higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

CHEMISTRY N5

2 AUGUST 2018

This marking guideline consists of 5 pages.

QUESTION 1

1.1 1.1.1 C_4H_{10} (1)

1.1.2 alkanes (1)

1.1.3 Alkanes are soluble in nonpolar solvents like hexane and insoluble in polar solvents like water. (2)

1.1.4

$$\begin{array}{l} \quad CH_3 \\ \quad\ \ | \\ CH_3 - CH - CH_3 \end{array}$$

$CH_3 - CH_2 - CH_2 - CH_3$ (4)

1.1.5 Isomers are compounds that have similar molecular formulae and different structures. (2)

1.2 1.2.1 It is a symmetrical bond splitting through which molecules split and each atom moves away with unpaired electrons. (2)

1.2.2 radicals (1)

1.2.3 C1 sp^3
C2 sp^3
C3 sp^3 (3)

1.2.4

$$CH_3 - CH_2 - CH_3(g) + C\ell_2 \rightarrow \begin{array}{l} \quad\ \ C\ell \\ \quad\ \ | \\ CH_3 - CH - CH_3 \end{array} + HC\ell$$ (4)

1.3 1.3.1 A
C
D (3)

1.3.2 An electrophile is a species that accepts a pair of electron from a nucleophile in a polar forming bond. Electrophiles are also referred to as 'electron lovers' or electron poor. (2)
[25]

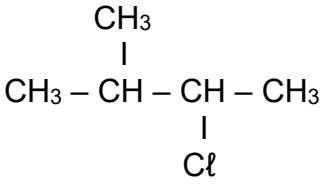
QUESTION 2

2.1 2.1.1 C_nH_{2n} (1)

2.1.2 Nonpolar (1)

2.1.3 2-Chloror-3-methylbutane (3)

2.1.4



(3)

2.1.5 Markovnikov's rule states that during the addition of HX to an alkene, the H attaches itself to the carbon atom with fewer alkyl substituents and the X will attach itself to a carbon atom with more alkyl substituents. (2)

2.2 2.2.1 Sodium ethoxide in ethanol

2.2.2 Base-induced elimination reactions generally give a more highly substituted alkene product, i.e. the alkene with more alkyl substituents on the double carbons.

2.2.3 -Methyl-2-butene 3-Methyl-1-butene
major product minor product
(3 × 2) (6)

2.3 2.3.1 $CH_3 - CH = CH - CH = CH_2$ (3)

2.3.2 1,3-Dimethylpentene (2)

2.4 $C_4H_6 + 5.5O_2(g) \rightarrow 4CO_2(g) + 3H_2O(\ell)$ (4)
[25]

QUESTION 3

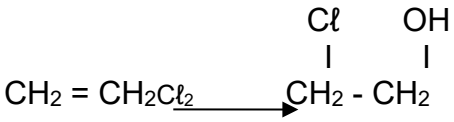
3.1 3.1.1 Alcohols have higher boiling points than alkanes. (2)

3.1.2 $CH_3OH(aq) + H_2O(\ell) \rightarrow CH_3O^-(aq) + H_3O^+(aq)$ (3)

3.1.3 $K_a = \frac{[CH_3O^-][H_3O^+]}{[CH_3OH]}$ (2)

3.1.4 The K_a will be small because alcohols are weak acids. (2)

3.2 3.2.1



3.2.2 $CO(g) + 2H_2(g) \longrightarrow CH_3OH(g)$

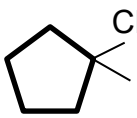
(2 × 3) (6)

3.3 3.3.1 cyclopentanone (2)

3.3.2

(1)

3.3.3



Methylcyclopentanol (3)

3.3.4 Grignard reagent or methylmagnesium bromide (1)

3.3.5 tertiary alcohol (1)

3.4

(2)
[25]

QUESTION 4

4.1	4.1.1	octanol		
	4.1.2	tollens reagent		
	4.1.3	urea		
	4.1.4	methanoic acid		
	4.1.5	RCOOR		
	4.1.6	formic acid		
	4.1.7	methanal		
	4.1.8	aniline		
	4.1.9	ethanamide		
	4.1.10	methyl amine	(10 × 1)	(10)
4.2	4.2.1	A Benzene B Cyclohexene C 1,4-Cyclohexadiene D Cyclohexane		(4)
	4.2.2	A and D		(2)
	4.2.3	alkenes		(2)
	4.2.4	A or D		(2)
4.3	$CH_3OH(g) + (CH_3)_2NH(g) \rightarrow (CH_3)_2N(g) + H_2O(\ell)$			(5)
				[25]
			TOTAL:	**100**