nelsonnet

Chapter test with answers

Chapter 6 Classes of organic compounds

Time permitted: 50 minutes

	Section	Number of questions	Marks available
A	Multiple choice	15	15
B	Short answer	5	15
	Total	**20**	**30**

Scale:

A+	29–30	A	26–28	B	23–25	C	19–22	D	15–18	E	9–14	UG	0–8

Section A Multiple choice (15 marks)

Section A consists of 15 questions, each worth one mark. Each question has only one correct answer. Circle the correct answer. Attempt all questions. Marks will not be deducted for incorrect answers. You are advised to spend no more than 15 minutes on this section.

1 What is the smallest member of the alkyne family?

- **A** Methyne
- **B** *Ethyne*
- **C** Propyne
- **D** Methelyne

2 Which of the following are possible combustion products for hydrocarbons?

- **A** CO_2 and H_2O
- **B** *CO, CO_2 and H_2O*
- **C** CO and H_2O
- **D** CO, CO_2, H_2 and H_2O

3 Which structure did Kekulé work out?

- **A** Cyclohexene
- **B** Cyclohexane
- **C** *Benzene*
- **D** Toluene

4 Saturated hydrocarbons:

A are soaked with water.

B *have no multiple bonds.*

C contain no side chains.

D do not belong to a functional group.

5 Name the following compound.

$$(CH_3)_3C(CH_2)_2CH(CH_3)_2$$

A 1, 1, 1, 5, 5-pentamethylbutane

B 1, 1, 5, 5-tetramethylpentane

C *2, 2, 5-trimethylhexane*

D 2, 5, 5-trimethylhexane

6 Hydrocarbons that contain a benzene ring are:

A cyclic.

B pharmaceuticals.

C *aromatic.*

D aliphatic.

7 A carbonyl group is a functional group of:

A *a double-bonded oxygen attached to a carbon atom.*

B an OH group attached to a single carbon.

C an O and an H atom attached separately to a single carbon atom.

D an oxygen atom shared between two carbon atoms.

8 Which compound exhibits hydrogen bonding?

A *CH_3CH_2OH*

B $CH_3CH_2CH_3$

C CH_2COOCH_3

D CH_3CHO

9 When does oxidation of an alcohol occur?

A When using only $Cr_2O_7^{2-}$

B When using only MnO_4^{2-}

C When using both $Cr_2O_7^{2}$ or MnO_4^{2-}

D *When using either $Cr_2O_7^{2}$ or MnO_4^{2-}*

10 Oxidation of ethanol produces:

A ethanoic acid.

B ethanal.

C *ethanal then ethanoic acid.*

D ethanoate.

11 What is the major product of the reaction between propene and HCl?

A *2-chloropropane*

B 1-chloropropane

C Chloropropane

D Chloropropene

12 Which of the following is not an aromatic compound?

A TNT

B Toluene

C *Cyclohexane*

D Phenol

13 Which of the following straight chain hydrocarbons has the highest melting point?

A *Decane*

B Octane

C Pentane

D Nonane

14 What is methane's shape?

A Square planar

B Trigonal planar

C Octahedral

D *Tetrahedral*

15 What is the major intramolecular bond in hydrocarbons?

A *Dispersion forces*

B Ionic

C Covalent

D Polar

Section B Short answer (15 marks)

Section B consists of five questions. Write your answers in the spaces provided. You are advised to spend 20 minutes on this section.

1 The reaction between benzene, cyclohexane, 1-hexene and bromine water will result in one of them instantaneously decolourising the bromine water. Which one will this be, and why? What does this tell us about the other two compounds?

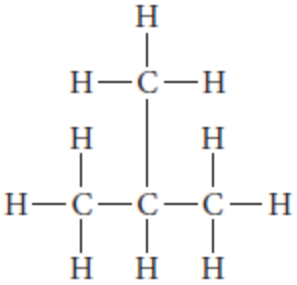
Answer: The alkene, 1-hexene, will decolourise because the bromine will add across the double bond. The other two compounds are too stable to react. They don't have electron rich double bonds for the bromine to react with.

(= 3 marks total)

2 Draw the structures of the following compounds:

a methylpropane

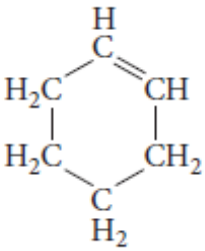
Answer:



(1 mark)

b cyclohexene

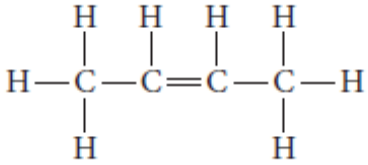
Answer:



(1 mark)

c but-2-ene

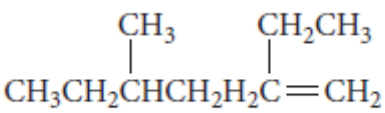
Answer:



(1 mark)

d 3-ethyl,2-methylhept-1-ene

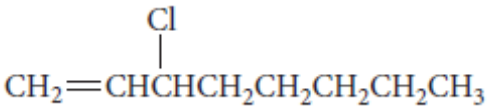
Answer:



(1 mark)

e 3-chlorooct-1-ene

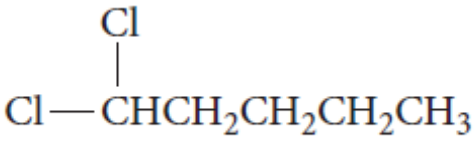
Answer:



(1 mark)

f 1,1-dichloropentane

Answer:



(1 mark)

(= 6 marks total)

3 Describe how you would make the ester methylpropane. Describe your starting reactants and the catalyst you would use.

Answer: Propanoic acid + methanol, catalyst conc. H_2SO_4 warm mixture in hot water.

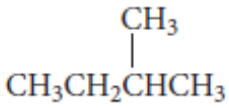
(= 1 mark total)

4 How many isomers are there of pentane? Draw them.

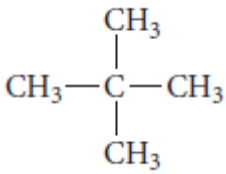
Answer: There are three total.

$CH_3CH_2CH_2CH_2CH_3$

(1 mark)



(1 mark)



(1 mark)

(= 3 marks total)

5 Show a reaction that produces ethanoic acid from an alcohol.

Answer: Any reaction that shows oxidation of an ethanol to ethanoic acid; for example, $3CH_3CH_2OH(aq) + 2Cr_2O_7^{2-}(aq) + 16H^+(aq) \rightarrow 3CH3COOH(aq) + 4Cr^{3+}(aq) + 11H_2O(l)$.

This can represented generally as:

$R–CH_2OH \rightarrow R–COOH$ (2 marks)

(= 2 marks total)