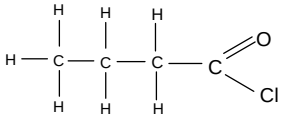
4.4 ANSWERS TO EXERCISES

4.4 Exercise 1

1. 2-hydroxypropanoyl chloride
2. methyl propanamide
3. propanoic anhydride
4. methylpropyl ethanoate
5. N-ethylpropanamide
6. N-ethylaminoethane or diethylamine
7. 2-hydroxymethylpropanenitrile
8. 2-aminobutanoic acid

9.



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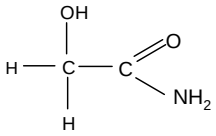

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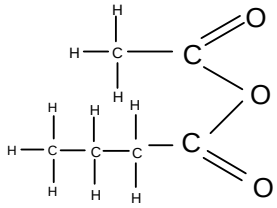

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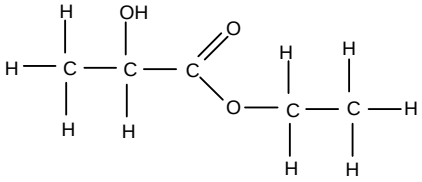

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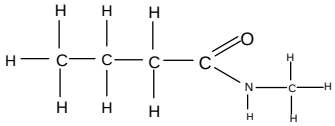

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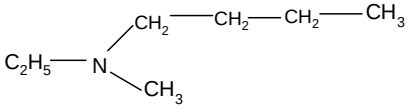

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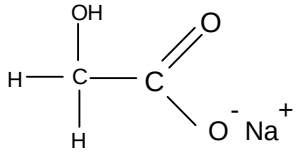

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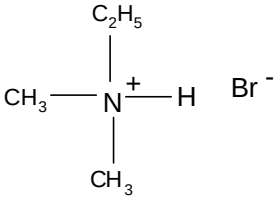
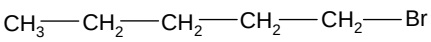
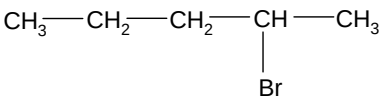


4.4 Exercise 2

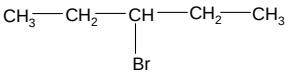
1.



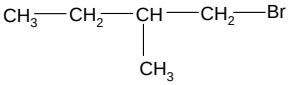
1-bromopentane
A



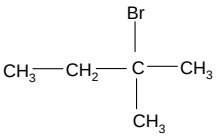
2-bromopentane
B



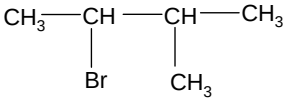
3-bromopentane
C



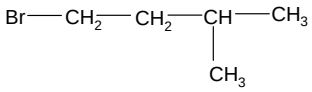
1-bromo,2-methylbutane
D



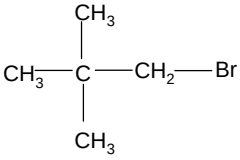
2-bromo,2-methylbutane
E



2-bromo,3-methylbutane
F



1-bromo,3-methylbutane
G

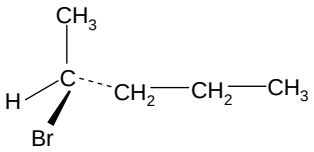


bromodimethylpropane
H

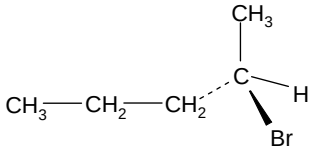
a) any two from A, B, C **or** any two from C, D, E, F
b) two from A, D or G, H **or** B and E or F

c) B, D and F are chiral

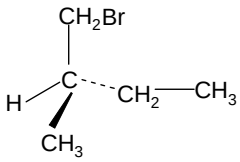
B:



and



D:



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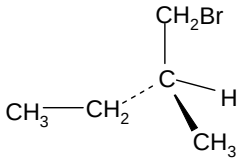
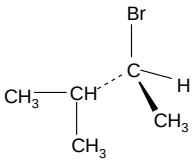


F:



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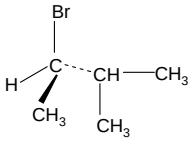
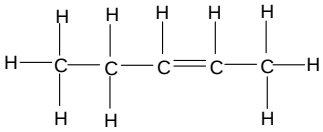
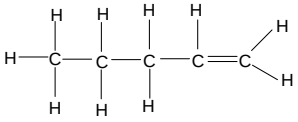


The isomers could be distinguished because they rotate the plane of plane-polarised light in opposite directions.

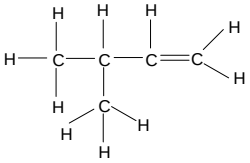
2.



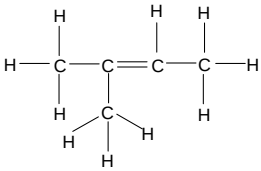
A: pent-2-ene



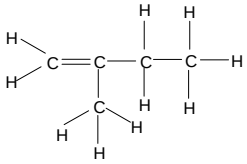
B: pent-1-ene



C: 3-methylbut-1-ene



D: 2-methylbut-2-ene

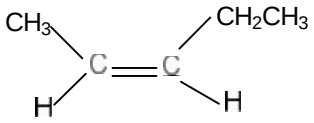


E: 2-methylbut-1-ene

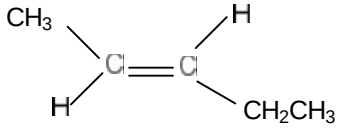
a) A and B **or** two from C, D, E

b) A and D **or** B and C or E

c) A shows geometrical isomerism

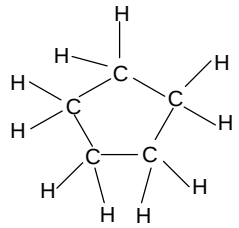


cis pent-2-ene



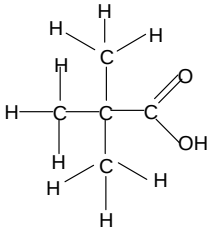
trans pent-2-ene

d)

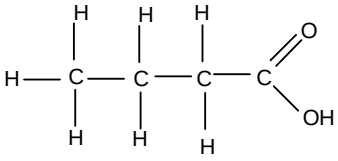


3.

a)

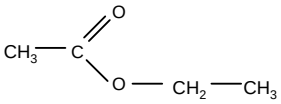


methylpropanoic acid

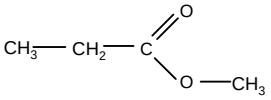


butanoic acid

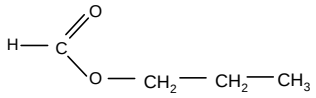
b) they are esters



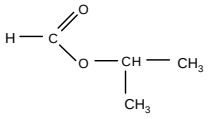
ethyl ethanoate



methyl propanoate



propyl methanoate

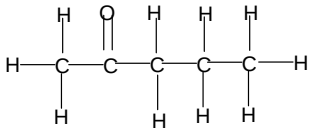


methylethyl methanoate

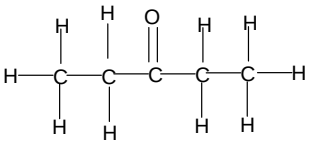
They are functional isomers of the carboxylic acids

4.

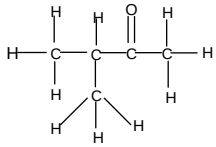
a) pentan-2-one:



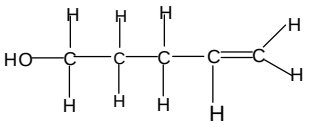
b) positional isomer:



c) chain isomer:



d) functional isomer



5. a) racemate b) single enantiomer c) racemate