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

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Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Mark Schemes

Q1.

(a) Z-2-methylpent-2-en (-1-) oic acid

Ignore missing hyphens or extra commas, spaces, hyphens

1

(b) $C_6H_{10}O_2 + 7½\ O_2 \longrightarrow 6CO_2 + 5H_2O$

Allow multiple

M1

Volume of CO_2 formed = 180 cm^3

If incorrect volume:155 gives 125mg / 335 gives 270mg could score M1,M3,M4 – max 3

If incorrect volume from AE then penalise M2 and mark on

(Final answer is 0.806 × their volume)

M2

Mol carbon dioxide = pV/RT = $\dfrac{105000 \times (180 \times 10^{-6})}{8.31 \times 298}$

$= 7.632 \times 10^{-3}$

If unit error in p, V or T lose M3 and M5

If incorrect rearrangement lose M3 and M5

If both errors seen then no further marks

M3

Mol **P**, $C_6H_{10}O_2$ used $= 7.632 \times 10^{-3} / 6 = 1.272 \times 10^{-3}$

M3 divided by 6 If wrong no further marks

M4

Mass **P** used $= 1.272 \times 10^{-3} \times 114(.0)$ g

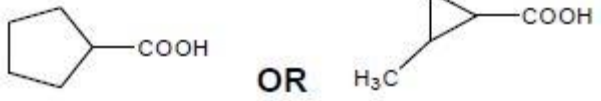
$= 145$ mg

Mark for answer (allow ans to 2 sf)

Check chemical equation before awarding final mark

M5

(c)



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Mark independently
Apply the list principle

M1

Fig 4: IR OH (acid) peak (2500-3000cm^{-1}) present
Ignore C=O signal at 1750 cm^{-1}

M2

Fig 5: ^{13}C NMR 4 peaks so 4 (non-equivalent) environments
Or Peak at 160-185 (show C=O) in (esters or) acids
Or Peak at 40-50 (show R-CO-CH) presence of carbonyl

M3

Both M2 & M3 can be awarded on the spectra
Allow correct Fig 4 answers in Fig 5 and converse

(d) **R** has 4 C next to C=O **S** has 2 C next to C=O
M1 for structural point

M1

in range δ = 20-50
R has two peaks and **S** only one peak in this range
Or **R** has more peaks (allowed if no numbers given)
M2 for resulting peak in spectra

M2

OR

S has a -C(H_2)-C(H_3) **R** does not

M1

S has one peak in range δ = 5-40 **R** does not
/ lowest peak for **S** is lower than lowest for **R**

M2

(Both have) three peaks

M3

(e) **R** Both singlets

M1

S has triplet and a quartet

M2

OR

R CH_3/peak at 2.1-2.6 is a singlet

M1

S CH_3/peak at 0.7-1.2 is a triplet

M2

OR

R CH_2/peak at 2.1-2.6 is a singlet

M1

S CH_2/peak at 2.1-2.6 is a quartet

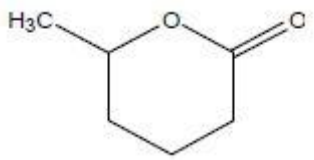
M2

(Both have) two peaks

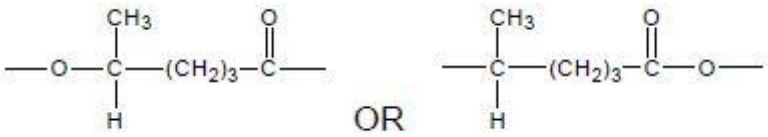
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M3

(f)



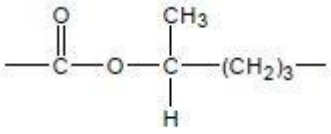
1



Must have trailing bonds

Ignore brackets and n

1



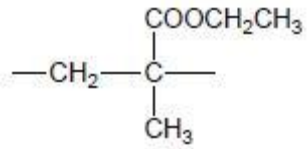
OR

condensation

Ignore esterification

1

(g)



Must have trailing bonds

Ignore brackets and n

M1

Strong / non-polar C-C bonds (in the chain)

M2

cannot be attacked by nucleophiles / acids / cannot be hydrolysed.

M3

OR

<u>Only</u> polar ester group

M2

Can be attacked by nucleophiles / acids / can be hydrolysed

M3

M3 dependent on correct or close M2

Allow 1 mark for in (polar) ester link in side chain/not in main chain therefore polymer chain not broken

[21]

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