higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

CHEMISTRY N5

10 August 2021

This marking guideline consists of 4 pages.

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QUESTION 1

1.1 False
1.2 True
1.3 True
1.4 False
1.5 False

(5 × 1) **[5]**

QUESTION 2

2.1 2.1.1 B: 4-Ethyl-3-methylheptane
C: 3-Ethyl-4,7-dimethylnonane (3 × 2) (6)

2.1.2 $CH_3CH_2CH_2CH_2CH_2CH_2CH_3$ (2)

2.1.3 None (1)

2.1.4 C_9H_{20} (2)

2.1.5 C_nH_{2n+2} (1)

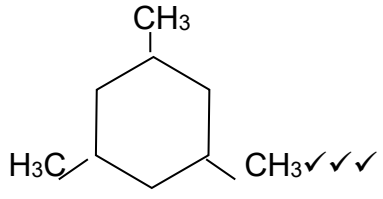
2.1.6 None.✓ Alkanes are insoluble in water.✓ (2)

2.1.7 $C_{10}H_{22} + 33/2O_2(g) \rightarrow 10CO_2(g) + 11H_2O(\ell)$ (4)

2.1.8
- Alkanes are classified as saturated hydrocarbons.
- Their boiling points increase with an increase in molecular weight.
- Alkanes up to butane exist as gases at ordinary temperature and pressure.
- Alkanes from n = 5 up to n = 16 are liquids at ordinary temperatures and pressures, and those with more than 16 carbon atoms are waxy solids.
- Alkanes are non-polar and does not dissolve in water.

(Any 4 × 1) (4)

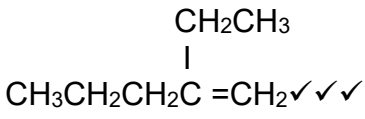
2.2



✓✓✓ (3)
[25]

QUESTION 3

3.1 3.1.1



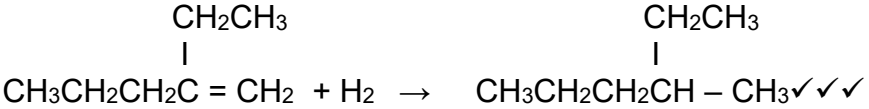
(3)

3.1.2 C_6H_{12} (1)

3.1.3 C_nH_{2n} (1)

3.1.4 Methanal
3-Hexanone (2 × 2) (4)

3.1.5



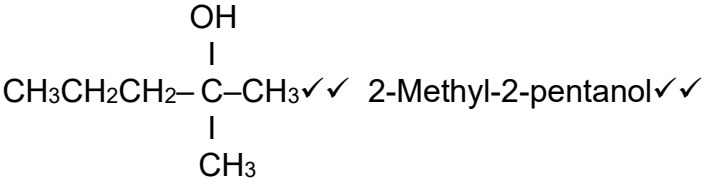
(3)

3.2 A Lindlar catalyst is a finely divided palladium metal✓ precipitated onto a calcium carbonate support✓ and then deactivated by treatment with lead acetate✓ and quinoline and aromatic amine.✓ (4)

3.3 3.3.1 $CH_2 = CHCH = CH_2$
3.3.2 $CH_3CH_2C \equiv CCH_2CH_3$
(2 × 2) (4)
[20]

QUESTION 4

4.1 4.1.1



(4)

4.1.2 Tertiary alcohol (1)

4.1.3 Grignard reagent (1)

4.1.4 $CH_3Br + Mg \rightarrow CH_3MgBr$ (3)

4.1.5
- Alcohols containing up to 12 carbon atoms are liquid at ordinary temperature and pressure.
- The boiling point of alcohols increases with an increase in molecular mass.
- The high boiling points of alcohols results from hydrogen bonding.
- Methanol, ethanol and propanol are soluble in water at ordinary temperature and pressure.
- Solubility in water decreases with an increase in molecular mass.

(Any 3 × 1) (3)

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4.2 4.2.1 Fermentation is a process or reaction in which sugars and carbohydrates✓ are broken down into ethanol and carbon dioxide.✓ The reaction is catalysed by certain enzymes that are found in yeast.✓ (3)

4.2.2 In alcohols, hydrogen is directly bonded to the highly electronegative oxygen atom.✓ The hydrogen atom in one molecule is bonded to the oxygen end of a neighbouring molecule,✓ and the phenomenon is called hydrogen bonding.✓ This results in alcohols having higher boiling points than their corresponding alkanes.✓ (4)

4.3 4.3.1 Pentyl ethanoate
4.3.2 Ethyl butanoate
4.3.3 Octyl ethanoate

(3 × 2) (6)
[30]

QUESTION 5

5.1 5.1.1 It is the removal of hydrogen form a molecule. (2)

5.1.2 Secondary alcohol.✓ Ketones are prepared by the dehydrogenation of secondary alcohols (-CHOH).✓ (2)

5.1.3 2-Propanol (3)

5.1.4
- Potassium dichromate or $K_2Cr_2O_7$
- Potassium permanganate or $KMnO_4$ (2)

5.1.5
$$CH_3CH(OH)CH_3 \xrightarrow[Cu/Ag\ catalyst]{(550-600\ ^0C)} CH_3-C(=O)-CH_3$$ ✓✓✓ (3)

5.1.6 To an unknown solution, add a few drops of Tollens' reagent or a silver salt solution.✓ If the silver ion is reduced to metallic silver, which forms a shiny mirror on the sides of the reaction tube,✓ it is a positive test for aldehydes.✓ (3)

5.2 5.2.1 Aniline
5.2.2 Acetamide
5.2.3 Urea
5.2.4 Methylamine
5.2.5 Methanal or formalin

(5 × 1) (5)
[20]

TOTAL: 100

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