

Mark schemes

1

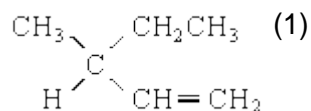
[1]

2

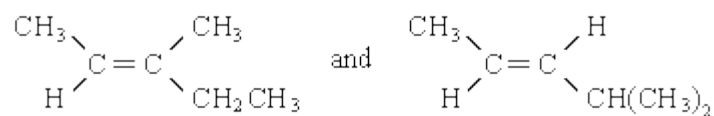
[1]

3

(a) *Structure of P:*



Structures of **Q** and **R:**



NOT C₃H₇

(1)

(1)

Q and R in any order

3

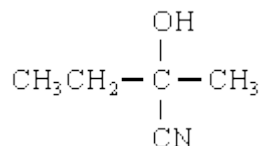
(b) (i) *Racemic mixture: equal mixture of optical isomers / enantiomers*
OR in explanation

Explanation: planar (>C=O) (1)

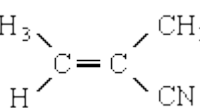
attack from either side is equally likely (1)

(ii) *Reagent S: HCN or (KCN / HCl or H₂SO₄) (1)*

Compound T:



Compound U:



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4

(a) 1, 4-diaminobutane or butane -1, 4-diamine (1)

A: BrCH₂CH₂Br **or** ClCH₂CH₂Cl (1)

B: NC CH₂CH₂CN

Step 1: Br₂ or Cl₂ (1) **(ignore aq)**

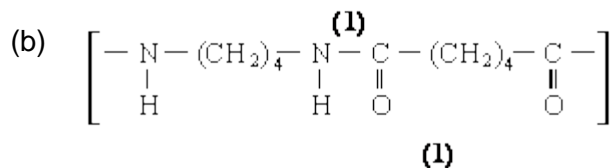
Step 2: KCN (1) **(NOT HCN)**

Step 3: H₂ / Ni **or** LiAlH₄ **or** Na / C₂H₅OH (1) **(NOT NaBH₄)**

Hydrogenation only for H₂ / Ni, **or** nucleophilic addition only for LiAlH₄(1)

OR reduction or addition

7



QL hydrogen bonding (1)

Polarity of H-bonding shown or discussed (1)

4

(c) Polyamides / peptide link can be hydrolysed (1)

OR polyalkenes cannot be hydrolysed

QL OH⁻ attacks peptide link or C^{d+} (1)

poly(ethene) non-polar (1)

3

[14]

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[1]

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[1]

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[1]