

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1.

- (a) 3-bromopropanenitrile

Allow 3-bromopropane-1-nitrile

1

- (b) This question is marked using levels of response. Refer to the Mark Scheme Instructions for Examiners for guidance on how to mark this question.

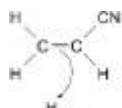
Level 3 5-6 marks	All stages are covered and each stage is generally correct and virtually complete. Answer is communicated coherently and shows a logical progression from Stage 1 to Stages 2 and 3.
Level 2 3-4 marks	All stages are covered but stage(s) may be incomplete or may contain inaccuracies OR two stages are covered and are generally correct and virtually complete. Answer is communicated mainly coherently and shows a logical progression from Stage 1 to Stages 2 and 3.
Level 1 1-2 marks	Two stages are covered but stage(s) may be incomplete or may contain inaccuracies OR only one stage is covered but is generally correct and virtually complete. Answer includes isolated statements but these are not presented in a logical order.
Level 0 0 marks	Insufficient correct chemistry to gain a mark.

Indicative Chemistry content**Stage 1 Types of Isomers formed**1a CH_3CHBrCN

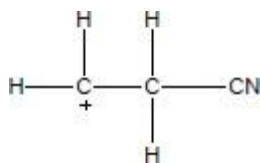
1b Exists as two Optical isomers / enantiomers

Stage 2 Mechanism

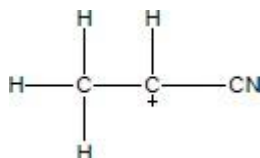
2a 2 curly arrows



2b Intermediate structure primary carbocation OR



2c Alternative Intermediate structure secondary carbocation OR



Stage 3 Optical isomerism

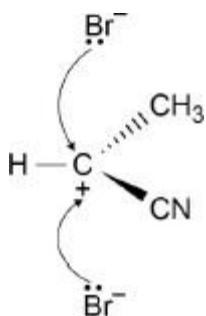
3a 2-bromo isomer has chiral carbon / C with four different groups / non superimposable mirror images

OR



3b Optical because (secondary) C⁺ planar

3c So can be attacked from above or below



6

(c) M1 KCN or NaCN

Penalise acid in M1

M2 Aqueous AND ethanol (alcohol)

2

(d) M1 H₂ and Ni/Pt/Pd

Allow LiAlH₄ and (Dry) ether BUT not NaBH₄

M2 NCCH₂CH₂CN + 4H₂ → H₂N(CH₂)₄NH₂

Allow with 8[H]

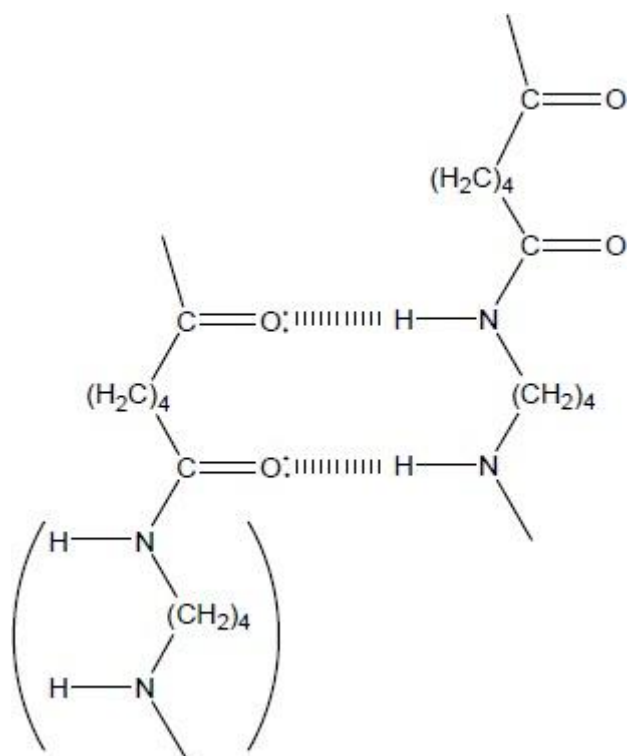
2

(e) M1 $x = 5$

M2 $y = 9$

2

(f)



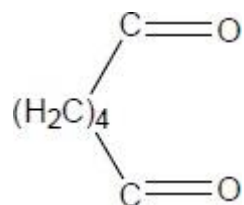
Structure shown on the left of the given structure.

The correct answer is the same irrespective of whether it's drawn on the left or right of the polymer section.

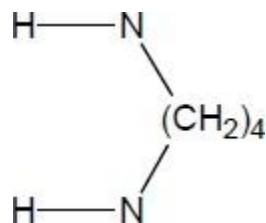
Deduct a mark(s) for error(s)/omission(s)

Must have the following:

- Minimum correct structure



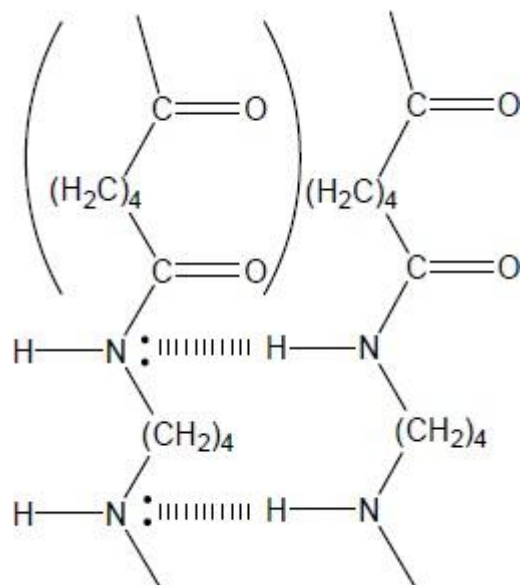
Or



- Lp on O or N

- 2 Linear dashed lines from O or N to H

Allow alternative connection below



Q2.
A



[1]

Q3.
D

It reacts with hydrochloric acid.

[1]