Gateways School

**Alkenes & Alcohols**

**Revision PPQ Answers**

40 marks

**Q1.**

(a)     *Electrophile*: e– pair / lone pair acceptor or e– deficient species or e–seeking species **(1)**

*For ‘species’ accept atom, molecule, ion  
NOT ‘+’ ion  
NOT ‘attracted to ‘‑’ charge’*

*Addition:* reaction which increases number of substituents or  
convert double bond to single bond or where two molecules  
form one molecule **(1)**

**2**

(b)     (High) e– dense or e– rich C=C or e– rich π bond or 4 e– between the C’s **(1)**

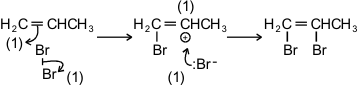
*NOT just ‘C=C’*

          causes induced dipole in Br2 **(1)**

*Ignore refs to ‘temporary’  
can score M2 from δ+ / δ– on Br2 in (c) unless a contradicting error in (b)*

**2**

(c)     *Mechanism:*

**

*If incorrect alkene, lose M3 (wrong cation)  
Mark M4 conseq on M3*

**

*Name of product:* 1,2-dibromopropane **(1)**

**5**

(d)     addition **(1)**

*Not additional*

**1**

**[10]**

**Q2.**

(a)     (i)      Electrophilic addition

*(Both words required)*

**1**

(ii)     M1 the reaction to form 1-bromopropane goes *via* the primary  
carbocation OR 1o carbocation

         OR *via* 

M2 primary carbocations are less stable than secondary carbocations

*(Credit converse arguments for M1 and M2 i.e. the reaction to form 2-bromopropane goes via the secondary carbocation , M1, and secondary carbocations are more stable than primary carbocations, M2)*

*(Accept the use of “carbonium ions” as an alternative to carbocation)*

**1**

(b)     M1 NaOH OR KOH OR correct name

**1**

M2 aqueous or solution in water *(ignore heat, reflux etc.)*

*(Penalise M1 for hydroxide ion alone, but mark on and credit M2)  
(Credit M2 ONLY for H2O as reagent and heat / warm / T=50 to 100oC)  
(NaOH(aq) scores M1 and M2 provided it is not contradicted)  
(Penalise M2 if NaOH(aq) followed by concentrated or ethanol)  
(Penalise M1 and M2 if followed by acid)*

**1**

(c)     Ethanolic OR alcoholic OR CH3CH2OH / CH3OH solvent OR  
aqueous ethanol/alcohol  
OR higher temperature *(must be comparative)*

*(Ignore heat or heat under reflux)*

*(Credit part (c) independently from part (b))*

*(Penalise “ethanoic”)*

**1**

(d)     (i)      Secondary OR 2o

**1**

(ii)     

         M1 arrow from double bond to H of H – O bond  
M2 arrow from bond to oxygen atom to show H – O bond breakage  
M4 arrow from lone pair of electrons to carbon atom of carbocation

*(Penalise M1 if arrow goes to H2SO4 or to formal positive charge on H, but ignore partial charges on sulphuric acid unless wrong)*

*(Credit M2 for H+ ion)*

*(For M4, accept negative charge anywhere on the ion)*

**4**

(iii)     Catalyst ONLY

*(Ignore homogeneous, heterogeneous)*

**1**

**[12]**

**Q3.**

(a)     To prevent vigorous boiling / uneven boiling / bubbling vigorously

*Reference to an effect on ‘reaction’ here loses this mark.*

**1**

(b)     Condenser

*Accept ‘condensation chamber’ or ‘condensation tube’.*

**1**

Should show effective water jacket and central tube

*If a flask is also drawn then the condenser must be at an appropriate angle.*

*Apparatus must clearly work.*

*Ignore direction of water flow.*

*Diagram must have a clear flow of vapour and water eg unblocked central tube or flow indicated by arrows.*

**1**

**[3]**

**Q4.**

(Mix the alcohol with warm) K2Cr2O7 / H+ allows 3° identification by lack of reaction

*Scheme must allow the alcohol to be distinguished to get all marks.*

**1**

Distillation of initial product needed for 1° / 2°

*If distillation stage not clear then max. 2 (M1 and M3).*

*Awareness of correct reactions / lack of reaction relating to each class of alcohol is worth 1 mark.*

**1**

Effect of Tollens’ / Fehling’s on oxidation product to identify 1° or 2° (by default)

*Reacting Tollens’ / Fehling’s with alcohols directly is incorrect and gains no M2 or M3.*

*Detailed observations relating to the reactions are not needed but should be penalised where incorrect.*

**1**

**[3]**

**Q5.**

(a)     M1     fermentation

**1**

M2     dehydration or elimination

**1**

(b)     (i)      yeast OR zymase OR an enzyme

**1**

(ii)     concentrated sulphuric or phosphoric acid

*(penalise aqueous or dilute as a contradiction)*

**1**

(c)     (i)      primary or 1°

**1**

(ii)     sugar or glucose or ethanol is renewable  
OR ethanol does not contain sulphur-containing impurities  
OR ethanol produces less pollution or is less smoky or less CO/C

*(the objective is a positive statement about ethanol)  
(penalise the idea that ethanol is an infinite source or vague statements that ethanol has less impurities) (penalise the idea that ethanol produces no pollution)*

**1**

(d)     C2H6 →C2H4 + H2

**1**

(e)     Addition

*(ignore self or chain as a preface to “addition “)  
(penalise additional)*

**1**

**[8]**

**Q6.**

B

**[1]**

**Q7.**

A

**[1]**

**Q8.**

B

**[1]**

**Q9.**

B

**[1]**