Organic Chemistry – 2022 Nov IGCSE Chemistry 0620

1. Nov/2022/Paper_11/No.34

Which formula represents ethanol?

A CH_3CH_3 **B** CH_2CH_2 **C** CH_3CH_2OH **D** CH_3COOH

2. Nov/2022/Paper_11/No.35

Fuel oil and naphtha are two fractions obtained from petroleum.

What are the major uses of these fractions?

	fuel oil	naphtha
A	jet fuel	making chemicals
B	jet fuel	making roads
C	ship fuel	making chemicals
D	ship fuel	making roads

3. Nov/2022/Paper_11/No.36

Which compound is a member of the alkene homologous series?

A C_2H_6 **B** C_4H_{10} **C** C_6H_{12} **D** C_8H_{18}

4. Nov/2022/Paper_11/No.37

Which type of covalent bond is found in both a molecule of methane and a molecule of ethane?

A a double bond between a carbon atom and a hydrogen atom

B a double bond between two carbon atoms

C a single bond between a carbon atom and a hydrogen atom

D a single bond between two carbon atoms

5. Nov/2022/Paper_11/No.38

A large hydrocarbon undergoes cracking.

A smaller hydrocarbon, X, and a gas are the only two products.

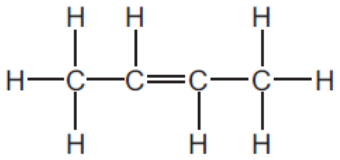
Which row identifies hydrocarbon X and the gas?

	hydrocarbon X	gas
A	saturated	carbon dioxide
B	saturated	hydrogen
C	unsaturated	carbon dioxide
D	unsaturated	hydrogen

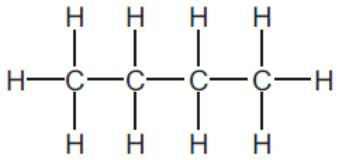
6. Nov/2022/Paper_11/No.39

The structures of two hydrocarbons, M and N, are shown.

M



N



Which statement is correct?

A M is an alkane and decolourises aqueous bromine.

B M is an alkene and decolourises aqueous bromine.

C N is an alkane and decolourises aqueous bromine.

D N is an alkene and decolourises aqueous bromine.

7. Nov/2022/Paper_11/No.40

Some information about four substances, P, Q, R and S, is listed.

P is made by combining many small molecules together.

Molecules of Q are the largest molecules found in petroleum.

R is produced by cracking alkanes.

S is nylon.

Which substances are synthetic polymers?

A P and Q **B** P and S **C** Q and R **D** R and S

8. Nov/2022/Paper_12/No.34

Which statement about both ethane and ethanol is correct?

A They are hydrocarbons.

B They contain oxygen.

C They contain the same number of atoms.

D They produce water when burned.

9. Nov/2022/Paper_12/No.35

Fuel oil and naphtha are two fractions obtained from petroleum.

What are the major uses of these fractions?

	fuel oil	naphtha
A	jet fuel	making chemicals
B	jet fuel	making roads
C	ship fuel	making chemicals
D	ship fuel	making roads

10. Nov/2022/Paper_12/No.36

Which homologous series of compounds reacts to form an addition polymer?

A alcohols

B alkanes

C alkenes

D carboxylic acids

11. Nov/2022/Paper_12/No.37

What is the total number of shared electrons in ethane, C_2H_6?

A 6 **B** 7 **C** 12 **D** 14

12. Nov/2022/Paper_12/No.38

Which process produces ethanol from glucose?

A catalytic addition

B cracking

C fermentation

D polymerisation

13. Nov/2022/Paper_12/No.39

Which statement about unsaturated hydrocarbons is correct?

A $CH_3CH_2CH{=}CHCH_3$ is an unsaturated hydrocarbon.

B Ethene has more hydrogen atoms per molecule than ethane.

C Unsaturated hydrocarbons have double bonds between carbon and hydrogen atoms.

D Unsaturated hydrocarbons turn aqueous bromine from colourless to brown.

14. Nov/2022/Paper_12/No.40

An organic compound X contains two carbon atoms in each molecule.

X reacts with aqueous sodium carbonate to give carbon dioxide.

What is compound X?

A ethanol

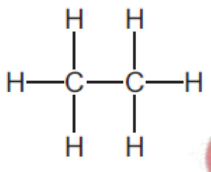
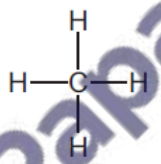
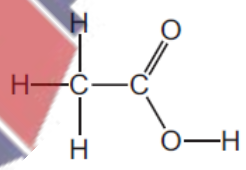
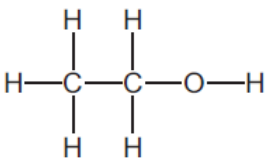
B ethane

C $CH_2=CH_2$

D CH_3COOH

15. Nov/2022/Paper_13/No.34

Which rows show the correct name for the structure shown?

	structure	name
1		ethene
2		methane
3		ethanol
4		ethanoic acid

A 1 and 2 **B** 2, 3 and 4 **C** 2 only **D** 3 and 4 only

16. Nov/2022/Paper_13/No.35

Fuel oil and naphtha are two fractions obtained from petroleum.

What are the major uses of these fractions?

	fuel oil	naphtha
A	jet fuel	making chemicals
B	jet fuel	making roads
C	ship fuel	making chemicals
D	ship fuel	making roads

17. Nov/2022/Paper_13/No.36

Which statement explains why members of the same homologous series have similar chemical properties?

A There are covalent bonds in all the molecules.

B There are only carbon and hydrogen atoms in all the molecules.

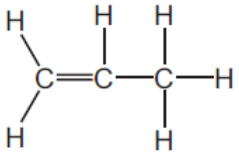
C There is the same number of carbon atoms in all the molecules.

D There is the same functional group in all the molecules.

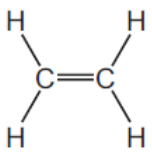
18. Nov/2022/Paper_13/No.37

Which molecules are unsaturated hydrocarbons?

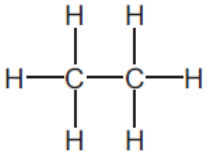
1



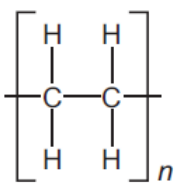
2



3



4



A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

19. Nov/2022/Paper_13/No.38

The results of tests carried out on an organic compound are shown.

test	result
appearance	colourless liquid
effect of adding aqueous bromine	no reaction
effect of applying a lighted splint	burns
effect of adding litmus	turns red

What is the organic compound?

A ethane

B ethanoic acid

C ethanol

D ethene

20. Nov/2022/Paper_13/No.39

Which word equation represents a reaction that occurs with ethanoic acid?

A ethanoic acid + calcium carbonate → salt + carbon dioxide

B ethanoic acid + copper → salt + hydrogen

C ethanoic acid + magnesium → salt + hydrogen

D ethanoic acid + sodium hydroxide → salt + oxygen

21. Nov/2022/Paper_13/No.40

Four substances are listed.

1 carbohydrate

2 ethanol

3 protein

4 sodium chloride

Which substances are natural polymers?

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

22. Nov/2022/Paper_21/No.35

Which statement about structural isomers is correct?

A They have the same structure but different reactivity.

B They have the same general formula but a different number of carbon atoms in their molecules.

C They have the same structure but different relative molecular masses.

D They have different structures but the same numbers of each type of atom.

23. Nov/2022/Paper_21/No.36

Which formula is the same in methanol, ethanol and propanol?

A empirical formula

B general formula

C molecular formula

D structural formula

24. Nov/2022/Paper_21/No.37

Ethene reacts with water under suitable conditions.

Which statement about this reaction is correct?

A The product of this reaction has an M_r of 46.

B The reaction produces two different products.

C The reaction occurs when ethene gas is bubbled into cold water in the presence of an acid catalyst.

D The reaction is a redox reaction.

25. Nov/2022/Paper_21/No.38

Ethanoic acid is made by reacting ethanol with acidified potassium manganate(VII).

Which type of reaction occurs when ethanol reacts with acidified potassium manganate(VII)?

A displacement

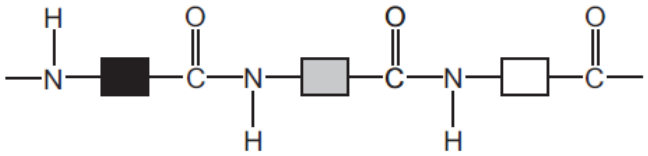
B fermentation

C oxidation

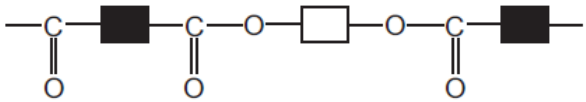
D neutralisation

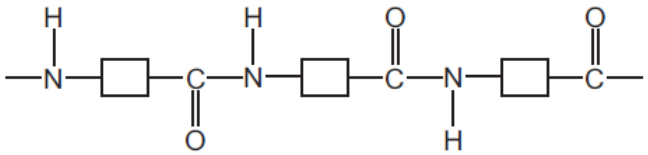
26. Nov/2022/Paper_21/No.39

Which structure represents *Terylene*?

A 

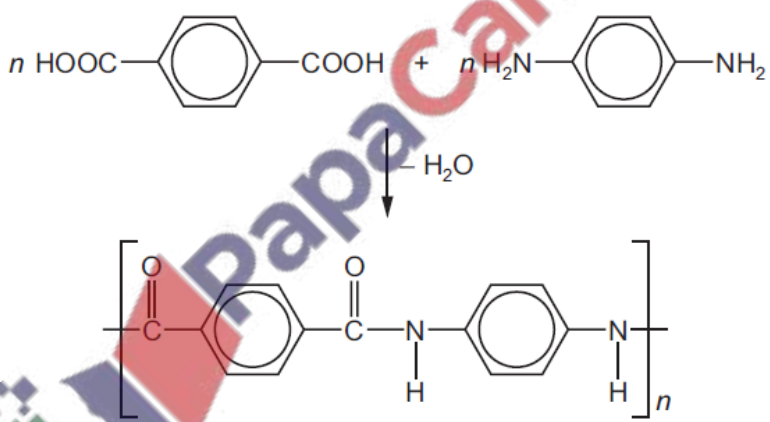
B 

C 

D 

27. Nov/2022/Paper_21/No.40

The equation shows the formation of a polymer called *Kevlar*.



Which row describes *Kevlar*?

	how the polymer is formed	type of polymer
A	addition polymerisation	polyamide
B	addition polymerisation	polyester
C	condensation polymerisation	polyamide
D	condensation polymerisation	polyester

28. Nov/2022/Paper_22/No.34

Which compound has the most $-CH_2-$ groups in one molecule?

A butane

B butanoic acid

C butan-1-ol

D but-1-ene

29. Nov/2022/Paper_22/No.35

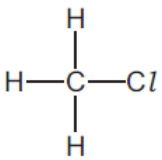
Methane reacts with chlorine in the presence of ultraviolet light.

Which substance is **not** produced in this reaction?

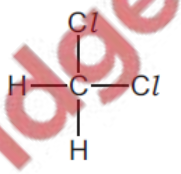
A

B

C



D



30. Nov/2022/Paper_22/No.36

Ethene reacts with both hydrogen and steam.

Which row about these reactions is correct?

	reactant with ethene	type of reaction	catalyst used
A	hydrogen	substitution	phosphoric acid
B	hydrogen	addition	nickel
C	steam	substitution	phosphoric acid
D	steam	addition	nickel

31. Nov/2022/Paper_22/No.37

Which type of reaction occurs when ethanol is converted to ethanoic acid?

A combustion

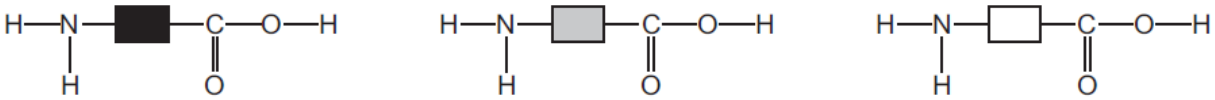
B decomposition

C neutralisation

D oxidation

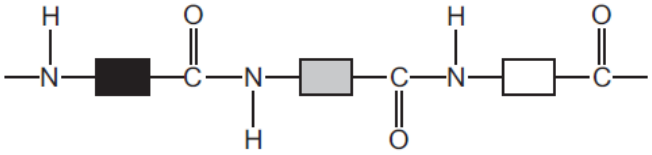
32. Nov/2022/Paper_22/No.38

Hydrolysis of polymer P produces the three compounds shown.

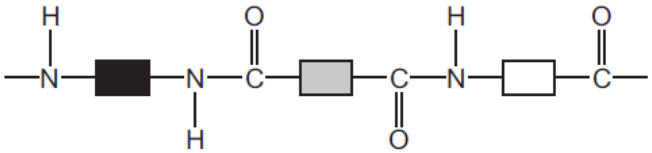


What is the structure of polymer P?

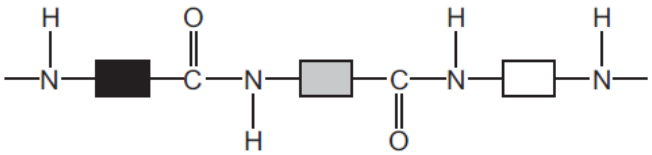
A



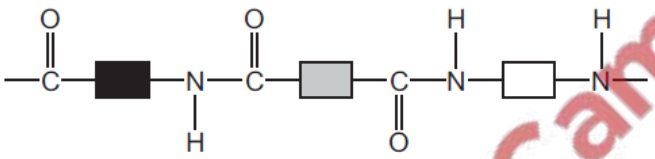
B



C



D



33. Nov/2022/Paper_22/No.39

Which statement about unsaturated hydrocarbons is correct?

A $CH_3CH_2CH{=}CHCH_3$ is an unsaturated hydrocarbon.

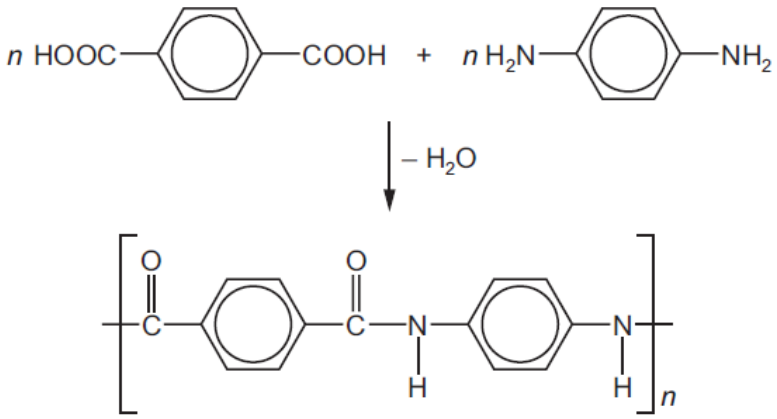
B Ethene has more hydrogen atoms per molecule than ethane.

C Unsaturated hydrocarbons have double bonds between carbon and hydrogen atoms.

D Unsaturated hydrocarbons turn aqueous bromine from colourless to brown.

34. Nov/2022/Paper_22/No.40

The equation shows the formation of a polymer called *Kevlar*.



Which row describes *Kevlar*?

	how the polymer is formed	type of polymer
A	addition polymerisation	polyamide
B	addition polymerisation	polyester
C	condensation polymerisation	polyamide
D	condensation polymerisation	polyester

35. Nov/2022/Paper_23/No.34

Which formula represents ethyl butanoate?

A $CH_3CH_2CH_2COOCH_2CH_3$

B $CH_3COOCH_2CH_2CH_2CH_3$

C $CH_3CH_2CH_2CH_2COOCH_2CH_3$

D $CH_3CH_2COOCH_2CH_2CH_2CH_3$

36. Nov/2022/Paper_23/No.35

Methanol, CH_3OH, is a member of the homologous series of alcohols.

What is the formula of the alcohol in the same homologous series which contains three carbon atoms?

A C_3H_5OH **B** C_3H_6OH **C** C_3H_7OH **D** C_3H_8OH

37. Nov/2022/Paper_23/No.36

Which type of compound reacts with hydrogen in an addition reaction?

A alkanes

B alkenes

C alcohols

D carboxylic acids

38. Nov/2022/Paper_23/No.37

The equation for the reaction between methane and chlorine is shown.

$$CH_4 + 4Cl_2 \rightarrow CCl_4 + 4HCl$$

Which type of reaction does methane undergo?

A substitution

B reduction

C condensation

D addition

39. Nov/2022/Paper_23/No.38

Which functional groups form an amide linkage?

A H_2N- and –COOH

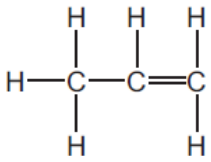
B H_2N- and H_2N-

C –OH and –COOH

D –OH and H_2N-

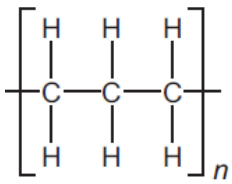
40. Nov/2022/Paper_23/No.39

The structure of propene is shown.

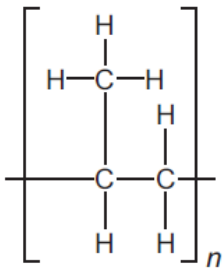


Which diagram represents poly(propene)?

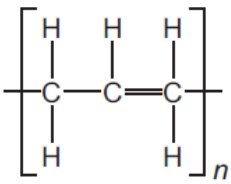
A



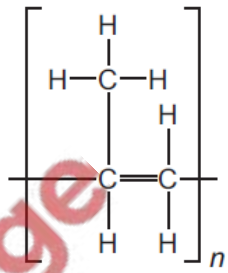
B



C

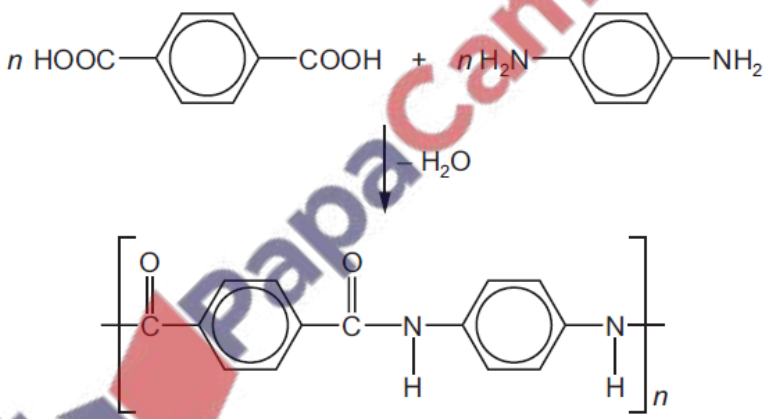


D



41. Nov/2022/Paper_23/No.40

The equation shows the formation of a polymer called *Kevlar*.



Which row describes *Kevlar*?

	how the polymer is formed	type of polymer
A	addition polymerisation	polyamide
B	addition polymerisation	polyester
C	condensation polymerisation	polyamide
D	condensation polymerisation	polyester

42. Nov/2022/Paper_31/No.1(b)

(b) Compound **C** can be produced by cracking the kerosene fraction of petroleum.

(i) State the meaning of the term *cracking*.

.....

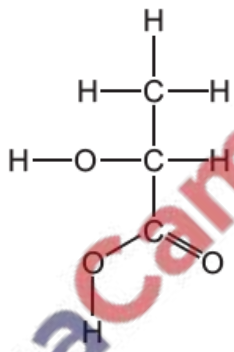
..... [2]

(ii) Complete the chemical equation for the cracking of $C_{13}H_{28}$ to form C_8H_{18} and one other hydrocarbon.

$$C_{13}H_{28} \rightarrow C_8H_{18} + \text{.....} \quad [1]$$

43. Nov/2022/Paper_31/No.7

(a) The structure of lactic acid is shown.



(i) On the structure, draw a circle around the alcohol functional group. [1]

(ii) Deduce the formula of lactic acid to show the number of carbon, hydrogen and oxygen atoms.

..... [1]

(b) Ethanol is an alcohol.

(i) Complete the sentence about ethanol using a word from the list.

ethane **ethene** **methane** **poly(ethene)**

Ethanol is manufactured by fermentation or from ..... . [1]

(ii) State **two** conditions needed for fermentation.

1 .....

2 .....

[2]

(iii) Ethanol is used in drinks and as a fuel.

State one **other** use of ethanol.

..... [1]

(iv) Name **one** physical property that can be used to determine if a sample of ethanol is pure or impure.

..... [1]

(c) Ethanol and methanol are in the same homologous series.

Explain the meaning of the term *homologous series*.

.....

.....

[2]

[Total: 9]

44. Nov/2022/Paper_32/No.1(b, c)

(b) Describe a test for an unsaturated hydrocarbon.

test .....

observations .....

[2]

(c) Name the **two** products formed when compound **A** undergoes complete combustion.

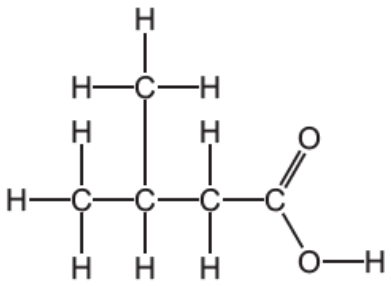
1 .....

2 .....

[2]

45. Nov/2022/Paper_32/No.7

(a) The structure of compound **T** is shown.



(i) Choose from the list the word that describes compound **T**.

alcohol
alkane
alkene
carboxylic acid

..... [1]

(ii) Deduce the formula of compound **T** to show the number of carbon, hydrogen and oxygen atoms.

..... [1]

(b) Compound **T** reacts with ethanol in the presence of a catalyst.

(i) State the meaning of the term *catalyst*.

..... [1]

(ii) Complete the sentence about ethanol using a word from the list.

combustion **cracking** **electrolysis** **fermentation**

Ethanol is manufactured from ethene or by ..... . [1]

(c) Ethene can be produced from ethanol.

(i) Draw the structure of ethene to show all of the atoms and all of the bonds.

[1]

(ii) Ethene is a gas at room temperature.

Use the kinetic particle model to describe the separation of the particles in a gas.

..... [1]

(iii) Ethene can be produced by cracking long-chain hydrocarbons to form short-chain hydrocarbons.

Explain why long-chain hydrocarbons are cracked to form short-chain hydrocarbons.

.....

..... [1]

(iv) Ethene can be polymerised.

State the name of the polymer formed.

..... [1]

(d) *Terylene* is a polymer.

Give **one** use of *Terylene*.

..... [1]

(e) Name a polymer that is a constituent of food.

..... [1]

[Total: 10]

46. Nov/2022/Paper_33/No.1(b)

(b) Describe how aqueous bromine can be used to distinguish between a saturated hydrocarbon and an unsaturated hydrocarbon.

observations with saturated hydrocarbon .....

.....

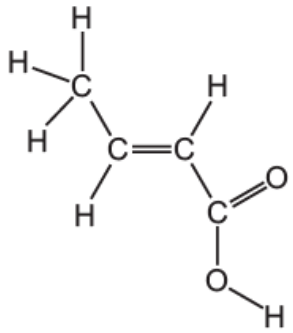
observations with unsaturated hydrocarbon .....

.....

[2]

47. Nov/2022/Paper_33/No.7

(a) The structure of an organic compound, **S**, is shown.



(i) On the structure, draw a circle around the carboxylic acid functional group. [1]

(ii) Deduce the formula of compound **S** to show the number of carbon, hydrogen and oxygen atoms.

..... [1]

(iii) Compound **S** is a solid at room temperature.

Use the kinetic particle model to describe the arrangement of the particles in a solid.

..... [1]

(b) Compound **S** reacts with ethanol.

(i) Draw the structure of ethanol to show all of the atoms and all of the bonds.

[1]

(ii) Ethanol can be manufactured by fermentation.

Describe one **other** method of manufacturing ethanol.

.....

..... [2]

(c) Compound **S** can be polymerised.

(i) State the general name given to the small units that join together to form a polymer.

..... [1]

(ii) Name **one** natural polymer.

..... [1]

(iii) Some plastics are non-biodegradable.

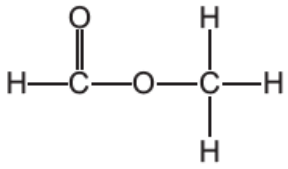
Describe **one** pollution problem caused by non-biodegradable plastics.

..... [1]

[Total: 9]

48. Nov/2022/Paper_41/No.6

Ester **Y** has the structure shown.



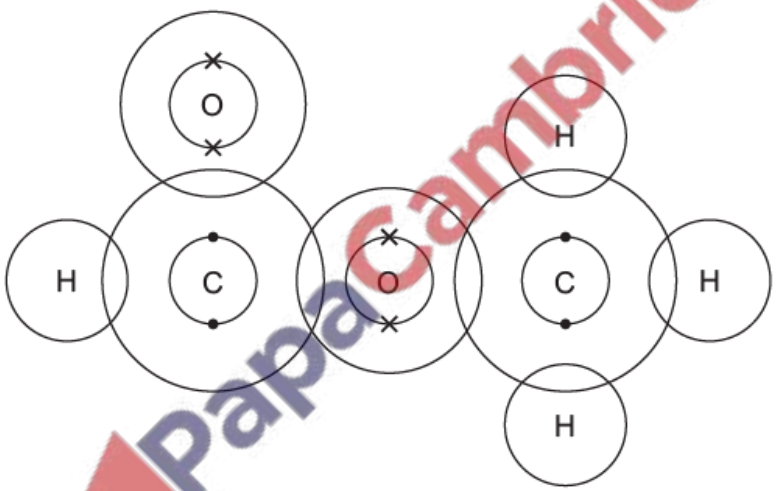
(a) (i) Name ester **Y**.

..... [1]

(ii) Deduce the empirical formula of ester **Y**.

..... [1]

(b) Complete the dot-and-cross diagram to show the arrangement of electrons in a molecule of ester **Y**.



[3]

(c) Ester **Y** can be made by reacting two organic compounds together.

Name the compounds and draw their structures.

Show all of the atoms and all of the bonds.

name .....

structure

name .....

structure

[4]

(d) **(i)** Describe what is meant by the term *structural isomer*.

.....

..... [2]

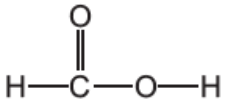
(ii) Name a carboxylic acid which is a structural isomer of ester **Y**.

..... [1]

[Total: 12]

49. Nov/2022/Paper_42/No.6

A carboxylic acid **Y** has the structure shown.



(a) State the general formula of carboxylic acids.

..... [1]

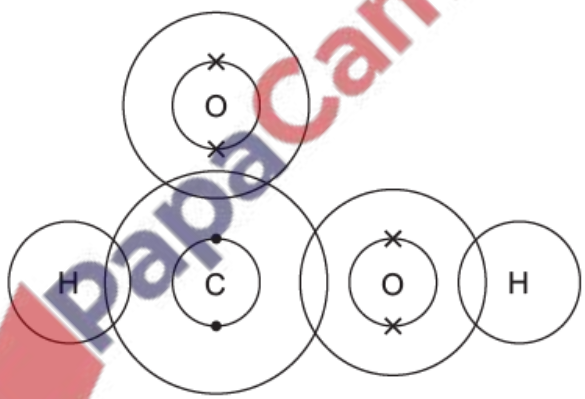
(b) Name carboxylic acid **Y**.

..... [1]

(c) Write the molecular formula of carboxylic acid **Y**.

..... [1]

(d) Complete the dot-and-cross diagram to show the arrangement of electrons in a molecule of carboxylic acid **Y**.



[3]

(e) Carboxylic acid **Y** will react with propan-1-ol, C_3H_7OH, to form ester **Z** and one other product.

(i) Name and draw the structure of ester **Z**.

Show all of the atoms and all of the bonds.

name .....

structure

[3]

(ii) Name the other product formed when carboxylic acid **Y** reacts with propan-1-ol.

..... [1]

(iii) Name:

- an ester which is a structural isomer of ester **Z**

.....

- a carboxylic acid which is a structural isomer of ester **Z**.

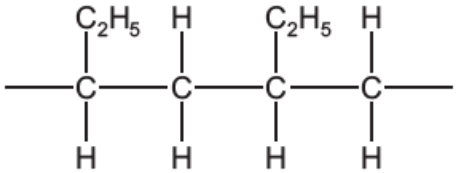
.....

[2]

[Total: 12]

50. Nov/2022/Paper_43/No.6(b_ c)

(b) Part of a synthetic polymer is shown.



(i) State the number of monomer units that are needed to make the part of the polymer shown.

..... [1]

(ii) Name and draw the structure of the monomer used to make this polymer. Show all of the atoms and all of the bonds.

name .....

structure

[3]

(iii) State the empirical formula of the polymer.

..... [1]

(c) Proteins are natural polymers.

Proteins are broken down into amino acids. The process is similar to how complex carbohydrates are broken down to give simple sugars.

(i) Name the type of reaction in which proteins are broken down into amino acids.

..... [1]

(ii) Name **two** types of substance that are used to break down proteins into amino acids.

1 .....

2 .....

[2]

(iii) Amino acids are colourless.

A sample containing a mixture of amino acids is separated. Each amino acid is detected and identified.

- Name the process used to separate the amino acids.

.....

- Name the type of substance used to detect the amino acids.

.....

- Give the symbol of the value used to determine the identity of each amino acid after separation and detection.

.....

[3]