

Name of the Student: _____

Max. Marks : 15 Marks

Time : 15 Minutes

Mark Schemes

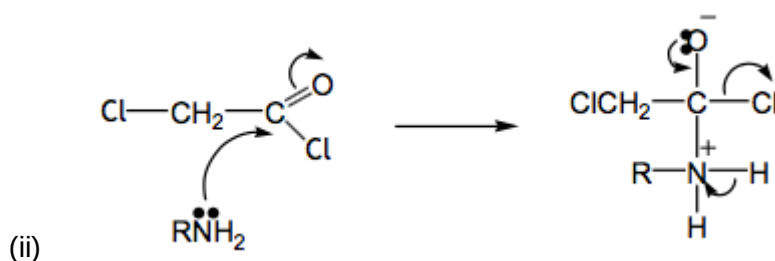
Q1.

- (a) (i) (2-)chloroethan (-1-) oyl chloride

2 not required but penalise 1- or other numbers at start. Ignore 1 in ethanoyl

Ignore hyphens, commas, spaces

1



M1 for arrow from lp on N to C

(or to space half way between N and C)

If full amine drawn, ignore slips except in -NH_2

M2 for arrow from C=O bond to O

Not score M2 as an independent first step, but can allow M1 for attack on C^+ produced

If Cl lost at this stage, Max 1 for M1

M3 for structure of ion including 2 charges

M4 for 3 arrows and lp on O

- may be scored in two steps

Ignore use of RNH_2 to remove H^+ in M4, but penalise use of Cl

4

- (b)
- Nucleophilic substitution

Allow minor spelling errors e.g. nucleophyllic

1

- (c) 9

1

- (d)
- $M_r = 234(0)$

9.4 scores 2 marks

1

% H = 9.4(0)

$$M2 = \frac{22}{M1} \times 100$$

If $M_r = 234$ not shown, can score M1 if their answer $\times 234 =$ their no of H

1

- (e) Tertiary amine OR 3° amine OR III° amine
Ignore N- substituted

1

- (f) (i) If **a** given: CE=0, can only score if answer given is **b**

M1 lp on N^b or on **b**

M2 alkyl groups donate electron density or positive inductive effect or electron donating groups attached

M3 (lp on N^b) more available or protonated amine stabilised or better lp donor/H⁺ acceptor

Ignore reference to nucleophiles

*NOTE – there is NO mark for **b** alone*

Alternatives

*M1 lp on N^a or on **a***

M2 lp or electrons (on N^a) delocalised into ring /towards O in C=O

M3 (lp on N^a) less available (to bond to H⁺/accept proton)

1

1

1

- (ii) Salt is ionic

Independent marks

1

(More) soluble (in blood/body fluids/water)

1

[15]