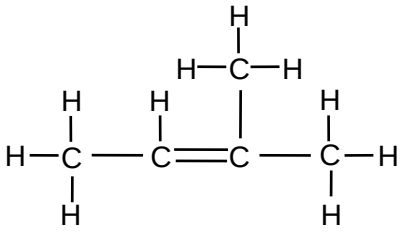


28.3

28.3.1 Heat strongly

28.3.2 Elimination/dehydrohalogenation/dehydrobromination

28.3.3

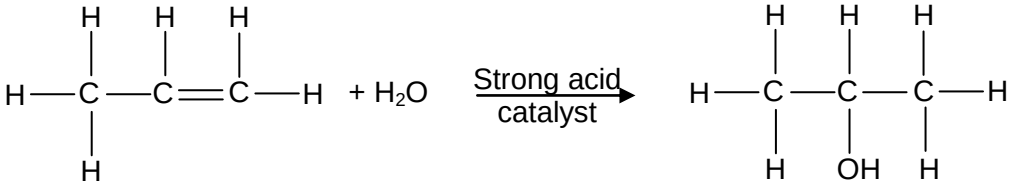


28.4 2-methylbut-2-ene

QUESTION 29

29.1 Addition

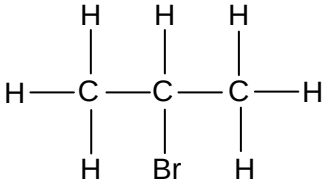
29.2



29.3 H_2O

29.4

29.4.1



29.4.2 Substitution

29.5

29.5.1 Elimination

29.5.2 Substitution

29.5.3 ANY TWO:

Heat (under reflux)

Concentrated strong base/concentrated NaOH(aq)/ concentrated KOH(aq)

Ethanol as solvent /in ethanol

QUESTION 30

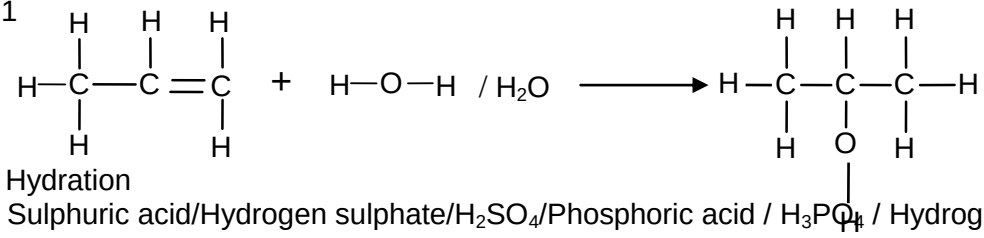
30.1 Prop-1-ene is highly flammable.

30.2 Any ONE:

- Alkenes contain a double carbon – carbon / (C=C) / bond.
- The presence of the pi bond.
- They are unsaturated.
- Contains an sp^2 hybridised C atom.
- All the carbon atoms are not bonded to the max. number of atoms.

30.3

30.9.3.1

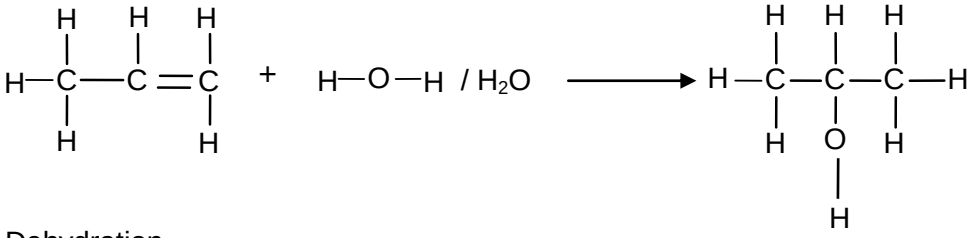


30.3.2 Hydration

30.3.3 Sulphuric acid/Hydrogen sulphate/H_2SO_4/Phosphoric acid / H_3PO_4 / Hydrogen phosphate

30.4 $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

30.5



30.6 Dehydration

QUESTION 31

31.1 Cyclohexene

31.2

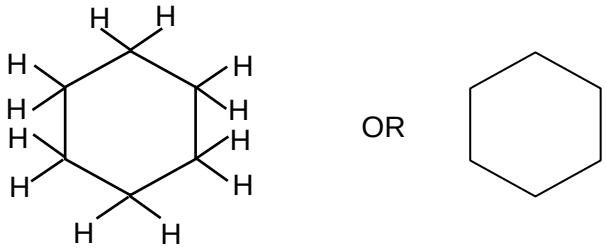
31.2.1 Test tube/beaker etc.

31.2.2 Bromine solution/bromine water

31.2.3 Pour a few cm^3 of the unknown liquid into the test tube.
Add a few cm^3 bromine solution to the liquid in the test tube.

31.2.4 The bromine will discolour immediately/fast/without additional energy.
An addition reaction (that is fast) took place.
The compound is unsaturated – only unsaturated compounds undergo addition reactions.

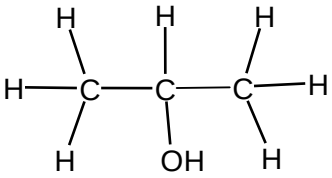
31.3



OR

QUESTION 32

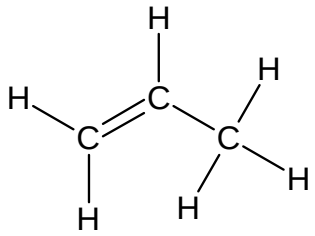
32.1



32.2 Propan-2-ol
(Branched molecules) have a smaller surface area / is more compact / is more spherical
Smaller area over which intermolecular forces/Van Der Waals forces can act - total force exerted between molecules is thus smaller.
Less energy needed to break intermolecular forces
OR
Propan-1-ol molecules can make close contact with each other over a much larger surface area / less spherical / less compact.
Intermolecular forces/Van Der Waals forces can act over a bigger surface (area) - total force exerted between two molecules is thus greater.
More energy needed to break intermolecular forces

32.3 Dehydration

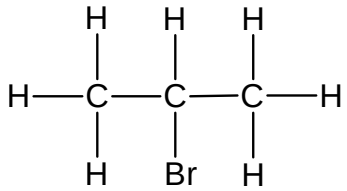
32.4



Prop-1-ene/1-propene

32.5

32.5.1



32.5.2 Haloalkanes

32.6 Dilute base/NaOH/KOH) OR aqueous base/NaOH/KOH OR NaOH/KOH in water OR NaOH/KOH in H_2O + ethanol
AND
Moderate heat

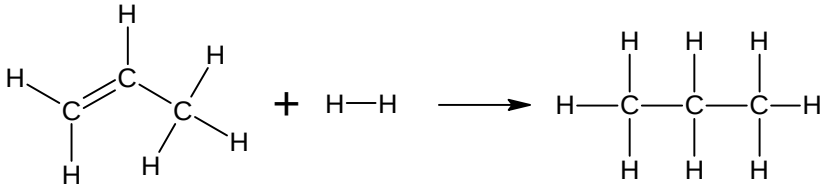
32.7

32.7.1 Dehydrohalogenation **OR** Dehydrobromonation

32.7.2 $CH_3CHBrCH_3 + NaOH \rightarrow CH_3CH = CH_2 + NaBr + H_2O$

32.8 Hydrogenation **OR** Addition

32.9



QUESTION 33

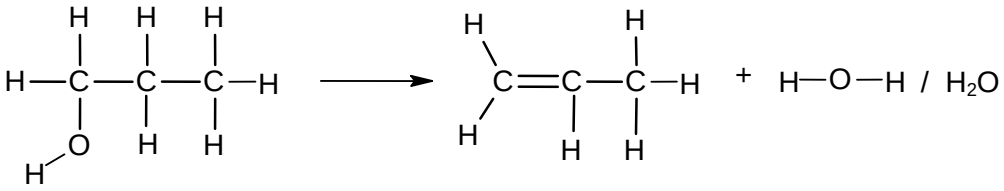
33.1

33.1.1 Addition / hydration

33.1.2 Substitution / Hydrolysis

33.1.3 Elimination / Dehydrohalogenation / Dehydrobromination

33.2

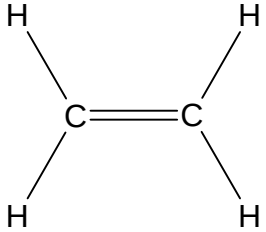


33.3 Propan-2-ol

33.4 Dilute base and mild heat

QUESTION 34

34.1



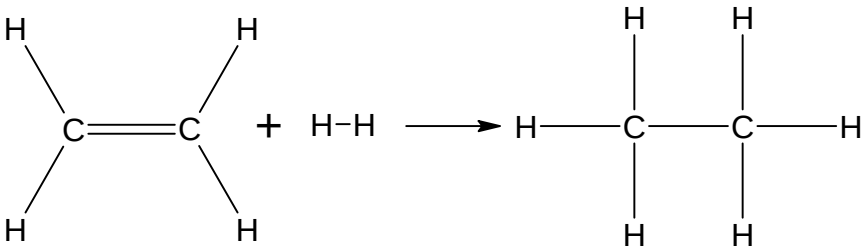
34.2 The ethene liberated by the banana ages the cabbage and lettuce.
OR
Lettuce and cabbage will become spoiled/rotten.
OR
Lettuce and cabbage will change colour.
OR
Lettuce and cabbage will ripen.

34.3

34.3.1 C_nH_{2n}

34.3.2 A: substitution (halogenation/bromination)
B: addition (hydrogenation)
D: addition (hydration)
H: substitution

34.3.3



34.3.4 HBr

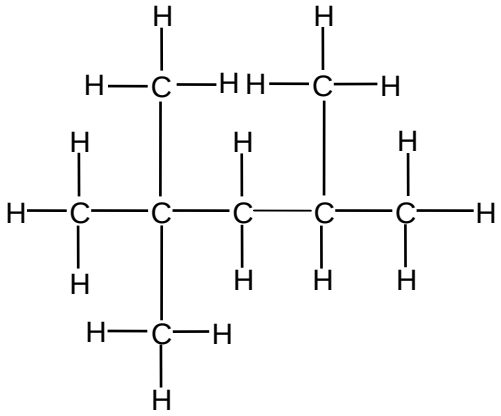
34.3.5 (a) E: concentrated
G: dilute
(b) Dehydrohalogenation

QUESTION 35

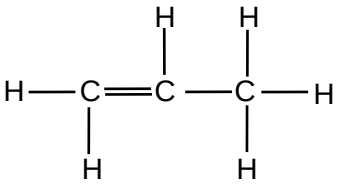
35.1 An (organic) compound that consists of hydrogen and carbon only.

35.2 CO_2 and H_2O

35.3



35.4

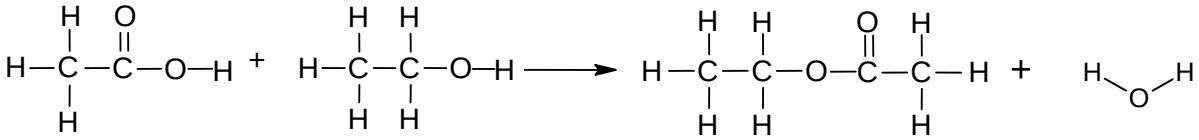


prop-1-ene

QUESTION 36

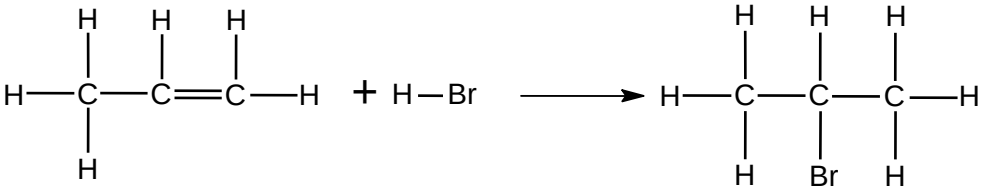
36.1 Alcohols

36.2

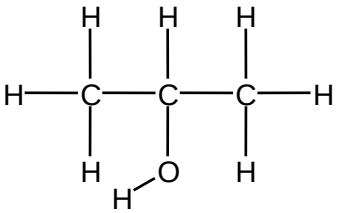


36.3 Catalyst
36.4 Ethanol is flammable.
36.5 Vapours are cooled down and condense / return to the test tube.
OR
Prevents vapours from leaving the test tube.
OR
Functions as a condenser.
OR
Causes mixture to reflux.
36.6 Sodium carbonate solution is a base and will neutralise both acids, preventing them from masking the smell of the ester.
36.7 Vapour pressure **OR** Boiling point **OR** Volatility

QUESTION 37
37.1 Contains a double bond (between two carbon atoms).
OR Carbon not bonded to the maximum number of (H) atoms.
37.2



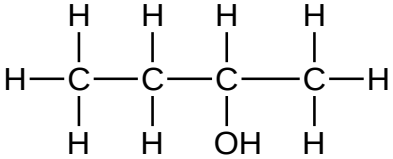
37.3 Addition / hydrohalogenation / hydrobromination
37.4



37.5 Hydrolysis
37.6
37.6.1 Water
37.6.2 H_3PO_4 / H_2SO_4 / HCℓ / HBr
37.6.3 Addition / hydration
37.7
37.7.1 prop-1-ene
37.7.2 Dehydrohalogenation OR Elimination

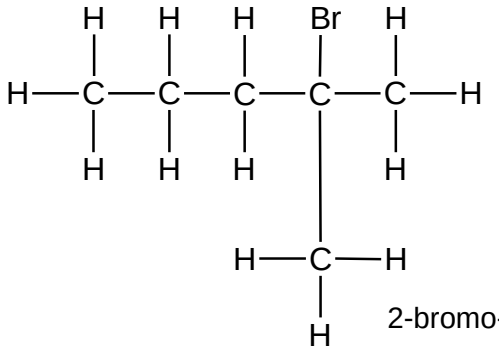
QUESTION 38
38.1 III - elimination/dehydration
38.2 I – hydration
II – hydrohalogenation

38.3



butan–2–ol / 2–butanol

38.4 H_2SO_4 / H_3PO_4 / HBr / HCℓ / HF / HI

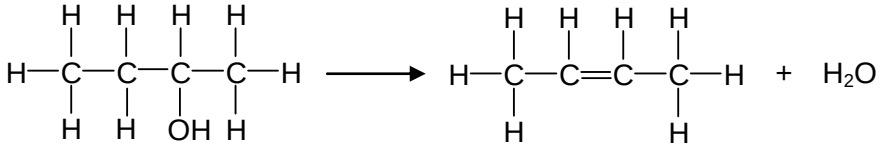
38.5 

2-bromo-2-methylpentane

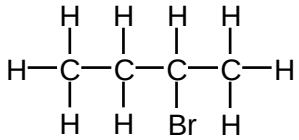
38.6 Alkenes

QUESTION 39

39.1 Elimination
39.2 Alkenes
39.3 Addition/hydrohalogenation/hydrobromination

39.4 

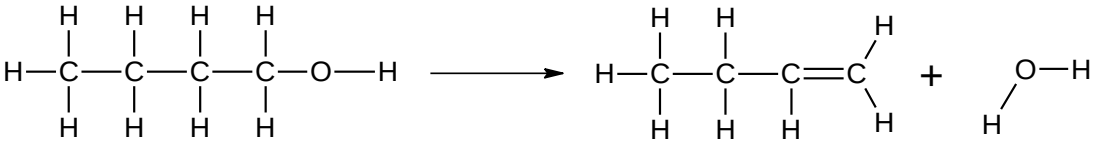
39.5 Q
The major product is the one in which the H-atom is removed from the least substituted C-atom (the C-atom with the least number of hydrogen atoms)/Die hoofproduk is die een waarin die H-atoom verwyder word vanaf die minste gesubstitueerde C-atoom (die C-atoom wat die minste H-atome bevat).

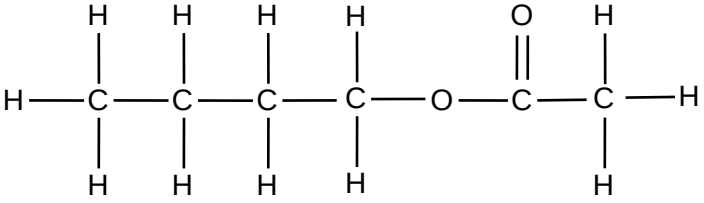
39.6 

2-bromobutane

39.7 Substitution

QUESTION 40

40.1 Primary
40.2
40.2.1 Elimination/dehydration
40.2.2 

40.3
40.3.1 Esterification/(Acid catalysed) condensation
40.3.2 

40.4
40.4.1 Substitution
40.4.2 1-bromobutane

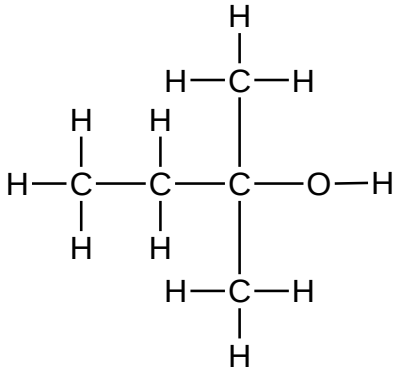
QUESTION 41

41.1

41.1.1 Elimination / dehydrohalogenation / dehydrobromination

41.1.2 Heat
Concentrated sodium hydroxide (NaOH)/Concentrated potassium hydroxide (KOH)/Concentrated strong base
OR sodium hydroxide (NaOH)/potassium hydroxide (KOH)/strong base dissolved in ethanol/alcohol
OR
Hot ethanolic sodium hydroxide/potassium hydroxide/KOH/NaOH

41.1.3



41.1.4 H_2O/water

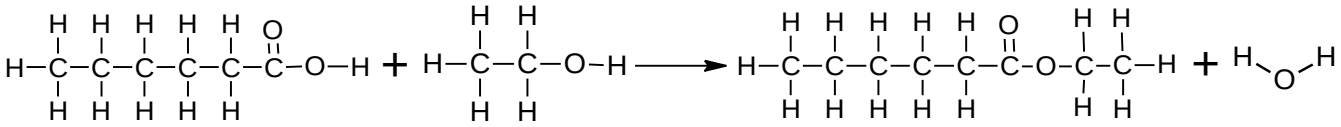
41.1.5 Addition/Hydration

41.2

41.2.1 Ethanol

41.2.2 Catalyst

41.2.3



41.2.4 Alcohols are flammable/volatile/catch fire easily.

41.2.5 (Food) flavourant

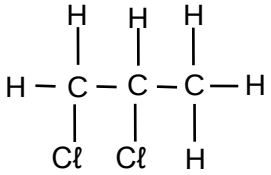
QUESTION 42

42.1

42.1.1 It contains a double bond/C = C) between two carbon atoms in its hydrocarbon chain.
OR
All carbon atoms not bonded to the maximum number of atoms /four atoms.

42.1.2 (a) Addition
(b) Substitution

42.1.3



42.1.4 Heat / sunlight / ultraviolet light/ hf

42.1.5 Butane

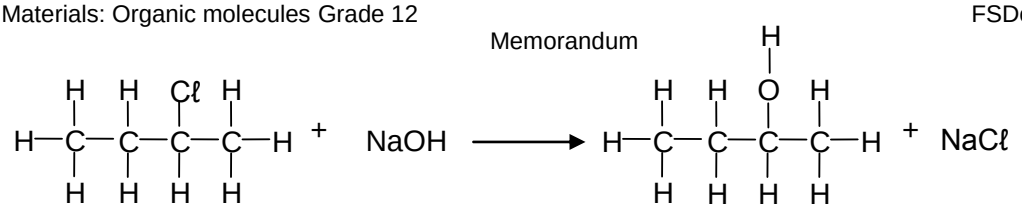
42.1.6 Hydrogen chloride / HCℓ

42.2

42.2.1 Elimination

42.2.2 But-2-ene

Memorandum

42.2.3 

42.2.4 Hydrolysis

42.3

42.3.1 ANY ONE:

Diseases like malaria are contained.
Provide food security through healthy crops.

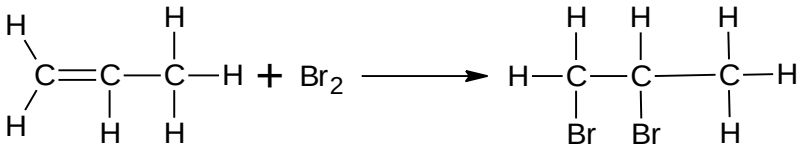
42.3.2 ANY ONE:

- Contaminates fruit and vegetables.
  that can lead to illness, e.g. cancer.
- Spraying of crops can result in respiratory problems.
- Inhaling (while spraying) can result in illness.

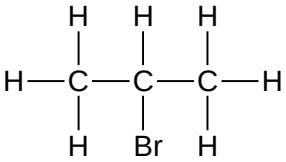
QUESTION 43

43.1

43.1.1 Haloalkanes OR Alkylhalides

43.1.2 

43.1.3 Addition

43.2 

43.3

43.3.1 Dilute (strong) base
Mild heat / heat

43.3.2 Secondary

43.3.3 Hydrolysis

43.4

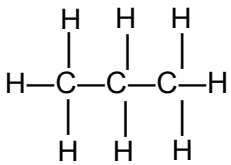
43.4.1 Sulphuric acid / H_2SO_4 / phosphoric acid / H_3PO_4

43.4.2 Dehydration

QUESTION 44

44.1 A: Substitution OR halogenation
B: Substitution
C: Substitution
D: elimination OR dehydrohalogenation

44.2 $CH_3CH_2CH_2Br + H_2O \rightarrow CH_3CH_2CH_2OH + HBr$
OR
$CH_3CH_2CH_2Br + OH^- \rightarrow CH_3CH_2CH_2OH + Br^-$

44.3 

44.4 $CH_3CH_2CH_2Br + KOH \rightarrow CH_2 = CHCH_3 + KBr + H_2O$

44.5 Propane-1-ol OR 1-propanol