**Carbon test solutions**

**Multiple choice**

|  |  |
| --- | --- |
| **Question** | **Response** |
| **1** | B |
| **2** | A |
| **3** | B |
| **4** | D |
| **5** | C |
| **6** | A |
| **7** | B |
| **8** | C |
| **9** | B |
| **10** | D |

**Question 1**

*Answer:* B

*Explanation:*

The reaction with bromine indicates a double bond and the reaction with the carbonate suggests an acid.

**Question 2**

*Answer:* A

*Explanation:*

Propyl butanoate is formed from the alkanol propanol reacting with the carboxylic acid, butanoic acid.

**Question 3**

*Answer:* B

*Explanation:*

The longest chain in this molecule is butane. On the second carbon, there are two methyl groups, hence the 2,2-dimethyl

**Question 4**

*Answer:* D

*Explanation:*

This is a standard substitution onto an alkane, forming chlorobutane from butane, then butanol.

**Question 5**

*Answer:* C

*Explanation:*

**Question 6**

*Answer:* A

*Explanation:*

Propane is lower boiling point than the longer butane which will be lower boiling point than the alkanol that has hydrogen bonding.

**Question 7**

*Answer:* B

*Explanation:*

H- O - = hydroxyl.. –NH2 = amine, COOH = carboxyl

**Question 8**

*Answer:* C

*Explanation:*

The molecule is

**Question 9**

*Answer:* B

*Explanation:*

The amide group is formed when an amine and a carboxylic acid react.

**Question 10**

*Answer:* D

*Explanation:*

This is methanoic acid

**SECTION B: Short-answer questions**

**Question 1** (8 marks)

1. . 3 marks

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*trans*-hex-3-ene *cis*-hex-3-ene

1. 1 mark





1. **i**.

**ii.**  propanoic acid methylethanoate 2 + 2 = 4 marks

**Question 2** (8 marks)

**a. i**. propan-1-amine

**ii**. –NH2 amine

1 + 1 = 2 marks

**b**. propane 🡪 (uv/Cl2) 1-chloropropane 🡪 (KOH) propan-1-ol 🡪 (NH3) to propan-1-amine 3 marks

**c**.  **i**.



**ii**. –NH-CO- amide 3 marks

**Question 3**

**a**. You show the 1- when there is more than one possible structure for the molecule\*. Propanol needs the 1 but propanoic acid does not as the acid group can only be on the end of the molecule\*

2 marks

**b**. **i**.

Numbering should start from the right hand end of this molecule, making it 2-methylpentane\*

**ii**. No, it is an isomer of hexane as it has 6 carbons \*

1 + 1 = 2 marks

**c**. **i**. 2-propanol and 1-propanol\*\*

**ii**. propan-2-one propanoic acid



2 + 2 = 4 marks

**Question 4** (6 marks)

**a. i.**  

**ii**. both molecules are flammable, insoluble in water, fuels and relatively low boiling point

**iii**. pentane will have a higher boiling point, higher viscosity, higher flashpoint \*\*

1 + 1 + 2 = 4 marks

**b**. pent-3-en-1-ol 2,3,4-trichloropentane



2 marks

**Question 5**

**a**.

Molecule A\*

Substance B KCl \*

2 marks

**b**. **i**.

\*



**ii**.

\*

**iii**. some 1-propanol is oxidized to propanoic acid, using Cr2O72- in acid\*\*





Remaining 1-propanol is reacted with propanoic acid using sulfuric acid as a catalyst to form propylpropanoate \*\*

1 + 1 + 4 = 6 marks

**c**.

Name: oct-1-ene \* Formula: C8H16 \*

2 marks

Total 10 marks