



TOPIC 20 HW MS

1. (a) If 2 stage test for one compound, award no marks for that compound, eg no mark for ROH or RX to alkene then Br₂ test. If reagent is wrong or missing, no mark for that test; if wrong but close/incomplete, lose reagent mark but can award for correct observation. In each test, penalise each example of wrong chemistry, eg AgCl₂
- propan-1-ol
 acidifiedpotassiumdichromate
 sodium
 Named acid + conc H₂SO₄
 named acyl chloride
 PCI₅
- M1
1
- (orange) turns green
 effervescence
 Sweet smell
 Sweet smell /misty fumes
 Misty fumes
- M2
1
- propanal
 add Tollens or Fehlings / Benedicts
 acidifiedpotassiumdichromate
 Bradys or 2,4-dnph
if dichromate used for alcohol cannot be used for aldehyde
- M3
1
- Tollens: silver mirror or Fehlings/ Benedicts: red ppt
 (orange) turns green
 Yellow or orange ppt
- M4
1
- propanoic acid
 Named carbonate/ hydrogencarbonate
 water and UI (paper)
 Named alcohol + conc H₂SO₄
 sodium or magnesium
 PCI₅
if sodium used for alcohol cannot be used for acid
- M5
1
- effervescence
 orange/red
 Sweet smell
 effervescence
 Misty fumes
if PCI₅ used for alcohol cannot be used for acid
- M6
1
- 1-chloro propane
 NaOH then acidified AgNO₃
 AgNO₃
If acidification missed after NaOH, no mark here but

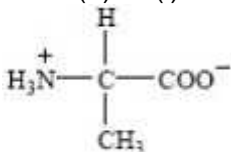


allow mark for observation

	M7	1
white ppt white ppt		
	M8	1
(b) oxidation (of alcohol by oxygen in air)		
	M1	1
absorption at <u>1680 -1750</u> (due to C=O) <i>Must refer to the spectrum</i>		
	M2	1
comparison of polarity of molecules or correct imf statement:propanone is less polar OR propan-2-ol is more polarOR propanone has dipole-dipole forcesOR propan-2-ol has hydrogen bonding		
	M3	1
about attraction to stationary phase or solubility in moving phasePropan-2-ol has greater affinity for stationary phase or vice versaOR propanone is more soluble in solvent/moving phase or vice versa		
	M4	1

[12]

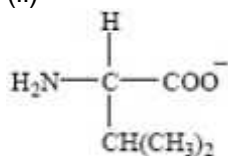
2. (a) (i)



allow -CO₂⁻
allow +NH₃-
don't penalize position of + on NH₃

1

(ii)

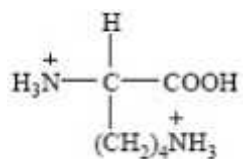


allow -CO₂⁻
allow NH₂-
allow C₃H₇

1

(iii)

MEGA LECTURE



allow $-\text{CO}_2\text{H}$

allow $^+\text{NH}_3-$

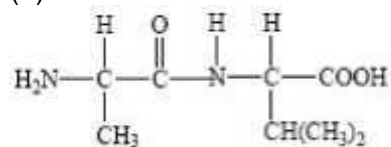
don't penalize position of + on NH_3

1

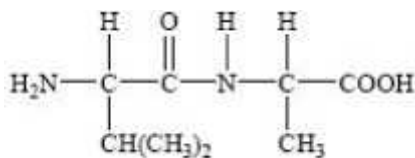
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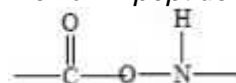
(b)



1



allow -CO₂H
allow NH₂-
allow C₃H₇
allow as zwitterions
if error in peptide link e.g.



if twice, penalise both times
not polymers
if wrong amino acid in both can score Max 1

1

(c) chromatography or electrophoresis
ignore qualification to chromatography

1

[6]

3. (a) chromatography (allow GLC TLC GC HPLC)
allow any qualification

1

(b) 5

1

Allow 320(.0) or 322(.0)

1

(c) Use of excess air/oxygen or high temperature (over 800 °C)
 or remove chlorine-containing compounds before incineration

1

(d) (i) Si(CH₃)₄ allow SiC₄H₁₂
allow displayed formula and do not penalise sticks
Not TMS

1

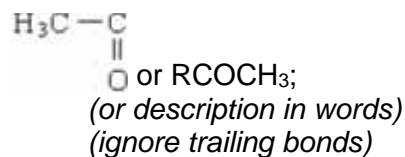
(ii) 3

1

[6]

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MEGA LECTURE

4. (a) (i)



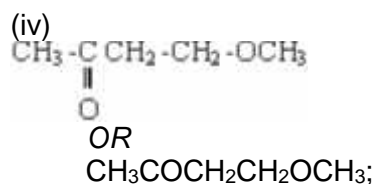
1

(ii) $\text{H}_3\text{C}-\text{O}$ or ROCH_3 ;
(allow 1 if both (i) and (ii) give CH_3- or $\text{H}_3\text{C}-$ only)

1

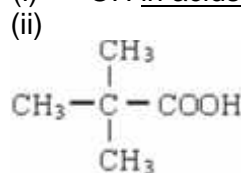
(iii) CH_2CH_2 or two adjacent methylene groups;

1



1

(b) (i) OH in acids or (carboxylic) acid present



(c)

reagent	$\text{K}_2\text{Cr}_2\text{O}_7 / \text{H}^+$	$\text{KMnO}_4 / \text{H}^+$
Y	no reaction	no reaction
Z	orange to green or turns green	purple to colourless or turns colourless

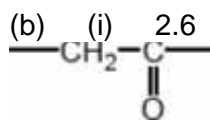
5

[9]



5. (a) OH alcohols

1



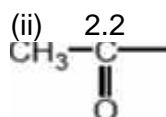
Ignore any group on RHS

*Must clearly indicate relevant **two** H on a C next to C=O*

On LHS, penalise H or CH or CH₂ or CH₃

Ignore missing trailing bonds or attached R groups

1

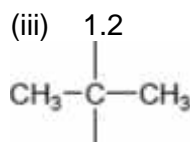


Ignore all groups on RHS

*Must clearly indicate relevant **three** H on C next to C=O*

Ignore missing trailing bonds or attached R group

1



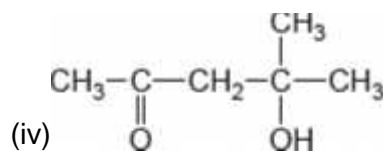
Or in words: two equivalent CH₃ groups

Must clearly indicate two equivalent methyl groups.

Penalise attached H

Ignore missing trailing bonds or attached R groups

1



1

[5]

6. (a) (i) Single / one (intense) peak / signal **OR** all H or all C in same environment **OR** 12 equiv H or 4 equiv C

Do not allow non-toxic or inert (both given in Q)

Any 2 from three

Ignore peak at zero

OR

Upfield / to the right of (all) other peaks **OR** well away from others **OR** doesn't interfere with other peaks

Ignore cheap

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MEGA LECTURE

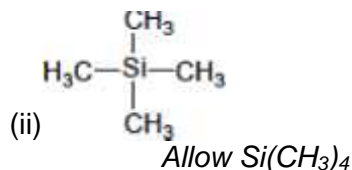
Ignore non-polar

OR

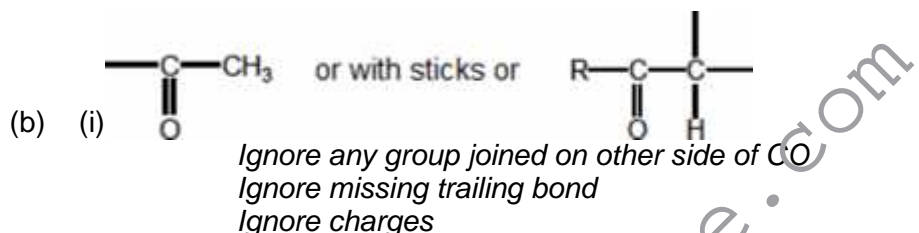
Low bp **OR** volatile **OR** can easily be removed

Ignore mention of solubility

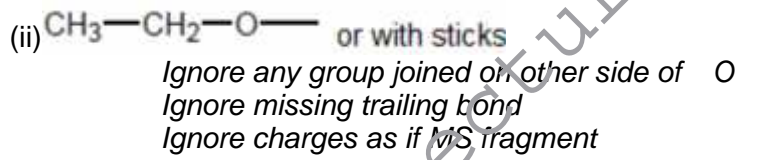
2



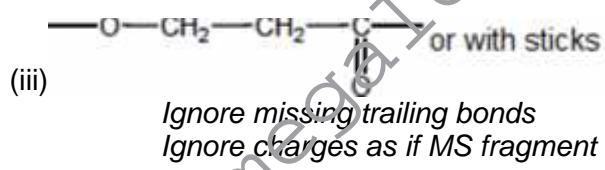
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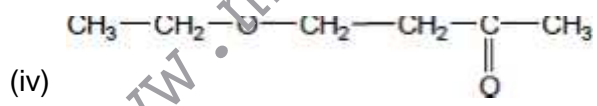
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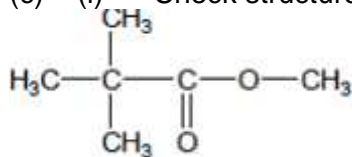
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1

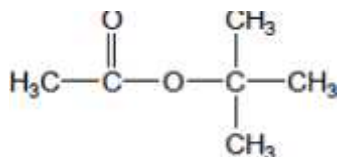
MEGA LECTURE

(c) (i) Check structure has 6 carbons



Allow $(\text{CH}_3)_3\text{CCOOCH}_3$ or $(\text{CH}_3)_3\text{CCO}_2\text{CH}_3$

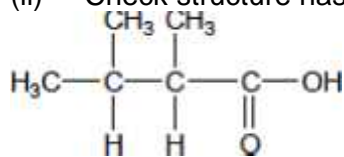
1



Allow $\text{CH}_3\text{COOC}(\text{CH}_3)_3$ or $\text{CH}_3\text{CO}_2\text{C}(\text{CH}_3)_3$

1

(ii) Check structure has 6 carbons



Allow $(\text{CH}_3)_2\text{CHCH}(\text{CH}_3)\text{COOH}$ or

$(\text{CH}_3)_2\text{CHCH}(\text{CH}_3)\text{CO}_2\text{H}$

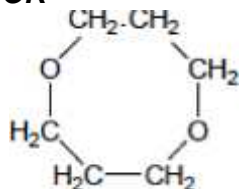
Penalise C_3H_7

1

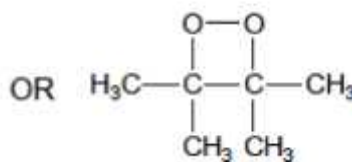
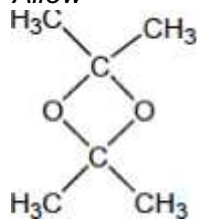
(iii) Check structure has 6 carbons



OR



Allow

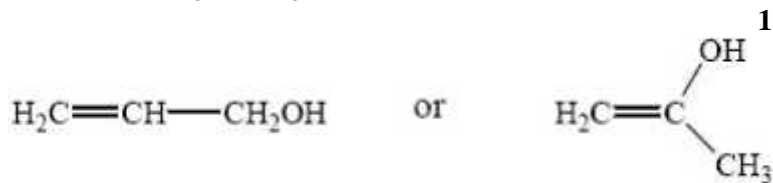
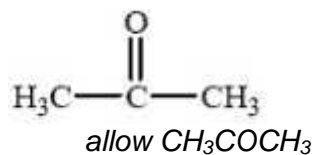


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[11]

MEGA LECTURE

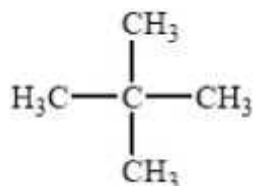
7. (a) A



B

must show C=C
Penalise sticks once per pair

(b) C CH₃CH₂CH₂CH₂CH₃



D

NOT cyclopentane which is only C₅H₁₀
Penalise sticks once per pair

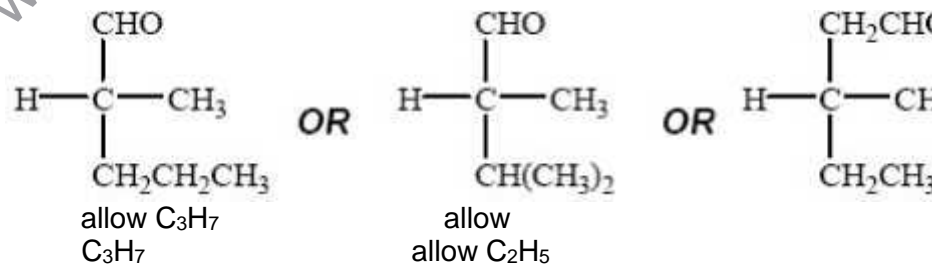
(c) E CH₃CH₂COOCH₃

Allow C₂H₅CO₂CH₃

F CH₃COOCH₂CH₃

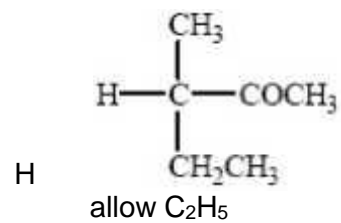
Allow CH₃CO₂CH₂CH₃ or CH₃CO₂C₂H₅
Penalise sticks once per pair

(d) G



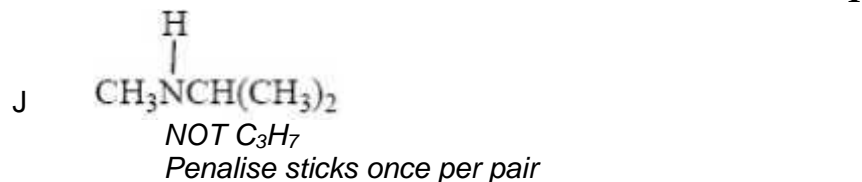
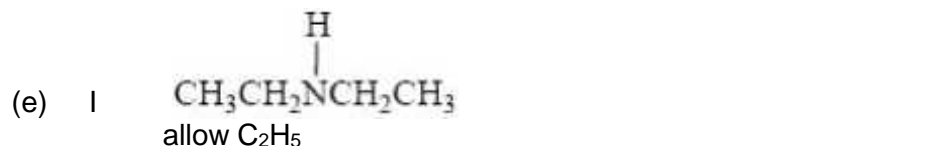
not C₅H₁₁ nor C₄H₉
Penalise sticks once per pair

MEGA LECTURE

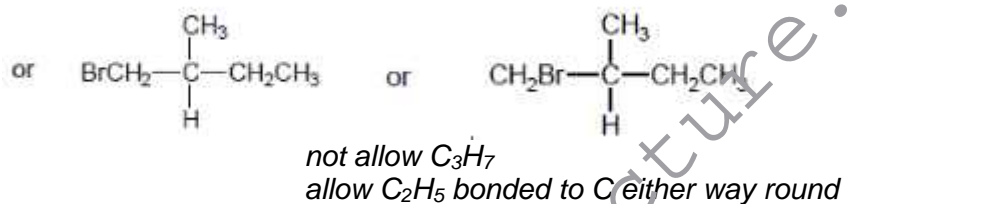


1

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MEGA LECTURE



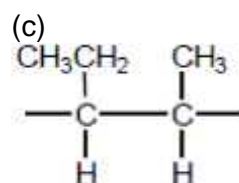
[10]



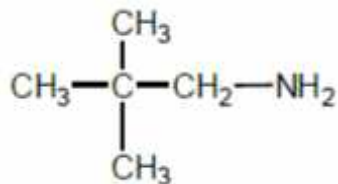
(ii) elimination 1
 allow base – elimination
 but penalise any other qualification

(iii) Z-pent-2-ene or cis-pent-2-ene either Z or cis is necessary
 (allow Z-2-pentene or cis-2-pentene)
 with or without brackets around Z
 with or without hyphens 1

- (b) (i) C 1
 (ii) A 1
 (iii) B 1
 (iv) D 1

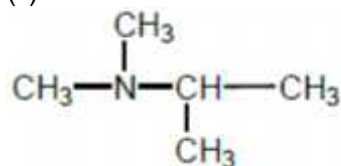


MEGA LECTURE



1

(ii)



NOT $(\text{C}_2\text{H}_5)_2\text{NCH}_3$ which is tertiary with 3 peaks but its spectrum has no doublet.

[17]

9. D
10. B
11. D
12. C

[1]

[1]

[1]

[1]