Name ..... Class: .....

Start Time ..... End Time ..... Time Taken .....

Time allowed: 33 minutes

INSTRUCTIONS TO CANDIDATES

- This document is designed to be used as a practice test.
- Complete the test under exam conditions in one sitting.
- Optional: Before marking it, go through the paper with a set of notes and improve your answers.
- Mark the test using the mark scheme make corrections on the paper.
- Complete the table on the front page.
- Improve your notes so that they better reflect your weaknesses.
- Make a note of your strengths and weaknesses for future revision.

Mark Scheme

Success Criteria	Questions in Paper	Mark	Out of	%	Rank Order
Saturated and unsaturated hydrocarbons	1a, 6aiii		2		
Electrophilic addition – the basics	[illegible], 5b		7		
Electrophilic addition – simple mechanism	[illegible]		9		
Stereoisomerism	1c, 3, 4a, 6aii		6		
Nomenclature	2		[illegible]		
Optical isomerism (optional)	4d		3		
Addition Polymerisation	5c, 6ai		3		
			31		

Q1.

(a) Contains a C=C ***OR*** a double bond

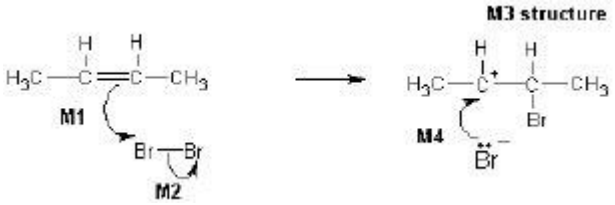
1

(b) **Electrophilic addition**

Both words needed

1

Mechanism:



Ignore partial negative charge on the double bond.

M2 Penalise partial charges on bromine if wrong way and penalise formal charges

Penalise once only in any part of the mechanism for a line and two dots to show a bond.

M1 Must show an arrow from the double bond towards one of the Br atoms on a Br-Br molecule.

Deduct 1 mark for sticks.

M2 Must show the breaking of the Br-Br bond.

M3 Is for the structure of the secondary carbocation with Br substituent.

M4 Must show an arrow from the lone pair of electrons on a negatively charged bromide ion towards the positively charged carbon atom.

Deduct 1 mark for wrong reactant, but mark consequentially.
If HBr, mark the mechanism consequentially and deduct 1.
If but-1-ene, mark the mechanism consequentially and deduct one mark.
If both HBr and but-1-ene, mark the mechanism consequentially and deduct ONLY one mark.

4

(c) (i) **M1** Compounds with the same structural formula

Penalise M1 if "same structure"
Ignore references to "same molecular formula" or "same empirical formula"

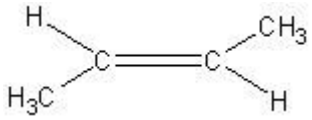
1

M2 With atoms/bonds/groups arranged differently in space
OR
atoms/bonds/groups have different spatial arrangements/ different orientation.

Mark independently.

1

(ii)



Award credit provided it is obvious that the candidate is drawing the trans isomer.

Do not penalise poor C–C bonds

Trigonal planar structure not essential

1

[9]

Q2.

C

[1]

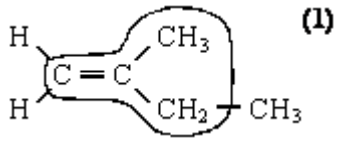
Q3.

B

[1]

Q4.

(a)



(1)

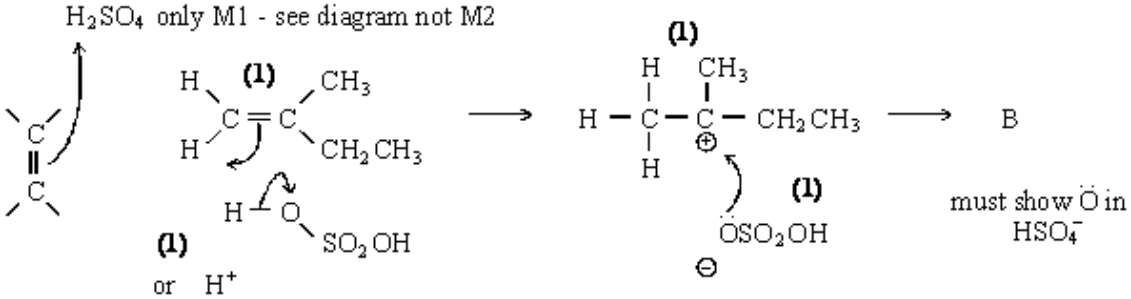
May circle 4 C's separately

1

(b)

H^+ can score M1 + M2

H_2SO_4 only M1 - see diagram not M2



Ignore δ+ and δ- unless wrong

4

(c) *Reagent*: H_2O or water **OR steam, Or dilute sulphuric acid (1)**
Condition: heat, or warm, or boil or reflux [50-100°C] **(1)**
Name of compound ***C***: 2-methylbutan-2-ol **(1)**

Allow 2-methylbutane-2-ol
Penalise hydroxy-2-methylbutane and 2-methylbut-2-ol once only in the paper

3

(d) *Identity of alcohol D*: 2-methylbutan-1-ol **(1),**
OR its structure, could describe
structure

Explanation: C formed via t-carbocation; D via p-carbocation, **(1)**
tertiary more stable than primary **(1)**
If have wrong carbocation can still score stability mark

3

[11]

Q5.

(a) *Electrophile*: e^- pair / lone pair acceptor or e^- deficient species or e^- seeking species **(1)**
For 'species' accept atom, molecule, ion
NOT '+' ion
NOT 'attracted to '-' charge'

Addition: reaction which increases number of substituents or convert double bond to single bond or where two molecules form one molecule **(1)**

2

(b) (High) e^- dense or e^- rich C=C or e^- rich π bond or 4 e^- between the C's **(1)**
NOT just 'C=C'

causes induced dipole in Br_2 **(1)**
Ignore refs to 'temporary'
can score M2 from δ^+ / δ^- on Br_2 in (c) unless a contradicting error in (b)

2
5

(c) addition **(1)**
Not additional

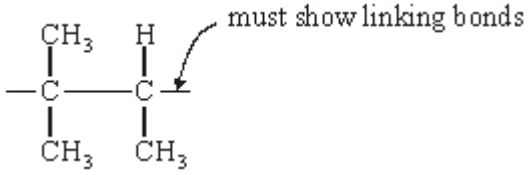
1

[10]

Q6.

(a) (i) *Type of polymerisation*: addition(al) **(1)**

Repeating unit:



(1)

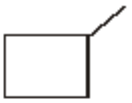
not multiples
allow n

(ii) $CH_3CH=CHCH_2CH_3$ **(1)** C_2H_5

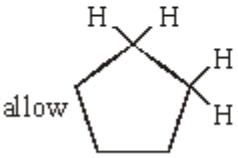
(iii)

(1)

or



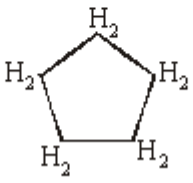
etc



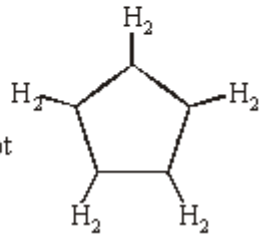
allow

etc

or



but not



4

[7]