A-LEVEL PAPER 2 PP8 MS

|  |  |
| --- | --- |
| **1.** | **[6]** |
| **2.** |  |
|  |  |
|  |  |
|  | **[10]** |
| **3.** |  |
|  | **[8]** |
| **4.** | **[2]** |

**5.** (a)     Exp 2  4.5 ×10–4

*Min 2sf*

**1**

Exp 3  4.5 ×10–3

*If three wrong answers, check their value of k in (b).*

**1**

Exp 4  0.043 OR 4.3 ×10–2        OR 0.044 OR 4.4 ×10–2

*They can score all 3 if they have used their (incorrect) value of k. see below.*

*Exp 2 rate = k × (1.0125 × 10–4)*

*Exp 3 [****Q****] = 0.02/k*

*Exp 4 [****P****] = 0.0913/√k*

**1**

(b)     

*Mark is for insertion of numbers into a correctly rearranged rate equ , k = etc*

*If upside down, score only units mark from their k*

*AE (-1) for copying numbers wrongly or swapping two numbers*

**1**

= 4.4(4) (allow 40/9)

**1**

mol–2dm+6s–1

*Any order*

*If k calculation wrong, allow units conseq to their k expression*

**1**

**[6]**

|  |  |
| --- | --- |
| **6.** |  |
|  | **[14]** |

**7.** (a)     (i)      (CH3)2CHOH + (CH3CO)2O   →   CH3COOCH(CH3)2 + CH3COOH

***Allow*** *CH3CO2CH(CH3)2 and CH3CO2H*

*Ignore (CH3)2 −C  in equation*

**1**

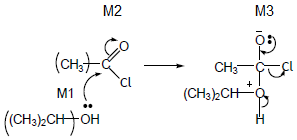
(1)-methylethyl ethanoate   OR

Propan-2-yl ethanoate

*Ignore extra or missing spaces, commas or hyphens*

**1**

(ii)



M4 for 3 arrows and lp

NO Mark for name of mechanism

*M1 for lone pair on O and arrow to C or to mid-point of space between O and C*

*M2 for arrow from C=O bond to O*

*•        M2 not allowed independent of M1, but  
                 allow M1 for correct attack on C+*

*•        + rather than δ+ on C=O loses M2*

*•        If Cl lost with C=O breaking, max1 for M1*

*M3 for correct structure with charges (penalise wrong alcohol here) but lone pair on O is part of M4*

*Penalise (CH3)2 −C in M3*

*M4 for lone pair on O and three arrows*

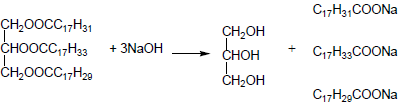
*•        Only allow M4 after correct / very close M3*

*•        M4 can be gained over more than one structure*

*•        Ignore Cl− removing H+*

**4**

(b)     (i)



*Penalise covalent Na e.g. -O-Na*

**LHS 1**

**RHS 1**

(ii)     C17H33COOCH3

*Allow C19H36O2*

**1**

**[9]**

|  |  |  |
| --- | --- | --- |
| **8.** |  | |
|  |  | |
|  | (c) |  |
|  | (d) | **[8]** |
| **9.** |  | |
|  |  | |
|  |  | |
| **10.** |  | |
|  |  | |
|  | **[6]** | |

**11.** (a)     Theoretical mass produced = 180 × 2 / 138 = 2.61 g

*Using 1.76 × 100 / 2 is a chemical error (CE), scores 0 / 2*

**1**

Percentage yield = 1.76 × 100 / 2.61 = 67.5%

*Correct answer scores M1 and M2.*

*Accept 67.4%*

*Do not penalise precision but answers must be to at least two significant figures.*

**1**

(b)     Crystals lost when filtering or washing / some aspirin stays in solution / other reactions occurring

*Ignore references to impurities.*

**1**

**[3]**

|  |  |  |
| --- | --- | --- |
| **12.** | (a) |  |
|  | (b) |  |
|  | (c) |  |
|  | (d) |  |
|  | (e) |  |
|  | (f) |  |
|  | (g) |  |
|  | (h) | **[19]** |
| **13.** | **[6]** | |