Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Optical isomerism

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Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 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

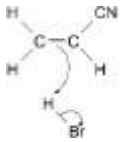
1a $CH_3CHBrCN$

1b Exists as two Optical isomers / enantiomers

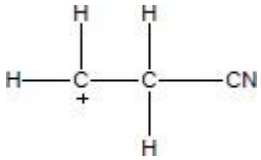
Stage 2 Mechanism

2a 2 curly arrows

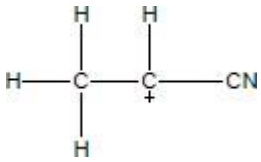
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2b Intermediate structure primary carbocation OR



2c Alternative Intermediate structure secondary carbocation OR



Stage 3 Optical isomerism

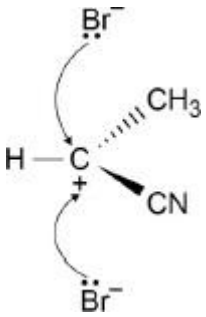
3a 2-bromo isomer has chiral carbon / C with four different groups / non superimposable mirror images

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 H_2 and Ni/Pt/Pd

Allow $LiAlH_4$ and (Dry) ether BUT <u>not</u> $NaBH_4$

M2 $NCCH_2CH_2CN + 4H_2 \rightarrow H_2N(CH_2)_4NH_2$

Allow with 8[H]

2

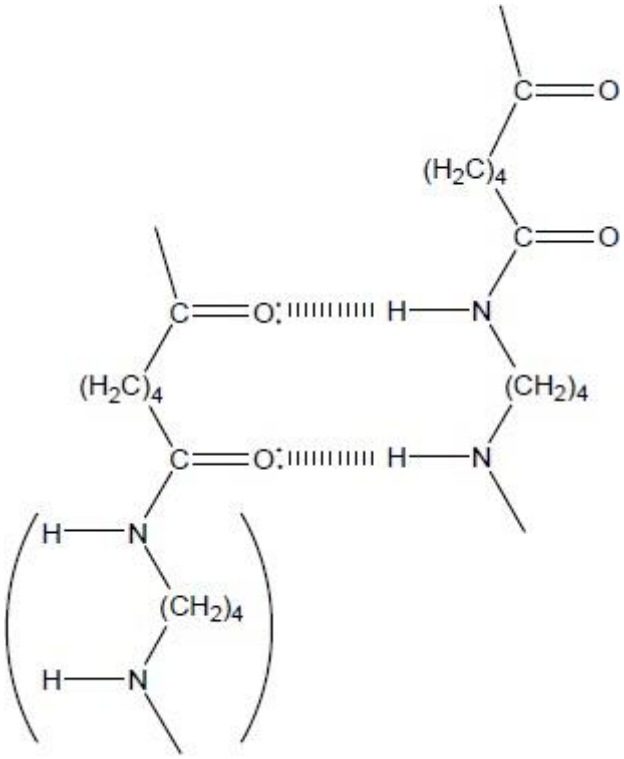
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(e) M1 $x = 5$

M2 $y = 9$

2

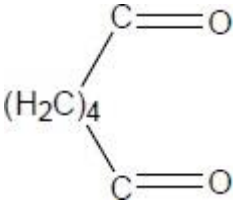
(f)



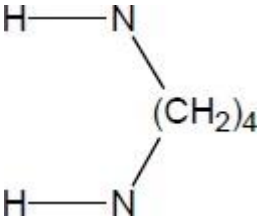
Structure shown on the left of the given structure.
The correct answer is the same irrespective of whether it's drawn on the left or right of the polymer section.

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

Must have the following:
• *Minimum correct structure*



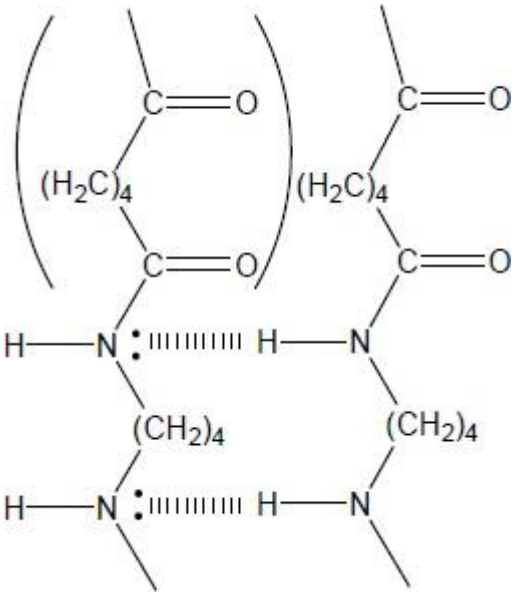
Or



• *Lp on O or N*
• *2 Linear dashed lines from O or N to H*

Allow alternative connection below

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2

[15]

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Q2.

(a)



1

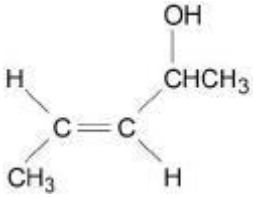
(b) Use Plane polarised light

M1

<u>rotates</u> (the plane of) in opposite directions

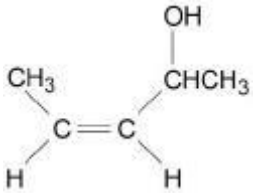
M2

(c)



Must be E isomer

M1

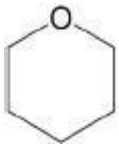


Must be Z isomer

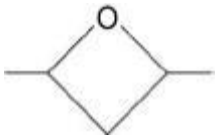
Allow 1 mark out of 2 for 2 correct structures but shown in the wrong boxes

M2

(d)



M1



M2

[7]

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