

Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Organic Synthesis

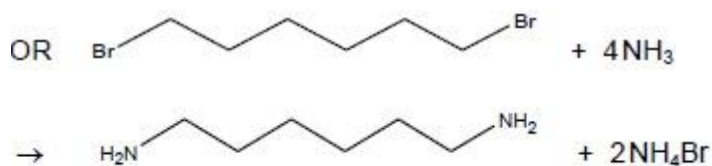
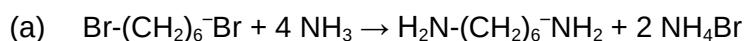
Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

Q1.



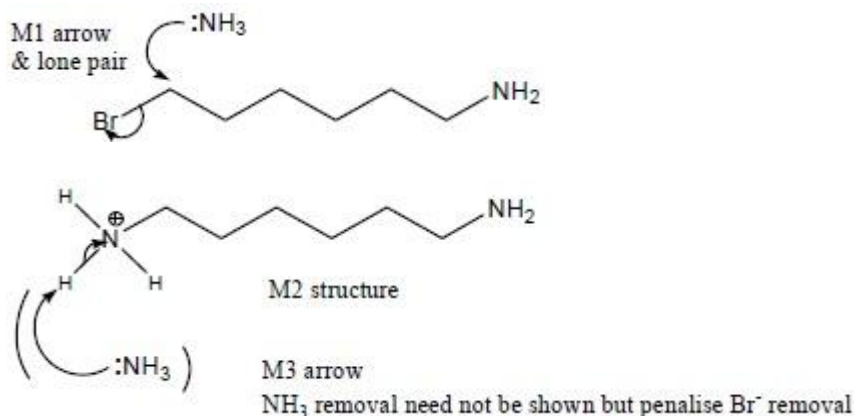
M1 both organic compounds correct (not molecular formulae)

Allow one correct structural formula and the other correct molecular formula of type $\text{XC}_6\text{H}_{12}\text{X}$

M2 balanced

2

(b)



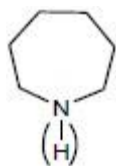
Or with structural formulae, $\text{Br}(\text{CH}_2)_6\text{NH}_2$ etc

Allow $\text{S}_{\text{N}}1$

Penalise incorrect partial charges in **M1**

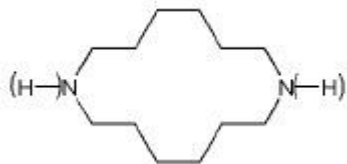
3

Impurity



(or as structural formula)

Allow



1

- (c) **M1** Stage 1 reagent KCN or NaCN

*Not HCN this loses **M1** and **M2***

*Any mention of acid loses **M1** & **M2***

1

M2 Stage 1 condition aqueous alcohol

***M2** dependent on correct **M1** (allow condition if only CN^- ions)*

1

M3 Stage 2 reagent & condition H_2 and Ni or Pt or Pd

***M3** only accessible if a cyanide is used in stage 1*

1

Allow LiAlH_4 (in dry ether) – acidic/aqueous = CE, but allow followed by acid.

NOT NaBH_4 NOT Sn/HCl or Fe/HCl

Ignore heat and reflux and pressure

Apply list principle to incorrect reagents/conditions

- (d) In 3-aminopentane

Allow converse for ammonia

Lone pair on N more available or Lone pair on N accepts H^+ better

Or greater stability of protonated N

1

because of alkyl electron pushing /inductive effect

Mark independently

1

- (e) No carbon (atom is) attached to 4 different groups

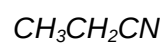
Allow central carbon has two alkyl groups

Allow symmetrical molecule

1

[12]

Q2.
B



[1]

Q3.

- (a) 3-bromo-(2)-methylpropan-1-ol ONLY

3 and 1 are essential, 2 may be omitted, but any other number here is wrong

Ignore hyphens and commas

1

- (b) Bromine is more electronegative than carbon

Allow difference in electronegativity if polarity of bond shown

M1

C is partially positive / electron deficient

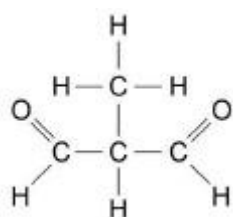
M2 and M3 can be awarded from diagram that shows nucleophilic attack

M2

Lone/electron pair (on the nucleophile) donated to the partially positive carbon

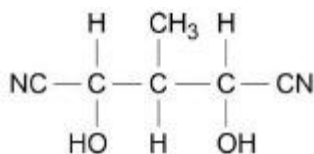
Allow lone pair attracted to / attacks the partially positive carbon

M3



Must be displayed with all bonds shown

1



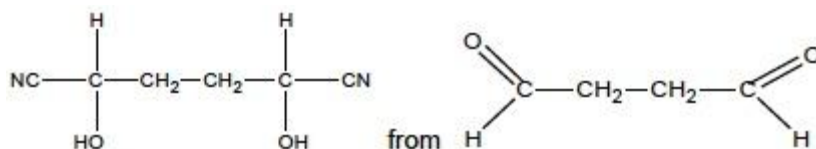
Not need be displayed

See General Marking instructions section 3.12 for penalties for incorrectly drawn bonds such as C-HO or C-NC etc.

1

KCN & (dil) acid

Allow



Allow HCN

Ignore alcoholic solvents

Penalise conc. HCl, H₂SO₄ or any HNO₃

1

[7]