

Name of the Student: _____

Max. Marks : 15 Marks

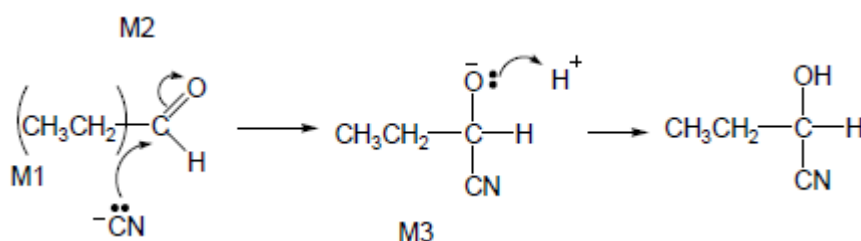
Time : 15 Minutes

Mark Schemes

Q1.

(a) Nucleophilic addition

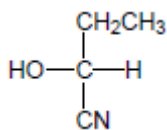
1

M4 for lp, arrow and H⁺Allow C₂H₅- for CH₃CH₂-

- M1 and M4 include lone pair and curly arrow.
- Allow: CN⁻ but arrow must start at lone pair on C.
- M2 not allowed independent of M1, but allow M1 for correct attack on C⁺.
- + rather than δ⁺ on C=O loses M2.
- Penalise incorrect partial charges.
- M3 is for correct structure including minus sign but lone pair is part of M4.
- Penalise extra curly arrows in M4.

4

(b) (i) M1

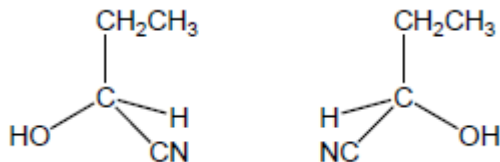


M1 for correct structure of product of part (a).

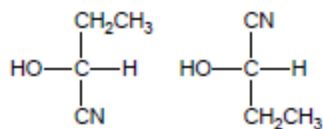
Allow C₂H₅- for CH₃CH₂-.Penalise wrongly bonded, OH or CN or CH₂CH₃ once only in clip.

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M2

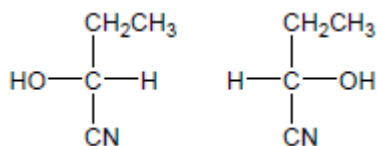


M2 cannot be gained by simply swapping two or more groups with no attempt to show a mirror image., e.g. do not allow M2 for



because these do not show the enantiomers as mirror images.

Students must show an attempt at mirror images, eg allow

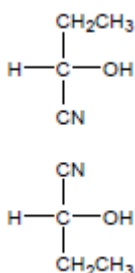


ie vertical groups same and horizontal swapped as if there was a mirror between them

No mirror need be shown

Do not penalize wedge bond when wedge comes into contact with both C & N

However these two could score M2 if placed as below as if with a "mirror" horizontally between them.



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- (ii) M1 (Plane) polarized light
M2 only scores following correct M1

1

M2 or Rotated in opposite directions (equally) (only allow if M1 correct close)

Not just in different directions but allow one rotates light to the left and one to the right.

Not molecules rotate.

1

- (c) 2-hydroxybutane(-1-)nitrile

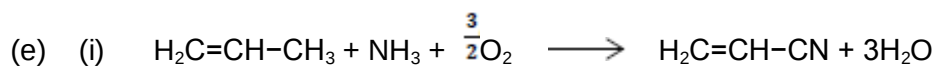
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- (d) Weak acid / (acid) only slightly / partially dissociated / ionised
Ignore rate of dissociation.

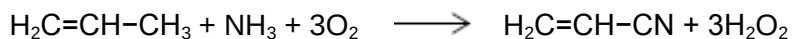
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[CN⁻] very low

Allow (very) few cyanide ions.



OR

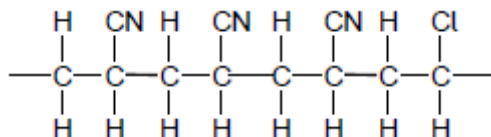


OR doubled.

Allow C_3H_6 and CH_2CHCN or $\text{C}_3\text{H}_3\text{N}$ on this occasion only.

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(ii)

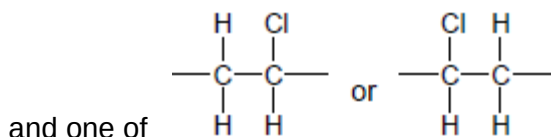
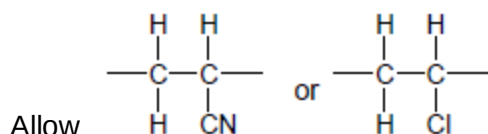
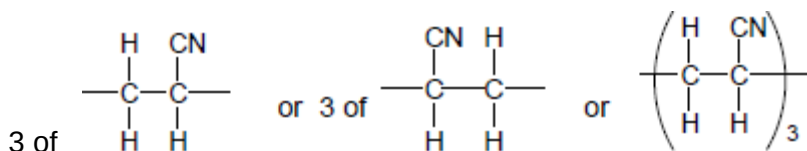


Ignore n.

Must show trailing bonds.

Do not penalise C–NC bond here on this occasion.

Must contain, in any order,



Allow $-\text{CH}_2\text{CH}(\text{CN})\text{CH}_2\text{CHCl}-$ etc.

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(iii) Addition (polymerization)

Allow self-addition.

Do not allow additional.

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[15]