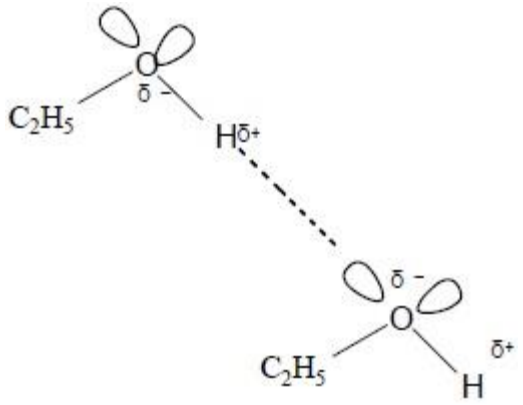
Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Physical 1

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Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Mark Schemes

Q1.



M1 *two lone pairs on each O atom*
<u>and</u>
δ+ and δ- on each H-O bond

1

M2 *<u>dotted/broken</u> line shown between lone pair on one molecule and the correct H on another*

1

M3 *O·····H–O in straight line, dependent on* ***M2***
Ignore any partial charges on C–H or C–O bonds
For straight line in ***M3****, allow a deviation of up to 15°*

1

If a different molecule containing hydrogen bonding due to O–H bond drawn (e.g. methanol, water) or an incorrect attempt at the structure of ethanol, then maximum of 2 marks (i.e. only penalise if would score all three marks otherwise)

(b) Hydrogen bonds (between ethanol molecules)

1

(permanent) dipole-dipole <u>OR</u> van der Waals force (between methoxymethane molecules)

Allow vdW

1

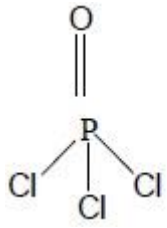
Hydrogen bonds are stronger/est intermolecular force

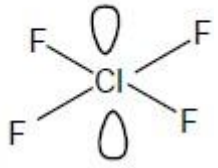
Allow more energy to break/overcome hydrogen bonding
Allow converse arguments

1

(c)

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$POCl_3$: allow any shape showing 1 double bond between P and O and 3 P-Cl bonds

1

ClF_4^-: allow any shape showing 4 Cl ¯F bonds and 2 lone pairs

1

(distorted) Tetrahedral

1

Square planar

1

90°

1

[11]

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Q2.

(a) Cyclopentanone

Allow cyclopentan -1-one but no other numbers

Ignore spaces, commas and hyphens

1

(b)

This question is marked using Levels of Response. Refer to the Mark Scheme Instructions for Examiners for guidance.	
Level 3 **5-6 marks**	**All stages are covered and each stage is generally correct and virtually complete.** Answer is well structured with no repetition or irrelevant points. Accurate and clear expression of ideas with no errors in use of technical terms.
Level 2 **3-4 marks**	**All stages are covered but stage(s) may be incomplete or may contain inaccuracies OR two stages are covered and are generally correct and virtually complete.** Answer shows some attempt at structure Ideas are expressed with reasonable clarity with, perhaps, some repetition or some irrelevant points. Some minor errors in use of technical terms
Level 1 **1-2 marks**	**Two stages are covered but stage(s) may be incomplete or may contain inaccuracies OR only one stage is covered but is generally correct and virtually complete.** Answer includes isolated statements and these are presented in a logical order. Answer may contain valid points which are not clearly linked. Errors in the use of technical terms.
0 marks	Insufficient correct chemistry to gain a mark.

Indicative Chemistry content

Stage 1: boiling points
1a) **Y** has a higher bp
1b) **Y** has H-bonds between molecules and **X** has dip-dip imf
1c) More energy required to overcome H-bonds

Mention of covalent bond breaking loses 1c

Stage 2: ^{13}C NMR
2a) Both have 3 peaks/absorptions in their ^{13}C NMR
2b) **X** has peaks at 20-50 **OR** 190-220ppm
2c) **Y** has peaks at 50-90 **OR** 90-150ppm

(Ignore peaks at 5-40ppm - present in both)

Stage 3: ir
3a) **X** has a peak (for C=O) at 1680-1750 cm^{-1}

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3b) **Y** has peak (for O−H) at 3230-3550 cm^{-1}
OR peak (for C=C) at 1620-1680 cm^{-1}

3c) They would have different fingerprint regions (below 1500 cm^{-1})

6

[7]

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