Name _____ Date _____ Key

Practice IB Exam: Topics 10

1. Which of the structures below is an aldehyde?

A. $CH_3CH_2\overset{\overset{O}{\|}}{C}H$

B. $CH_3\overset{\overset{O}{\|}}{C}CH_3$

C. $CH_3CH_2\overset{\overset{O}{\|}}{C}OH$

D. $CH_3\overset{\overset{O}{\|}}{C}OCH_3$

**(Total 1 mark)**

2. What is the final product formed when $CH_3CH_2OH$ is refluxed with acidified potassium dichromate(VI)?

↑ a primary alcohol

A. $CH_3CHO$

B. $CH_2{=}{=}CH_2$

C. $CH_3COOH$ ← carboxylic acid

D. $HCOOCH_3$

**(Total 1 mark)**

3. Which of the substances below is **least** soluble in water?

A. $CH_2OHCHOHCH_2OH$

B. $CH_3\overset{\overset{O}{\|}}{C}CH_3$ — more able to interact with $H_2O$

C. $CH_3CH_2\overset{\overset{O}{\|}}{C}OH$

capable of hydrogen bonding (-OH) with $H_2O$

D. $CH_3\overset{\overset{O}{\|}}{C}CH_3$ — less able to interact with $H_2O$

**(Total 1 mark)**

4. Which type of compound can be made in one step from a secondary alcohol?

A. an aldehyde

B. an alkane

C. a carboxylic acid

D. a ketone

**(Total 1 mark)**

5. Which are characteristics typical of a free radical?

$X-Y \rightarrow X^{\bullet} + Y^{\bullet}$

I. It has a lone pair of electrons.
II. It can be formed by the homolytic fission of a covalent bond.
III. It is uncharged.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

**(Total 1 mark)**

6. What is/are the product(s) of the reaction between ethene and hydrogen bromide?

A. $CH_3CH_2Br$

$CH_2=CH_2 + HBr \rightarrow CH_2(Br)-CH_2(H)$

B. $CH_3CH_2Br$ and $H_2$

C. $CH_2BrCH_2Br$

D. $CH_3BrCH_2$ Br and $H_2$

**(Total 1 mark)**

7. Which reaction type is typical for halogenoalkanes?

A. nucleophilic substitution

B. electrophilic substitution

C. electrophilic addition

D. nucleophilic addition

**(Total 1 mark)**

8. Which substance is **not** readily oxidized by acidified potassium dichromate(VI) solution?

A. propan-1-ol

B. propan-2-ol

C. propanal

D. propanone

**(Total 1 mark)**

9. Which formula is a correct representation of pentane?

A. $CH_3CH_2CHCH_2CH_3$

B. $(CH_3CH_2)_2CH_3$

C. $CH_3(CH_2)_3CH_3$

D. $CH_3(CH_3)_3CH_3$

**(Total 1 mark)**

10. How many structural isomers are possible with the molecular formula $C_6H_{14}$?

A. 4

B. 5

C. 6

D. 7

1.) $CH_3-(CH_2)_3-CH_3$

2.) $CH_3-\underset{\underset{CH_3}{|}}{CH}-(CH_2)_2-CH_3$

3.) $CH_3-CH_2-\underset{\underset{CH_3}{|}}{CH}-CH_2-CH_3$

4.) $CH_3-\underset{\underset{CH_3}{|}}{CH}-\underset{\underset{CH_3}{|}}{CH}-CH_3$

5.) $CH_3-\underset{\underset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_2-CH_3$

**(Total 1 mark)**

11. Which compound is converted to butanal by acidified potassium dichromate(VI) solution?

A. butan-1-ol

B. butan-2-ol

C. butanone

D. butanoic acid

**(Total 1 mark)**

12. Which formulas represent butane or its isomer?

I. $CH_3(CH_2)_2CH_3$ ✓ — $C_4H_{10}$

II. $CH_3CH(CH_3)CH_3$ ✓

III. $(CH_3)_3CH$ ✓

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

**(Total 1 mark)**

13. Which substance(s) could be formed during the incomplete combustion of a hydrocarbon?

I. Carbon ✓

II. Hydrogen

III. Carbon monoxide ✓

A. I only

B. I and II only

C. I and III only

D. II and III only

**(Total 1 mark)**

14. Which compound has the lowest boiling point?

A. $CH_3CH_2CH(CH_3)CH_3$

B. $(CH_3)_4C$

C. $CH_3CH_2CH_2CH_2CH_3$

D. $CH_3CH_2OCH_2CH_3$

The longer the hydrocarbon chain, the higher the b.p.

**(Total 1 mark)**

15. Which product is formed by the reaction between $CH_2CH_2$ and HBr?

A. $CH_3CH_2Br$

B. $CH_2CHBr$

C. BrCHCHBr

D. $CH_3CHBr_2$

I know... same as #6!

**(Total 1 mark)**

16. Which statement about neighbouring members of all homologous series is correct?

A. They have the same empirical formula.

B. They differ by a $CH_2$ group.

C. They possess different functional groups.

D. They differ in their degree of unsaturation.

**(Total 1 mark)**

17. Consider the following compounds.

I. $CH_3CH_2CH(OH)CH_3$ ✓ a secondary alcohol

II. $CH_3CH(CH_3)CH_2OH$ ✓ a primary alcohol

III. $(CH_3)_3COH$ ✗ a tertiary alcohol

The compounds are treated separately with acidified potassium dichromate(VI) solution. Which will produce a colour change from orange to green?

A. I and II only

B. I and III only

C. II and III only

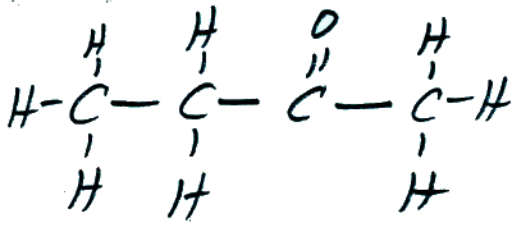
D. I, II and III

just indicates a chemical rxn (change) has taken place!

**(Total 1 mark)**

18. $CH_3COCH_3$ is the first member of the ketone homologous series. Draw the full structural formula of the next member of this homologous series and predict how its melting point compares with that of $CH_3COCH_3$.

**(Total 2 marks)**



dots not needed on oxygen!

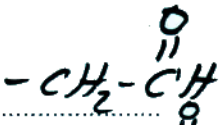
will have a higher melting point (the larger the molecule, the greater its van der Waals forces)

**19.** Some alcohols are oxidized by heating with acidified potassium dichromate(VI). If oxidation does occur, identify the possible oxidation products formed by each of the alcohols below. Indicate if no oxidation occurs.

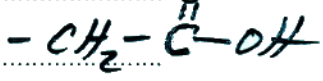
Butan-1-ol (1-butanol)

butanal

or



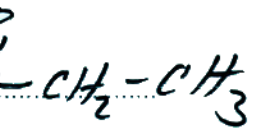
& butanoic acid



Butan-2-ol (2-butanol)

butanone

or



2-methylpropan-2-ol (2-methyl-2-propanol) — A tertiary alcohol!

No reaction