higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

CHEMISTRY N5

9 APRIL 2018

This marking guideline consists of 5 pages.

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QUESTION 1

1.1 Ethane
1.2 Amides
1.3 Dehydration
1.4 Iodopropane
1.5 Butanoi
1.6 2-Butyne
1.7 Methylpropane
1.8 Methanoic acid
1.9 Aniline
1.10 Propyne

(10 × 1) **[10]**

QUESTION 2

2.1 2.1.1 Sp^2 hybridization (1)

2.1.2 $C_2H_6(g) + C\ell_2(g) \rightarrow C_2H_5C\ell(g) + HC\ell(g)$ (4)

2.1.3 Radicals (1)

2.1.4 Heterolytic bond cleavage.✓ It is a symmetrical bond cleavage, after the bond is broken, each atom leaves with an unpaired electron.✓ (2)

2.1.5 It is an unsaturated hydrocarbon. (1)

2.1.6 $C_2H_6(g) + O_2(g) \rightarrow CO_2(g) + H_2O(\ell)$ (4)

2.1.7
- They are nonpolar
- They are insoluble in water and soluble in nonpolar compounds.
- The boiling points of alkanes increase with an increase in molecular size.
- Alkanes from n=1 to n=4 are gases at ordinary temperatures and pressures.
- Alkanes from n=5 to n=16 are liquids at ordinary temperatures and pressures.
- Those with more than 16 carbon atoms exists as waxy solids.

(Any THREE) (3)

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2.2 2.2.1 $C_2H_4(g) + HBr(g) \rightarrow C_2H_5Br(g)$ (3)

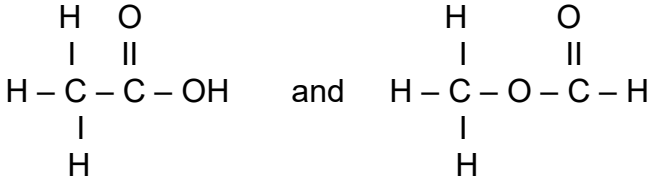
2.2.2
- An **electrophile** is an **electron lover** or a substance that accepts an electron pair form a nucleophile.
- An **nucleophile** is an **electron rich** or a substance that donates a pair of electrons to an electrophile. It is also called a nucleus lover. (4)

2.2.3 It is a nonpolar compound.✓ Generally alkenes are classified as nonpolar compounds.✓ (2)

[25]

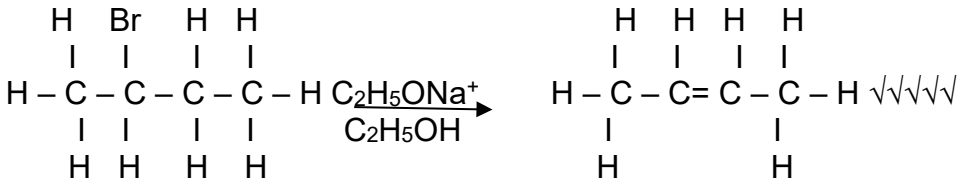
QUESTION 3

3.1



Ethanoic acid✓✓ Methylmethanoate✓✓ (4)

3.2



2-Bromobutane 2-Butene (5)

3.3 It is a carbon atom that has gained an electron, i.e. a carbon anion. (2)

3.4 3.4.1



RCOOH or R– C – OH✓ (1)

3.4.2 Addition reaction (1)

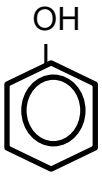
3.4.3 Alcohol (1)

3.4.4 Carboxylic acids (1)

3.4.5 $C_4H_6(g) + O_2(g) \rightarrow CO_2(g) + H_2O(\ell)$ (3)

3.4.6
A Butene
B 2-propanol
C Ethene
D 1,2-Chloroethane
E Propanoic acid (5)

3.5

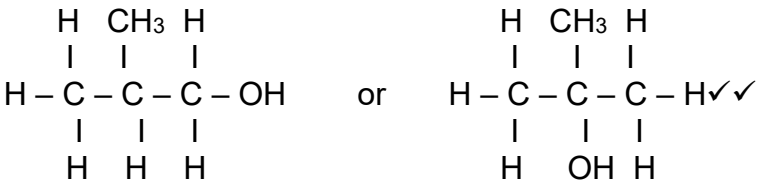


(2)
[25]

QUESTION 4

4.1 4.1.1 2-Methyl-1-propanol or 2-methyl-2-propanol (2)

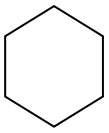
4.1.2



(2)

4.1.3 Alcohols (1)

4.1.4 $CH_3 - CH_2 - CH_2 - CH_2OH$



(2)

4.2 4.2.1 $CH_3 - CH_2OH$ (2)

4.2.2 Primary alcohol. ✓ The –OH functional group is bonded to a carbon atom that contains three hydrogen atoms.✓ (2)

4.2.3 To remove water from the alcohol. (1)

4.3 Alcohols have strong intermolecular forces (hydrogen bonds) whereas alkanes does not have those strong intermolecular forces. (2)

4.4 4.4.1 $MgBrCH_2 - CH_3$

4.4.2 Ethylmagnesiumbromide

4.4.3 2-Methyl-2-butanol

(2 × 2) (6)
[20]

QUESTION 5

5.1 5.1.1 Carboxylic acid (1)

5.1.2 Ethanoic acid (2)

5.1.3  (3)

5.1.4 Propylethanoate✓✓ + water✓✓ (4)

5.1.5 Esterification reaction (1)

5.2 5.2.1 Diethyl ether

5.2.2 Trimethyl amine

5.2.3 Ethanamide

(3 × 2) (6)

5.3 $NH_2(CH_3)_2(aq) + H_2O(\ell) \rightarrow CH_3NH_3^+(aq) + OH^-(aq)$ (3)

[20]

TOTAL: 100

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