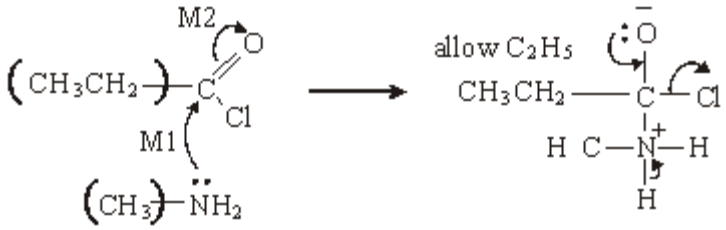
Name of the Student:_____
Max. Marks : 16 Marks **Time : 16 Minutes**

Mark Schemes

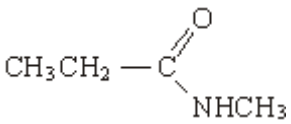
Q1.

(a) (nucleophilic) addition-elimination;



(M3 for structure)
(M4 for 3 arrows and lone pair)
(M2 not allowed independent of M1, but allow M1 for correct attack on C+ if M2 show as independent first.)
(+on C of C=O loses M2 but ignore δ+ if correct)
(Cl^- removing Ft loses M4)

1



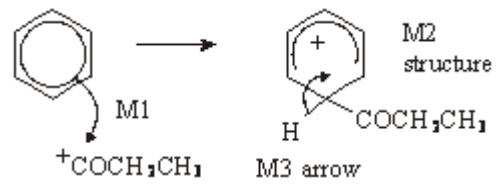
(If MS lost above for wrong C chain, do not penalise same error again here)

5

(b) $CH_3CH_2COCl + AlCl_3 \rightarrow [CH_3CH_2CO]^+ + AlCl_4^-$;

(penalise wrong alkyl group once at first error)
(position of + on electrophile can be on O or C or outside [ ]) (penalise wrong curly arrow in the equation or lone pair on $AlCl_3$)

1

	*(horseshoe must not extend beyond C2 to C6 but can be smaller)* *(+ not too close to C1)* *(penalise M2 if CH_3 chain wrong again but allow M1 and M3)* *(M3 arrow into hexagon unless Kekule)*

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(M1 arrow from within hexagon to C or to + on C) *(don't penalise position of + on C of RCO+)*	*(allow M3 arrow independent of M2 structure)*

3

$AlCl_4^- + H^+ \rightarrow AlCl_3 + HCl$;

(or can be gained in mechanism);

1

(c) M1 $CH_3CH_2COCl + H_2O \rightarrow CH_3CH_2COOH + HCl$ 1
(penalise wrong alkyl group once at first error)

1

M2 M_r of CH_3CH_2COCl = 92.5 1
(if Mr wrong, penalise M2 only)

1

M3 moles of CH_3CH_2COCl = 1.48/92.5 = 0.016 1

1

M4 moles NaOH = 2 × 0.016 = 0.032 1
(allow for × 2 conseq to wrong no of moles)

1

M5 volume of NaOH = 0.032/0.42 = 0.0762 dm^3 or 76.2 cm^3 1
(with correct units)
(if ×2 missed in M4 lose M5 also)

1

[16]

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