higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

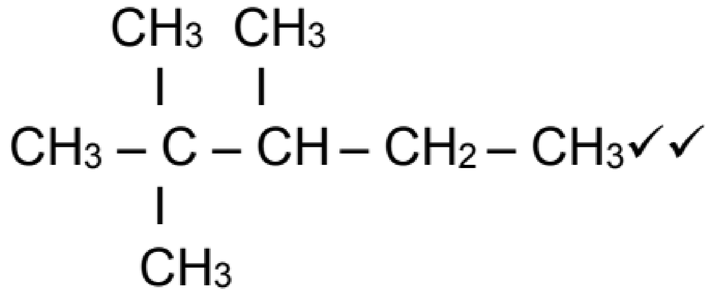
CHEMISTRY N5

27 NOVEMBER 2019

This marking guideline consists of 5 pages.

QUESTION 1: INTRODUCTION TO ORGANIC CHEMISTRY AND ALKNES

1.1



(2)

1.2 1.2.1 Radicals are compounds or a group of compounds with unpaired electrons or an odd number of electrons and are highly reactive. (1)

1.2.2 $C\ell\cdot$ (1)

1.2.3 Hybridisation is the mathematical combination of ground-state S and P orbitals.✓ In the propane molecule all three carbon atoms are sp^3 hybrids.✓✓ (3)

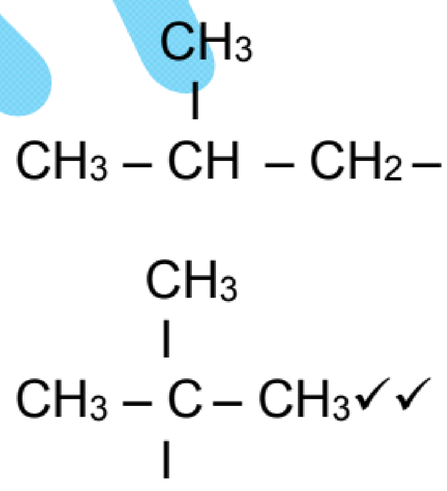
1.2.4 Homolytic bond breakage occurs when each atom or species breaks away with its unpaired electron. (2)

1.3 An electrophile is an electron lover or a substance that accepts an electron pair from a nucleophile, while a nucleophile is an electron-rich substance that donates a pair of electrons to an electrophile. It is also called a nucleus lover.
(2 + 2) (4)

1.4 1.4.1 C_5H_{12} (1)
1.4.2 C_nH_{2n+2} (1)
1.4.3 Pentane (1)
1.4.4 No (1)

1.4.5 Pentane will have a higher boiling point,✓ because the boiling points of alkanes increase with an increase in molecular size.✓ (2)

1.4.6



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QUESTION 2: ALKENES, ALKYNES AND AROMATIC COMPOUNDS

2.1 2.1.1 Isolated polyene
2.1.2 Conjugated polyene
2.1.3 Isolated polyene
(3 × 1) (3)

2.2 2.2.1 Base-induced elimination reactions generally give more highly substituted alkene products. (2)

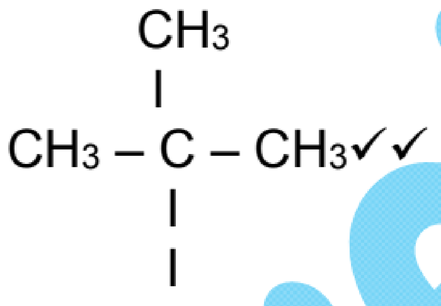
2.2.2 Major product: 2-butene✓✓
Minor product: 1-butene✓✓ (4)

2.2.3 Sodium ethoxide in ethanol (1)

2.3 2.3.1 During the addition of HX to an alkene, the H attaches to the carbon with fewer alkyl substituents and the X attaches to the carbon with more alkyl substituents. (2)

2.3.2 2-Iodo-2-methylpropane (4)

2.3.3



(2)

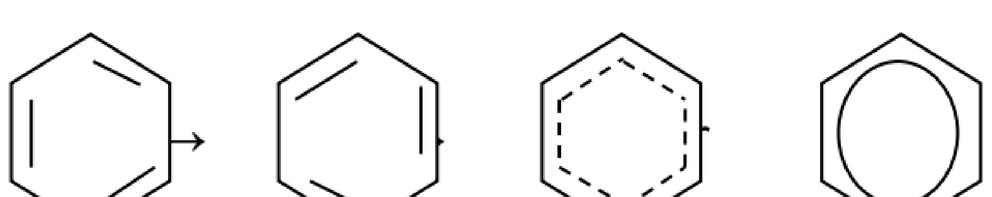
2.4 2.4.1 $CH_3 - C \equiv C - CH_3 \xrightarrow[\text{Lindlar catalyst}]{H_2} CH_3 - CH = CH - CH_3$

$CH_3 - CH = CH - CH_3 \xrightarrow[\text{Lindlar catalyst}]{H_2} CH_3 - CH_2 - CH_2 - CH_3$✓✓✓✓ (4)

2.4.2 Butane (1)

2.4.3 Sodium or lithium metal in liquid ammonia solvent (2)

2.5 Resonance is the rotation of double bonds. In the benzene structure all the C–C bond lengths are equal and it is possible for the double bond to rotate throughout the benzene ring.✓✓



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