SL Paper 1

What is the product of the reaction between hex-3-ene and steam?

A. Hexan-1-ol

B. Hexan-2-ol

C. Hexan-3-ol

D. Hexan-4-ol

Markscheme

C

Examiners report

[N/A]

Applying IUPAC rules, what is the name of $\mathrm{CH_3CH(CH_3)CH_2COOH}$?

A. 2,3-dimethylpropanoic acid

B. Pentanoic acid

C. 3-methylbutanoic acid

D. 2-methylbutanoic acid

Markscheme

C

Examiners report

There were no comments about this question but it is worth noting that over 56% chose answer D.

Which organic molecule is **not** a structural isomer of pentan-1-ol?

A. pentan-2-ol

B. 2-methylpentan-2-ol

C. 2-methylbutan-2-ol

D. pentan-3-ol

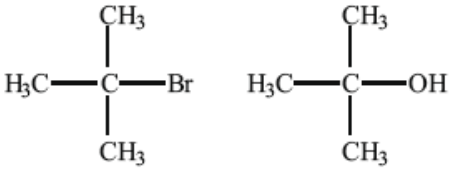
Markscheme

B

Examiners report

[N/A]

In which pair are both compounds secondary?

A. 

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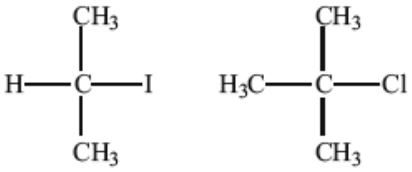
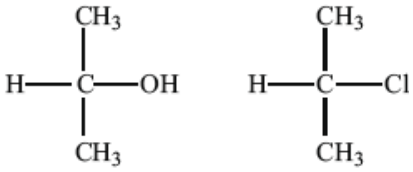
C. 

D. 

Markscheme

D

Examiners report

This question could have been better worded but 72% of the candidates chose the correct answer.

Which of the following pairs are members of the same homologous series?

A. $CH_3CH_2CH_2OH$ and CH_3CH_2CHO

B. $CH_3CH(OH)CH_3$ and $CH_3CH_2CH(OH)CH_3$

C. CH_3COCH_3 and CH_3CH_2COOH

D. $CH_3COCH_2CH_3$ and CH_3CH_2CHO

Markscheme

B

Examiners report

[N/A]

Which properties are features of a homologous series?

I. Same general formula

II. Similar chemical properties

III. Gradation in physical properties

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

D

Examiners report

One respondent opined that the word “gradation” is difficult to understand, particularly for students not working in their mother tongue. Whilst other words could have been used, this word was used because it appears in the syllabus.

Some methane gas is burned in a limited supply of oxygen. Which products could form?

I. C(s)

II. CO(g)

III. $CO_2(g)$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

D

Examiners report

We recognize that this might be a language problem. “Incomplete combustion” is not the same as “burned in a limited supply of oxygen”. Candidates may also have not read “could” correctly. The correct answer was D. This was the “hardest” question on the paper.

How many **structural** isomers exist with the formula $C_3H_5Cl_3$?

A. 3

B. 4

C. 5

D. 6

Markscheme

C

Examiners report

[N/A]

What are possible products of the incomplete combustion of propane?

A. carbon monoxide, hydrogen and carbon

B. carbon dioxide, carbon and hydrogen

C. carbon, carbon monoxide and water

D. carbon dioxide and water only

Markscheme

C

Examiners report

[N/A]

Which equation represents a propagation step in the reaction of methane with bromine?

A. $CH_4 \rightarrow CH_3\bullet + H\bullet$

B. $CH_4 + Br\bullet \rightarrow CH_3\bullet + HBr$

C. $\mathrm{CH_4 + Br\bullet \rightarrow CH_3Br + H\bullet}$

D. $\mathrm{CH_3\bullet + Br\bullet \rightarrow CH_3Br}$

Markscheme

B

Examiners report

Answer C was the most popular distractor, given by nearly a quarter of the candidates. It is a common misconception that a bromine radical can displace a hydrogen radical.

Which species can oxidize ethanol to ethanoic acid?

A. $\mathrm{I^-}$

B. Fe

C. $\mathrm{O^{2-}}$

D. Acidified $\mathrm{K_2Cr_2O_7}$

Markscheme

D

Examiners report

[N/A]

What is the major product of the reaction between HCl and but-2-ene?

A. 1,2-dichlorobutane

B. 2,3-dichlorobutane

C. 1-chlorobutane

D. 2-chlorobutane

Markscheme

D

Examiners report

[N/A]

What is the mechanism for the reaction of propene with iodine in the dark?

A. electrophilic addition

B. electrophilic substitution

C. free radical substitution

D. nucleophilic substitution

Markscheme

A

Examiners report

[N/A]

What happens when a few drops of bromine water are added to excess hex-1-ene and the mixture is shaken?

I. The colour of the bromine water disappears.

II. The organic product formed does not contain any carbon-carbon double bonds.

III. 2-bromohexane is formed.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

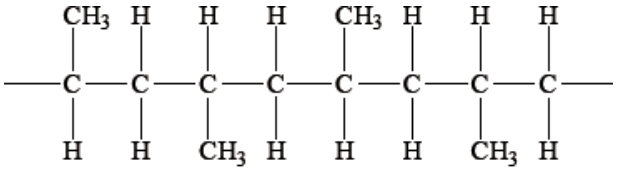
Markscheme

A

Examiners report

[N/A]

Which substance can be polymerized to produce the polymer below?



A. But-1-ene

B. But-2-ene

C. Propene

D. 2-methylpropene

Markscheme

C

Examiners report

[N/A]

Which of the structures below is an aldehyde?

A. $CH_3CH_2CH_2CH_2OH$

B. $CH_3CH_2COCH_3$

C. $CH_3CH_2COOCH_3$

D. $CH_3CH_2CH_2CH\ O$

Markscheme

D

Examiners report

There were three G2 comments on this question stating that the wording of the question was ambiguous (e.g. use of the word relatively etc.). This was discussed at Grade Award and for this reason it was decided to remove this question.

Which order is correct when the following substances are arranged in order of **increasing** boiling point?

A. $CH_3CH_3 < CH_3CHO < CH_3CH_2OH$

B. $CH_3CHO < CH_3CH_2OH < CH_3CH_3$

C. $CH_3CH_2OH < CH_3CH_3 < CH_3CHO$

D. $CH_3CH_3 < CH_3CH_2OH < CH_3CHO$

Markscheme

A

Examiners report

One respondent stated that it would be best to write from least reactive to most reactive in both of these questions. However, “increasing” is written in bold in both questions and, also, this type of question has been asked extensively on previous papers and hence candidates would have understood what was asked for explicitly if they had looked at some of the previous examination papers. In the case of Q.13 60% of candidates gave the correct answer and in Q.27, 68% had the question correct.

Which of the following are isomers of pentane?

I. 2-methylpentane

II. methylbutane

III. dimethylpropane

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

C

Examiners report

[N/A]

Which compound is **not** an isomer of hexane?

A. $\mathrm{CH_3CH(CH_3)CH_2CH_2CH_3}$

B. $\mathrm{CH_3CHCHCH_2CH_2CH_3}$

C. $\mathrm{(CH_3)_3CCH_2CH_3}$

D. $\mathrm{CH_3CH_2CH(CH_3)CH_2CH_3}$

Markscheme

B

Examiners report

[N/A]

Which steps are involved in the free-radical mechanism of the bromination of ethane in the presence of ultraviolet radiation?

I. $C_2H_6 + Br\bullet \rightarrow C_2H_5\bullet + HBr$

II. $C_2H_5\bullet Br_2 \rightarrow C_2H_5Br + Br\bullet$

III. $C_2H_5\bullet + Br\bullet \rightarrow C_2H_5Br$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

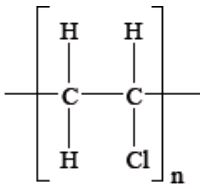
Markscheme

D

Examiners report

[N/A]

Which monomer could be used to form a polymer with the following repeating unit?



A. CH_3CH_2Cl

B. CH_2ClCH_2Cl

C. CH_2CHCl

D. CHClCHCl

Markscheme

C

Examiners report

[N/A]

Which organic product forms in the following reaction?

$$(CH_3)_2CHOH \xrightarrow[\text{reflux}]{K_2Cr_2O_7/H^+}$$

A. Ethanoic acid

B. Propanal

C. Propanone

D. Propanoic acid

Markscheme

C

Examiners report

[N/A]

Which compound contains a secondary carbon atom?

A. $CH_3CH(Cl)CH(CH_3)_2$

B. $(CH_3)_2CHCH_2Cl$

C. $(CH_3)_3CCl$

D. CH_3CH_2Cl

Markscheme

A

Examiners report

[N/A]

How many structural isomers of C_6H_{14} exist?

A. 4

B. 5

C. 6

D. 7

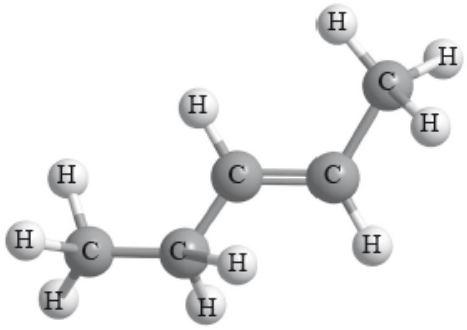
Markscheme

B

Examiners report

[N/A]

Consider the compound $(CH_3CH_2)CH{=}CH(CH_3)$. Which statements are correct?



I. A suitable name is pent-2-ene.

II. The empirical formula is CH_2.

III. An isomer of the compound is pentane.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

A

Examiners report

Three respondents commented on this question. One respondent stated that a 3D structure should not be used here. As previously mentioned in this report, candidates should be encouraged to see a whole range of different representations of structures and in organic chemistry it is especially important that candidates are exposed to 3D representations as part of the overall teaching of organic chemistry. Another respondent stated that it would have been better if statement I. was instead given as a suitable name for the compound is pent-2-ene, which is a fair comment. This was mirrored by another respondent who stated that the molecule drawn is in fact a geometrical isomer and hence E should have been used. Although this is correct, at SL in Topic 10, it is clearly stated that the distinction between *cis* and *trans* isomers is not required (TN for AS 10.1.8), so this is the reason why reference was not given to (2E)-pent-2-ene in the question, so the respondent is correct in stating that it would be better if the term IUPAC name was not given for this reason.

Which of these reactions proceeds by a free radical mechanism in the presence of UV light?

A. $C_6H_6 + Cl_2 \rightarrow C_6H_5Cl + HCl$

B. $C_6H_6 + 3H_2 \rightarrow C_6H_{12}$

C. $CH_2CH_2 + HBr \rightarrow CH_3CH_2Br$

D. $CH_3CH_3 + Cl_2 \rightarrow CH_3CH_2Cl + HCl$

Markscheme

D

Examiners report

[N/A]

Which is a tertiary halogenoalkane?

A. $\mathrm{CH_3CH_2CH_2Br}$

B. $\mathrm{CH_3CH_2CH(CH_3)Cl}$

C. $\mathrm{C(CH_3)_3Br}$

D. $\mathrm{CH_3CHClCH_2CH_3}$

Markscheme

C

Examiners report

[N/A]

Which statement is correct about the polymerization of ethene to poly(ethene)?

A. The polymer is an alkene.

B. The monomer ethene and the repeating unit have the same empirical formula.

C. The monomer ethene is less reactive than the polymer.

D. The polymer contains C–C single and C=C double bonds.

Markscheme

B

Examiners report

[N/A]

Which structural formula represents a secondary halogenoalkane?

A. $\mathrm{CH_3CHBrCH_2CH_3}$

B. $\mathrm{(CH_3)_3CBr}$

C. $\mathrm{CH_3(CH_2)_3Br}$

D. $\mathrm{(CH_3)_2CHCH_2Br}$

Markscheme

A

Examiners report

[N/A]

What is the order of increasing boiling point?

A. $C_4H_{10} < CH_3COOH < CH_3CH_2CHO < CH_3CH_2CH_2OH$

B. $C_4H_{10} < CH_3CH_2CHO < CH_3CH_2CH_2OH < CH_3COOH$

C. $CH_3COOH < CH_3CH_2CH_2OH < CH_3CH_2CHO < C_4H_{10}$

D. $C_4H_{10} < CH_3CH_2CH_2OH < CH_3CH_2CHO < CH_3COOH$

Markscheme

B

Examiners report

[N/A]

What is the organic product of the reaction between 2-chlorobutane and sodium hydroxide solution?

A. Butan-1-ol

B. Butan-2-ol

C. Butanal

D. Butanone

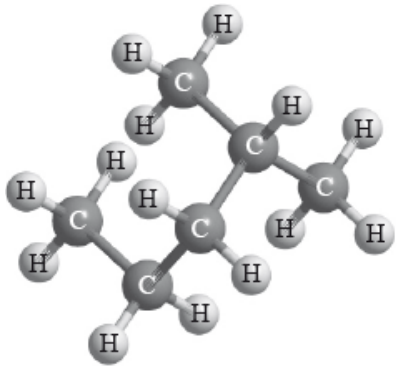
Markscheme

B

Examiners report

[N/A]

What is the name of the following molecule applying IUPAC rules?



A. 1,1-dimethylbutane

B. Hexane

C. 2-methylpentane

D. 4-methylpentane

Markscheme

C

Examiners report

[N/A]

Which equation represents the initiation reaction when methane reacts with chlorine in the presence of ultraviolet light?

A. $CH_4 \rightarrow CH_3\bullet + H\bullet$

B. $Cl_2 \rightarrow 2Cl\bullet$

C. $Cl_2 \rightarrow Cl^+ + Cl^-$

D. $CH_3\bullet + Cl_2 \rightarrow CH_3Cl + Cl\bullet$

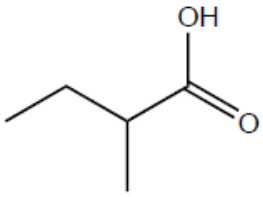
Markscheme

B

Examiners report

[N/A]

What is the name of the compound with this molecular structure applying IUPAC rules?



A. 1-methylpropanoic acid

B. 2-methylpropanoic acid

C. 2-methylbutanoic acid

D. 3-methylbutanoic acid

Markscheme

C

Examiners report

[N/A]

Which statements about the chlorine free radical are correct?

I. It has 18 electrons.

II. It is an uncharged species.

III. It is formed by homolytic fission.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

C

Examiners report

[N/A]

What is the general formula of the alkyne series?

A. C_nH_n

B. C_nH_{2n-2}

C. C_nH_{2n}

D. C_nH_{2n+2}

Markscheme

B

Examiners report

[N/A]

Which compound can be oxidized when heated with an acidified solution of potassium dichromate(VI)?

A. $CH_3C(O)CH_2CH_3$

B. $CH_3CH_2CH(OH)CH_3$

C. $(CH_3)_3COH$

D. $CH_3(CH_2)_2COOH$

Markscheme

B

Examiners report

[N/A]

Which conditions are used to convert ethanol to ethanal?

A. Excess oxidizing agent and reflux

B. Excess oxidizing agent and distillation

C. Excess ethanol and reflux

D. Excess ethanol and distillation

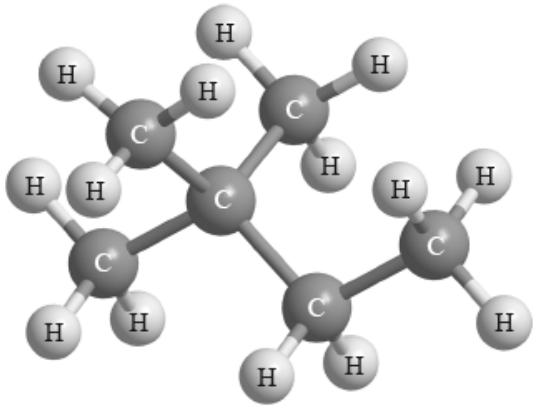
Markscheme

D

Examiners report

[N/A]

What is the name of the alkane shown in the diagram below, applying IUPAC rules?



A. Hexane

B. 1,1,1-trimethylpropane

C. Ethylmethylpropane

D. 2,2-dimethylbutane

Markscheme

D

Examiners report

This question was answered correctly by the most candidates (87.72%).

Which compound could be **X** in the two-stage reaction pathway?

$$C_2H_4 \rightarrow \mathbf{X} \rightarrow C_2H_5OH$$

A. C_2H_6

B. C_2H_3OH

C. C_2H_5Br

D. $C_2H_4Cl_2$

Markscheme

C

Examiners report

[N/A]

What is the product of the oxidation of butan-2-ol?

A. But-2-ene

B. Butanoic acid

C. Butanal

D. Butanone

Markscheme

D

Examiners report

This proved to be one of the most challenging questions on the paper with a difficulty index of 42%, with more candidates selecting oxidation products from a primary alcohol (B and C) than the correct response. It did however prove to be a very good discriminator with a discrimination index of 0.56.

What is the mechanism of the reaction between ethane and chlorine in sunlight?

A. Free radical substitution
B. Free radical addition
C. Electrophilic substitution
D. Electrophilic addition

Markscheme

A

Examiners report

[N/A]

What is the name of $(CH_3)_3CCOCH_3$, applying IUPAC rules?

A. 2,2-dimethylbutan-3-one

B. 3,3-dimethylbutan-2-one

C. 2,2-dimethylbutanal

D. 3,3-dimethylbutanal

Markscheme

B

Examiners report

[N/A]

Which substance is **not** produced during the combustion of alkanes?

A. CO_2

B. CO

C. C

D. H_2

Markscheme

D

Examiners report

[N/A]

Which conditions are required to obtain a good yield of a carboxylic acid when ethanol is oxidized using potassium dichromate(VI), $K_2Cr_2O_7(aq)$?

I. Add sulfuric acid

II. Heat the reaction mixture under reflux

III. Distil the product as the oxidizing agent is added

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

A

Examiners report

One teacher commented on the G2 form that this question required more specific knowledge than was indicated by the syllabus and indeed many candidates found this question challenging, as indicated by the very high number of blank responses and the difficulty index of 33%. The discrimination index of 0.23 showed that it was accessible to many of the better candidates.

Which are structural isomers?

I. CH_3CH_2OH and CH_3OCH_3

II. $HOCH_2CH_3$ and CH_3CH_2OH

III. CH_3COOH and $HCOOCH_3$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

B

Examiners report

[N/A]

What is the IUPAC name for $\mathrm{CH_3CH_2CH(CH_3)CH_3}$?

A. 1,1-dimethylpropane

B. 2-ethylpropane

C. 2-methylbutane

D. 3-methylbutane

Markscheme

C

Examiners report

[N/A]

Which statement about a homologous series is correct?

A. Members of the series differ by CH_3.

B. Members of the series have the same physical properties.

C. Members of the series have the same empirical formula.

D. Members of the series have similar chemical properties.

Markscheme

D

Examiners report

[N/A]

Which three compounds can be considered to be a homologous series?

A. CH_3OH, CH_3CH_2OH, $CH_3CH_2CH_2OH$

B. CH_3CH_2OH, CH_3CHO, CH_3COOH

C. $CH_3CH_2CH(OH)CH_3$, $CH_3CH_2CH_2CH_2OH$, $(CH_3)_3COH$

D. $CH_3CH_2CH_2CH_2OH$, $CH_3CH_2OCH_2CH_3$, $(CH_3)_2CH_2CHO$

Markscheme

A

Examiners report

[N/A]

Which type of reaction occurs between an alcohol and a carboxylic acid?

A. Addition

B. Oxidation

C. Esterification

D. Polymerization

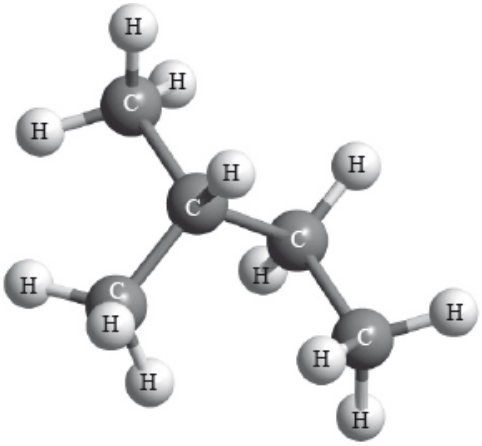
Markscheme

C

Examiners report

[N/A]

What is the IUPAC name of the following compound?



A. 2-methylbutane

B. Ethylpropane

C. 3-methylbutane

D. Pentane

Markscheme

A

Examiners report

This question provoked a large number of comments on G2 forms, mainly stating that 2-methylbutane should have been given rather than just methylbutane. There is some merit to this although in this case the word methylbutane alone is not ambiguous. Though many were attracted by the incorrect response of 3-methylbutane, a greater number of candidates answered the question correctly and it proved quite a good discriminator, with a discrimination index of 0.41.

Which equations represent the incomplete combustion of methane?

I. $\mathrm{CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)}$

II. $\mathrm{CH_4(g) + 1\frac{1}{2}O_2(g) \rightarrow CO(g) + 2H_2O(g)}$

III. $\mathrm{CH_4(g) + O_2(g) \rightarrow C(s) + 2H_2O(g)}$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

C

Examiners report

[N/A]

What product is formed when $\mathrm{CH_3CH(OH)CH_3}$ is reacted with acidified potassium dichromate(VI)?

A. $\mathrm{CH_3COOCH_3}$

B. $\mathrm{CH_3CH_2CHO}$

C. $\mathrm{CH_3CH_2COOH}$

D. $\mathrm{CH_3COCH_3}$

Markscheme

D

Examiners report

[N/A]

When bromine water is shaken with a liquid organic compound, it is rapidly decolourized. What can be determined from this test?

A. The compound is an alcohol.

B. The compound is an alkane.

C. The compound is an alkene.

D. The compound is an iodoalkane.

Markscheme

C

Examiners report

Though it produced a significant number of blank responses, with a difficulty index of 57%, the majority of the candidates answered this question correctly and with a discrimination index of 0.59 it was one of the best discriminators on the paper.

Which of the following statements about alkenes is **not** correct?

A. They have reactive double bonds.

B. They can form addition polymers.

C. They react mainly by substitution.

D. They can react with water to form alcohols.

Markscheme

C

Examiners report

[N/A]

Which compound would decolourize bromine water in the dark?

A. $\mathrm{CH_3COCH_2CH_3}$

B. $\mathrm{CH_3(CH_2)_4OH}$

C. $\mathrm{CH_3CHCHCH_3}$

D. $\mathrm{CH_3(CH_2)_3CH_3}$

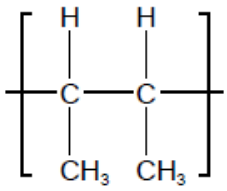
Markscheme

C

Examiners report

[N/A]

Which monomer is used to form the polymer with the following repeating unit?



A. $CH_3CH=CHCH_3$

B. $CH_3CH_2CH=CH_2$

C. $CH_3CH_2CH_2CH_3$

D. $(CH_3)_2C=CH_2$

Markscheme

A

Examiners report

[N/A]

Which compound could be formed when $CH_3CH_2CH_2OH$ is heated with acidified potassium dichromate(VI)?

I. CH_3CH_2CHO

II. CH_3CH_2COOH

III. CH_3COCH_3

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

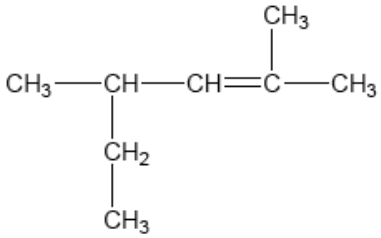
Markscheme

A

Examiners report

[N/A]

Applying IUPAC rules, what is the name of the compound?



A. 1-ethyl-1,3-dimethylbut-2-ene

B. 2-ethyl-4-methylpent-3-ene

C. 2-methyl-4-ethylpent-3-ene

D. 2,4-dimethylhex-2-ene

Markscheme

D

Examiners report

[N/A]

Which compound is an isomer of octane, C_8H_{18}?

A. $(CH_3)_2CH(CH_2)_2CH(CH_3)_2$

B. $(CH_3)_2CHCH_2CHCHCH_2CH_3$

C. $CH_3(CH_2)_5CH_3$

D. $(CH_3)_2CH(CH_2)_2CHCHCH_3$

Markscheme

A

Examiners report

There was some concern that this is not on the syllabus. The examiners consider the question to be a fair extension of assessment statement 10.1.5.

Which statement is correct for members of the same homologous series?

A. They have the same empirical formula and a gradual change in chemical properties.

B. They have the same empirical formula and a gradual change in physical properties.

C. They have the same general formula and a gradual change in chemical properties.

D. They have the same general formula and a gradual change in physical properties.

Markscheme

D

Examiners report

[N/A]

Which compounds belong to the same homologous series?

A. $CHCCH_2CH_3$, $CHCCH_2CH_2CH_3$

B. $CH_3CH_2CH_2CH_2OH$, $CH_3CH_2OCH_2CH_3$

C. CH_2CHCH_3, $CH_3CH_2CH_2CH_3$

D. CH_3COCH_3, $CH_3CH_2OCH_3$

Markscheme

A

Examiners report

[N/A]

Which molecule contains an ester group?

A. CH_3CH_2COOH

B. CH_3COOCH_3

C. $CH_3COCH_2CH_2OH$

D. $OHCCH_2CHO$

Markscheme

B

Examiners report

[N/A]

Which three compounds can be considered to be a homologous series?

A. CH_3NH_2 $CH_3CH_2NH_2$ $CH_3CH_2CH_2NH_2$

B. $CH_3CH_2CH_2NH_2$ $CH_3CH(NH_2)CH_3$ $CH_3(NH)CH_2CH_3$

C. $C(CH_3)_4$ $CH_3CH_2CH_2CH_2CH_3$ $(CH_3)_2CHCH_2CH_3$

D. CH_3CH_2COOH CH_3COOCH_3 $HCOOCH_2CH_3$

Markscheme

A

Examiners report

[N/A]

Which type of reaction occurs when methanol and propanoic acid react together in the presence of a catalyst?

A. Addition

B. Condensation

C. Redox

D. Neutralization

Markscheme

B

Examiners report

[N/A]

What is the structural formula of 2,3-dibromo-3-methylhexane?

A. $CH_3CHBrCHBrCH(CH_3)CH_2CH_3$

B. $CH_3CHBrCBr(CH_3)CH_2CH_2CH_3$

C. $CH_3CH_2CHBrCBr(CH_2CH_3)_2$

D. $CH_3CHBrCHBrCH(CH_2CH_3)_2$

Markscheme

B

Examiners report

[N/A]

What is the function of the ultraviolet light used in the reaction between ethane and bromine?

A. It causes bromine free radicals to form bromine molecules.

B. It causes bromide ions to form bromine molecules.

C. It causes bromine molecules to form bromide ions.

D. It causes bromine molecules to form bromine free radicals.

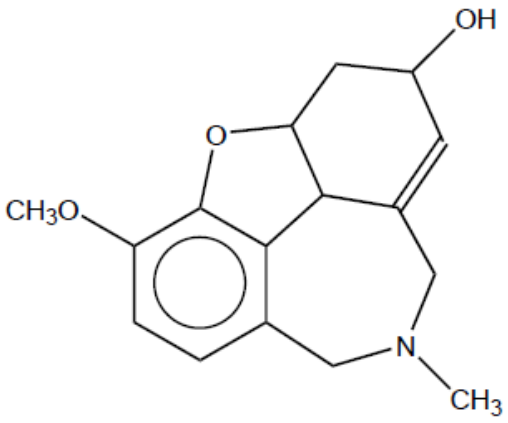
Markscheme

D

Examiners report

[N/A]

The structure of a drug used to treat symptoms of Alzheimer's disease is shown below. Which functional groups are present in this molecule?



A. Hydroxyl and ester

B. Hydroxide and ether

C. Hydroxyl and ether

D. Hydroxide and ester

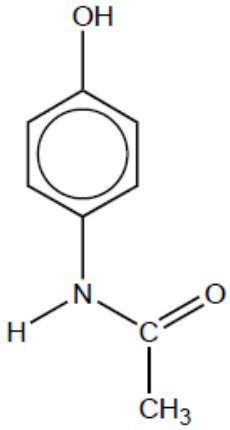
Markscheme

C

Examiners report

[N/A]

Which functional group is present in paracetamol?



A. Carboxyl

B. Amino

C. Nitrile

D. Hydroxyl

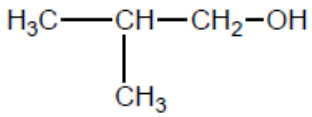
Markscheme

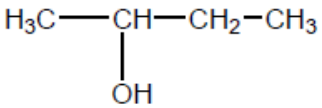
D

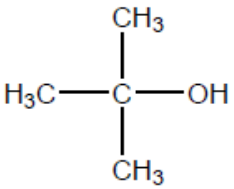
Examiners report

[N/A]

Which alcohols are oxidized by acidified potassium dichromate(VI) solution when heated?

I. 

II. 

III. 

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

A

Examiners report

[N/A]

How many non-cyclic structural isomers exist with the molecular formula $\mathrm{C_5H_{10}}$?

A. 2

B. 3

C. 4

D. 5

Markscheme

D

Examiners report

[N/A]

Which molecule has a tertiary nitrogen?

A. $(CH_3)_2NH$

B. $(C_2H_5)_4N^+I^-$

C. $C_3H_7N(CH_3)_2$

D. $C_6H_5NH_2$

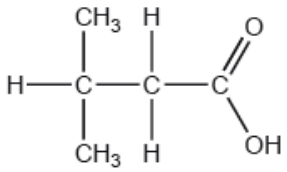
Markscheme

C

Examiners report

[N/A]

What is the name of this compound, using IUPAC rules?



A. 1,1-dimethylpropanoic acid

B. 3,3-dimethylpropanoic acid

C. 2-methylbutanoic acid

D. 3-methylbutanoic acid

Markscheme

D

Examiners report

[N/A]

Which compound can both be esterified and turn acidified potassium dichromate(VI) solution green?

A. $(CH_3)_3COH$
B. $CH_3CH_2CO_2H$
C. $(CH_3)_2CHOH$
D. $CH_3CH_2COCH_3$

Markscheme

C

Examiners report

[N/A]

Which of the following substances are structural isomers of each other?

I. $CH_3(CH_2)_3CH_3$

II. $(CH_3)_2CHCH_3$

III. $CH_3CH(CH_3)CH_2CH_3$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

B

Examiners report

[N/A]

For the reaction pathway below, what are the names for the first and second steps?

$$CH_2CHCH_3 \rightarrow CH_3CHClCH_3 \rightarrow CH_3CHOHCH_3$$

	First step	Second step
A.	nucleophilic substitution	oxidation
B.	addition	nucleophilic substitution
C.	nucleophilic substitution	nucleophilic substitution
D.	addition	oxidation

Markscheme

B

Examiners report

[N/A]

Which statements are correct for the reaction of ethene with bromine in the absence of ultraviolet light?

I. It is an addition reaction.

II. The organic product is colourless.

III. The organic product is saturated.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

D

Examiners report

One respondent commented that the absence of UV light was not relevant. The condition was mentioned to exclude the possibility of a substitution reaction.

How many alcohols have the general formula $C_4H_{10}O$?

A. 3
B. 4
C. 5
D. 6

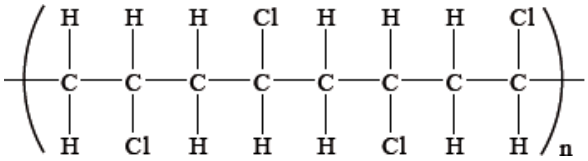
Markscheme

B

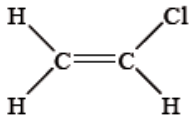
Examiners report

[N/A]

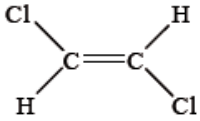
From which monomer is this polymer made?



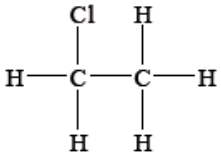
A.



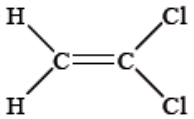
B.



C.



D.



Markscheme

A

Examiners report

[N/A]

Which describes the reaction between a halogen and ethane?

	Mechanism	Bond fission in halogen
A.	free radical	homolytic
B.	free radical	heterolytic
C.	addition	homolytic
D.	addition	heterolytic

Markscheme

A

Examiners report

[N/A]

What are possible names of a molecule with molecular formula $C_4H_{10}O$?

I. 1-Methoxypropane

II. 2-Methylpropan-2-ol

III. Butanal

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

Markscheme

A

Examiners report

[N/A]

Which equation represents a propagation step in the mechanism for the reaction between ethane, C_2H_6, and chlorine, Cl_2, in the presence of sunlight/UV?

A. $C_2H_6 + Cl\bullet \rightarrow C_2H_5\bullet + HCl$

B. $C_2H_6 + Cl\bullet \rightarrow C_2H_5Cl + H\bullet$

C. $Cl_2 \rightarrow 2Cl\bullet$

D. $C_2H_5\bullet + Cl\bullet \rightarrow C_2H_5Cl$

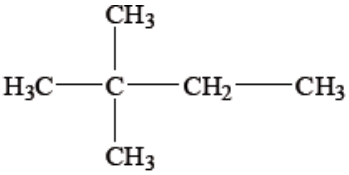
Markscheme

A

Examiners report

[N/A]

What is the name of the following compound applying IUPAC rules?



A. 1,1,1-trimethylpropane

B. 2,2-dimethylbutane

C. 3,3-dimethylbutane

D. 2-methyl-2-ethylpropane

Markscheme

B

Examiners report

[N/A]

What is the product of the following reaction?

$$CH_3CH(OH)CH_3 \xrightarrow{Cr_2O_7^{2-}/H^+}$$

A. CH_3COOH

B. CH_3COCH_3

C. CH_3CH_2COOH

D. $CH_3CH_2CH_3$

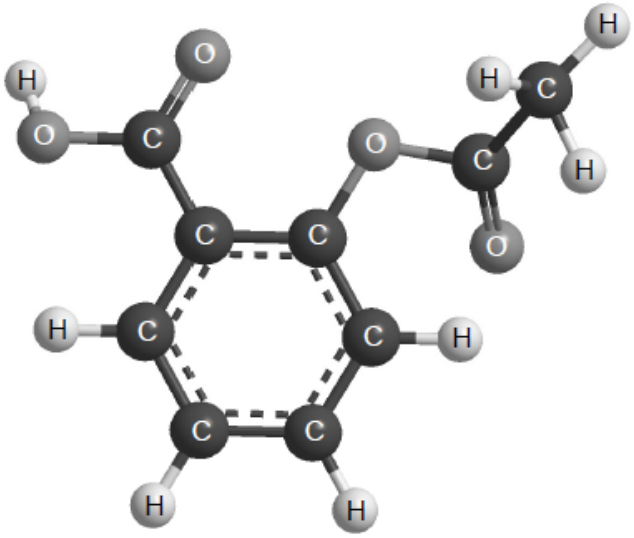
Markscheme

B

Examiners report

One G2 comment stated that there was an overlap between this question and a similar question in P2, which is correct.

What are the functional groups in the aspirin molecule?



I. Ether
II. Carboxyl
III. Ester

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

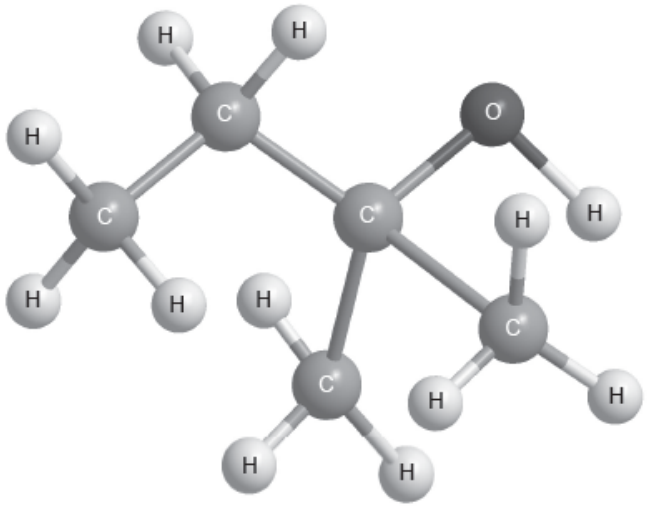
Markscheme

C

Examiners report

[N/A]

What is the name of this compound, using IUPAC rules?



A. 3-methylbutan-3-ol

B. 2-ethylpropan-2-ol

C. 2-methylbutan-2-ol

D. 3-methylbutan-2-ol

Markscheme

C

Examiners report

[N/A]