Practice Question Set For A-Level
**Subject : Chemistry**
**Paper-2 Topic: Chromatography**

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**Name of the Student**:_____
**Max. Marks : 22 Marks** **Time : 22 Minutes**

Mark Schemes

Q1.

(a) **Wear plastic gloves:**

Essential – to prevent contamination from the hands to the plate

**1**

**Add developing solvent to a depth of not more than 1 $cm^3$:**

Essential – if the solvent is too deep it will dissolve the mixture from the plate

**1**

**Allow the solvent to rise up the plate to the top:**

Not essential – the $R_f$ value can be calculated if the solvent front does not reach the top of the plate

**1**

**Allow the plate to dry in a fume cupboard:**

Essential – the solvent is toxic
*Allow hazardous*

**1**

(b) Spray with developing agent or use UV

**1**

Measure distances from initial pencil line to the spots (*x*)

**1**

Measure distance from initial pencil line to solvent front line (*y*)

**1**

$R_f$ value = *x* / *y*

**1**

(c) Amino acids have different polarities

**1**

Therefore, have different retention on the stationary phase or different solubility in the developing solvent

**1**

**[10]**

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Q2.

(a) $HNO_3 + 2H_2SO_4 \longrightarrow NO_2^+ + H_3O^+ + 2HSO_4^-$

*Allow $H_2SO_4 + HNO_3 \longrightarrow NO_2^+ + HSO_4^- + H_2O$*

*Allow a combination of equations which produce $NO_2^+$*

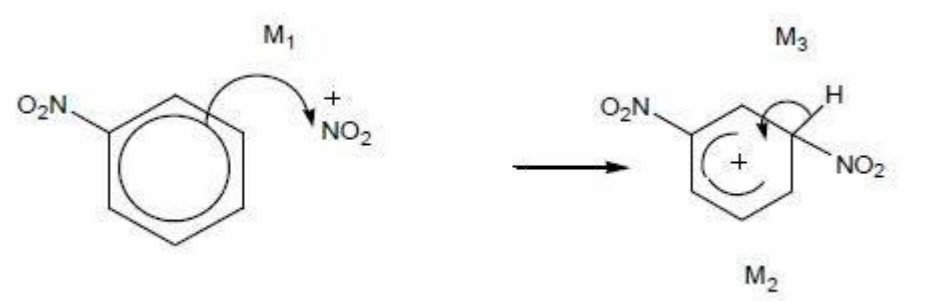
*Penalise equations which produce $SO_4^{2-}$*

**1**

(b) Electrophilic substitution.

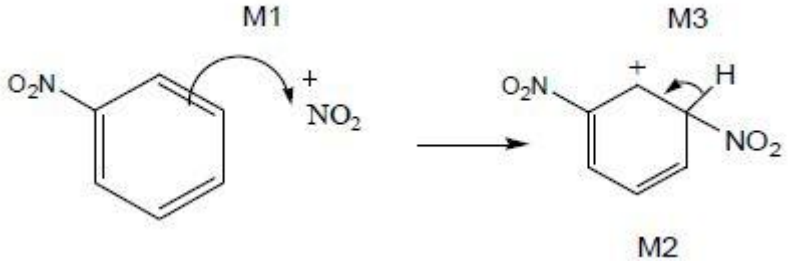
*Ignore nitration*

**1**




**3**

OR Kekule




*M1 Arrow from inside hexagon to N or + on N (Allow $NO_2^+$)*

*M2 Structure of intermediate*

- *horseshoe centred on C1 and must not extend beyond C2 and C6, but can be smaller*
- *+ in intermediate not too close to C1 (allow on or "below" a line from C2 to C6)*

*M3 Arrow from bond into hexagon (Unless Kekule)*

- *Allow M3 arrow independent of M2 structure*
- *+ on H in intermediate loses M2 not M3*

(c) D

**1**

(d) (Balance between) solubility in moving phase and retention by stationary phase

*OR (relative) affinity for stationary / solid and mobile / liquid / solvent (phase)*

(e) Solvent depth must be below start line

*Ignore safety*

**1**

(f) 1,2- is more polar **OR** 1,4- is less polar

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**OR** 1,2 is polar, 1,4- is non-polar

**1**

1,4- ( or Less/non polar is) less attracted to (polar) plate / stationary phase / solid
**OR** (Less/non polar is) more attracted to / more soluble in (non-polar) solvent / mobile phase / hexane

**1**

*M2 dependent on correct M1*

*If M1 is blank then read explanation for possible M1 and M2*

*Allow converse argument for 1,2*

(g) No CE = 0

Yes - mark on but there is **NO MARK FOR YES**

*Mark independently following yes*

Solvent (more) polar or ethyl ethanoate is polar

**1**

Polar isomer more attracted to / more soluble in / stronger affinity to the solvent (than before)

*Penalise bonded to mobile phase in M2*

**1**

**[12]**

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