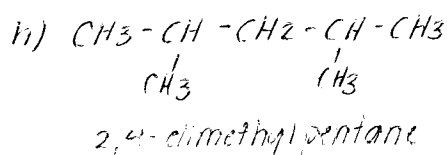
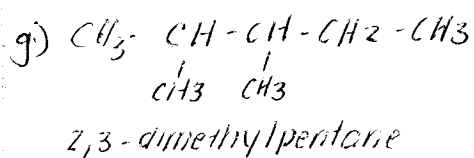
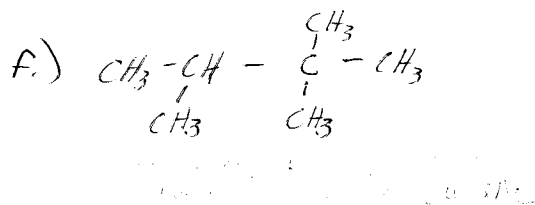
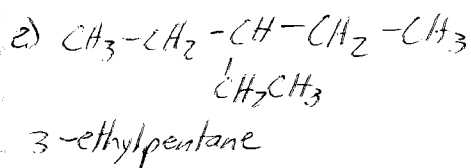
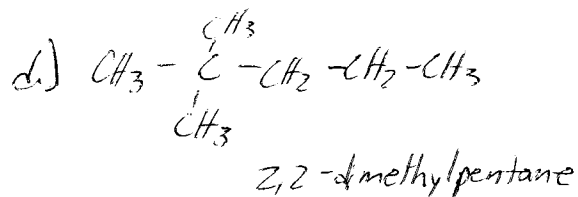
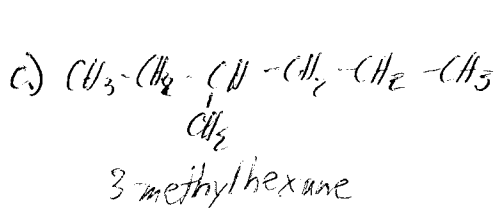
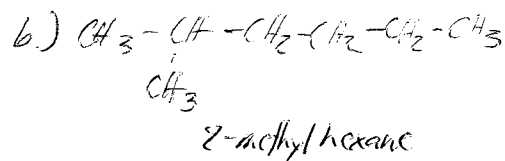
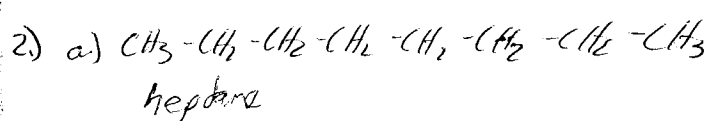
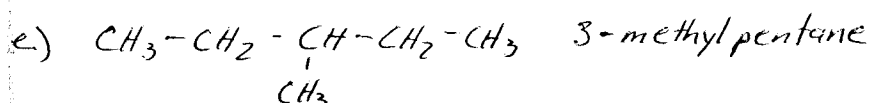
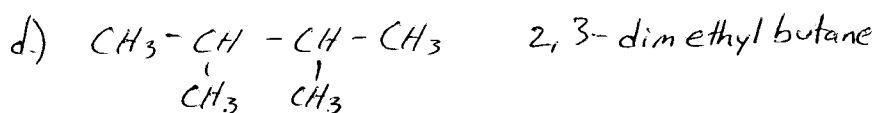
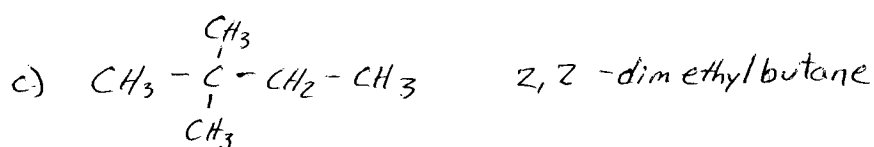
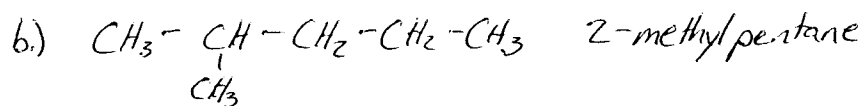
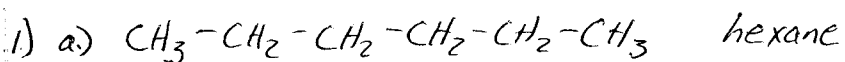


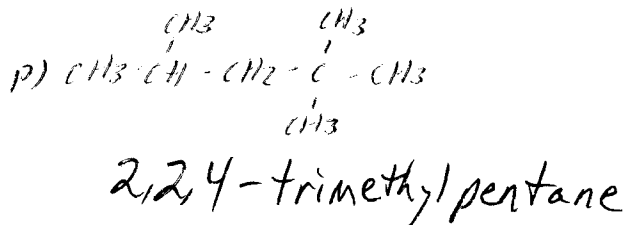
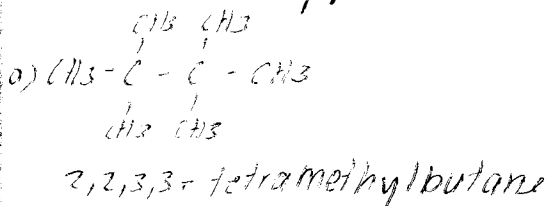
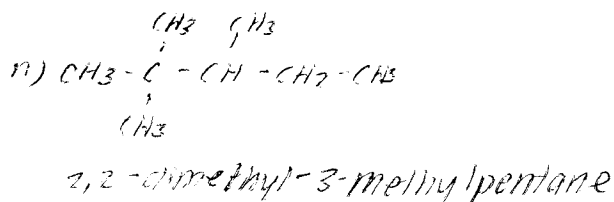
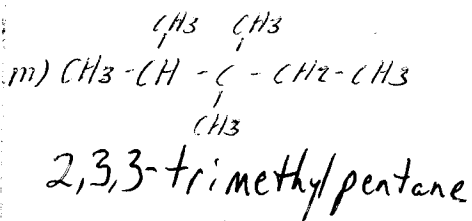
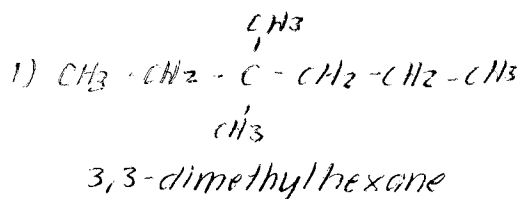
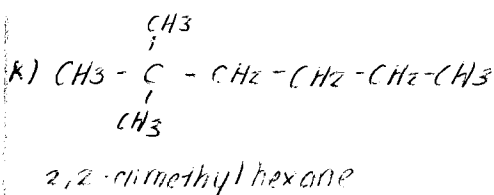
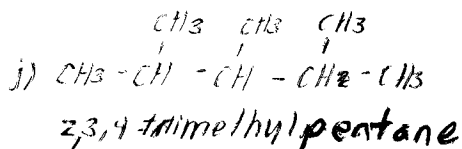
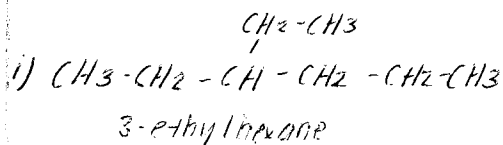
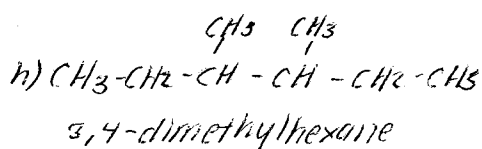
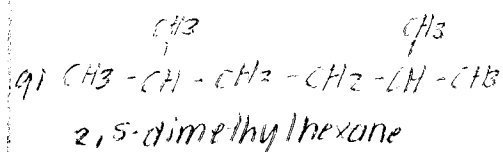
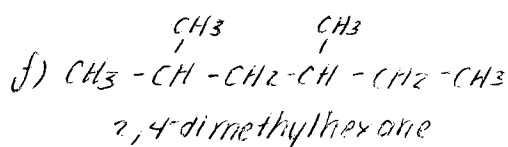
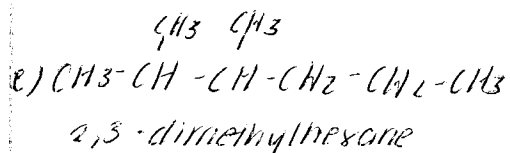
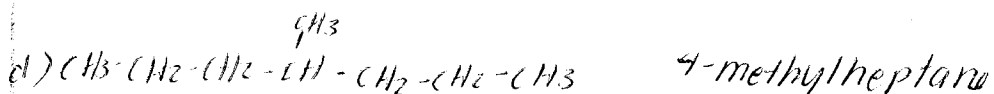
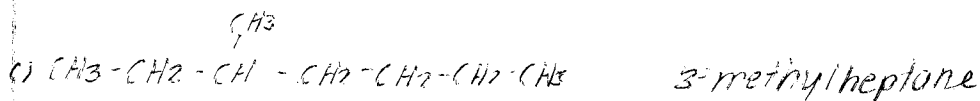
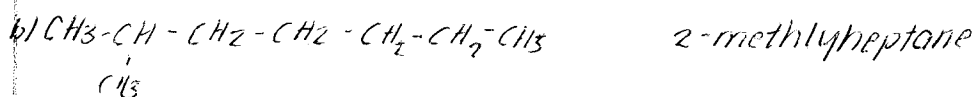
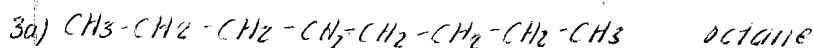
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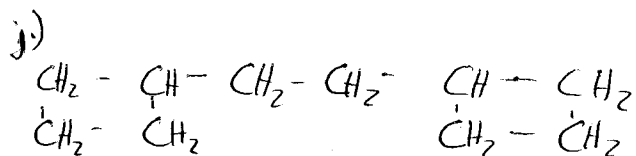
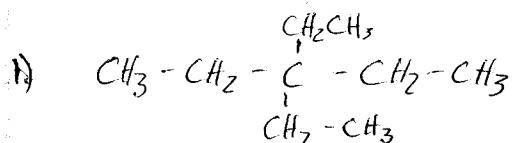
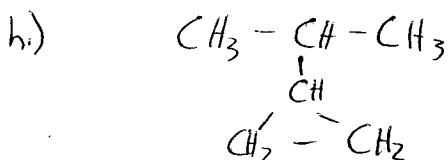
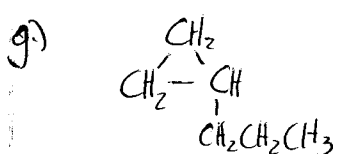
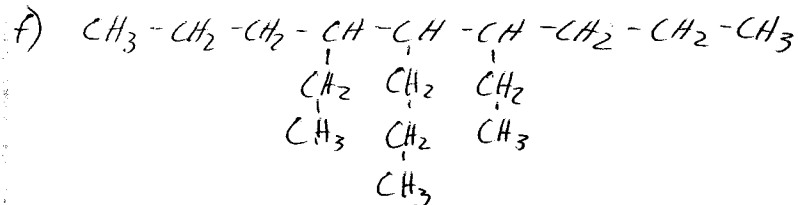
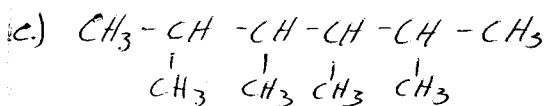
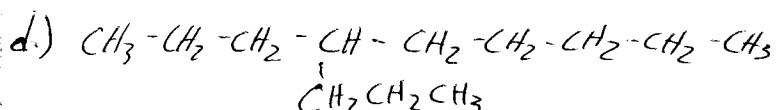
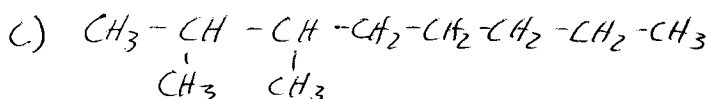
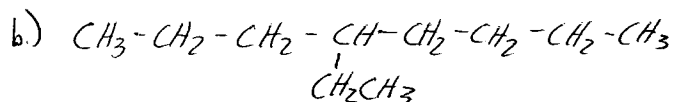
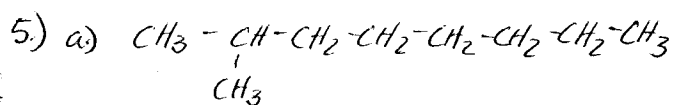
ORGANIC CHEMISTRY

ANSWERS

15 - Exercises - H98





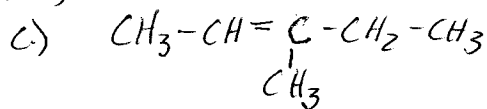
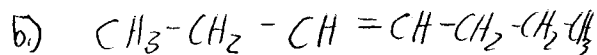
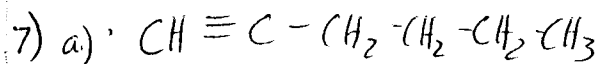


6.) a) 3,4-dimethylheptane

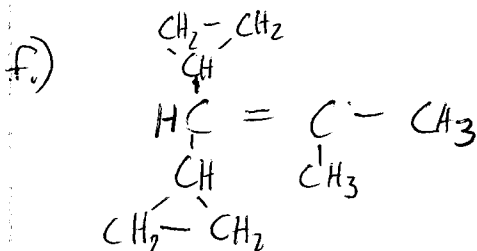
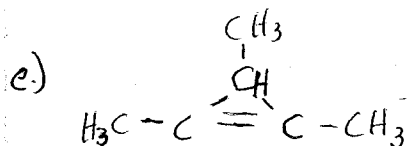
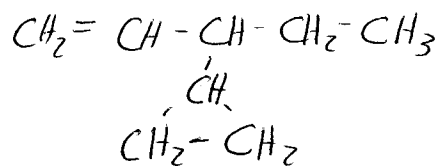
b) 3,4,4,5-tetraethylheptane

c) 1,2,3,4-tetramethylcyclobutane

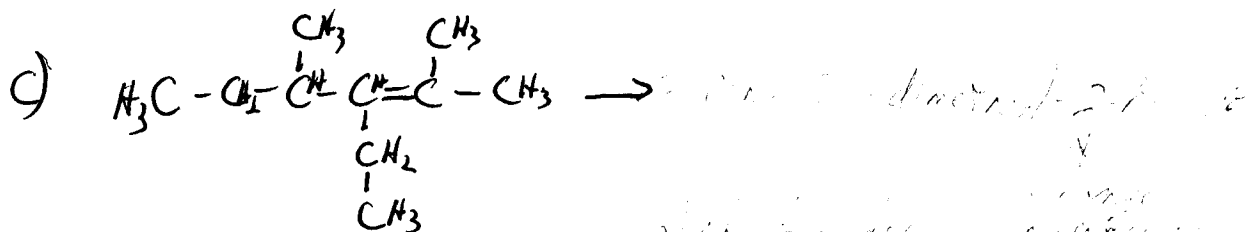
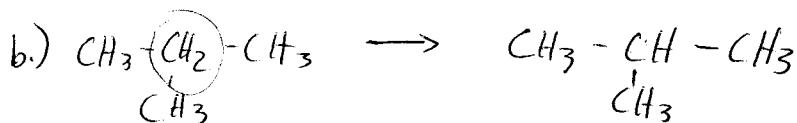
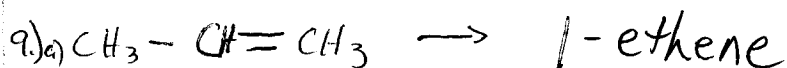
d) 2-butyl-1-ethylcyclohexane



d)



- 8) a) methene b) propene c) propyne d) 2-pentyne
 e) 3-methylbutene f) pentene g) cyclobutene
 h) 2,2,5,5-tetramethyl-3-hexyne i) 4-ethylcyclohexene
 j) 5-ethyl-5-methylcycloheptyne



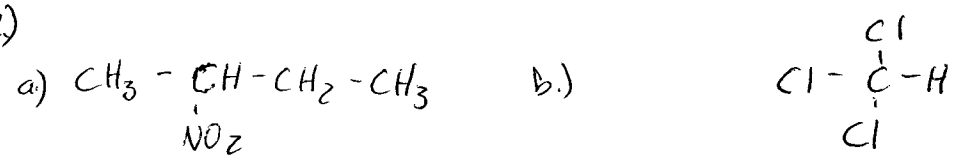
2,2,3,3-tetramethyl-2-butene
 (d. d. d. d.)
 (d. d. d. d.)

2,2,3,3-tetramethyl-2-butene
 (d. d. d. d.)
 (d. d. d. d.)

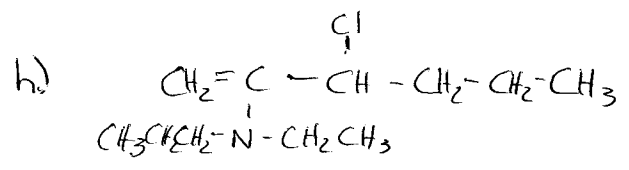
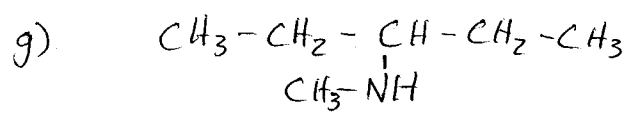
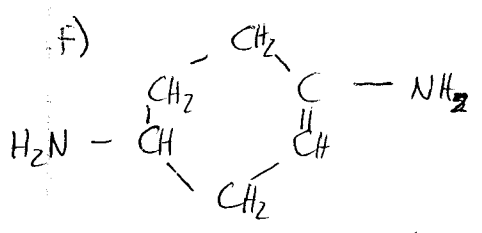
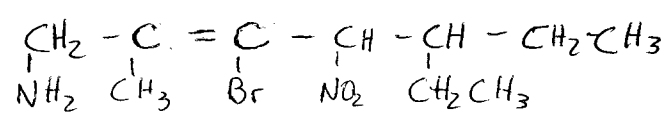
Exercises pg 18

- 1) a) bromoethane b) 1,2-dichloroethane
 c) aminomethane d) 1,1,2,2-tetraiodoethane
 e) 3-amino-1-chloropropyne f) 2,2,2-trichloro-1,1,1-trifluoroethane
 g) methylaminomethane h.)
 i) 2-ethylmethylaninopropane 1-amino-2-methyl-2-propanol

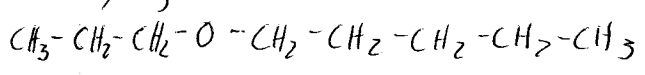
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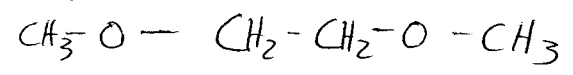
e)



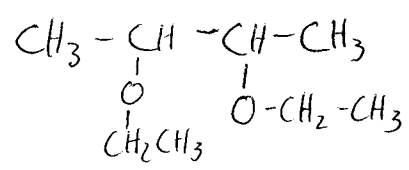
3) a)



b.)



c)



d.)

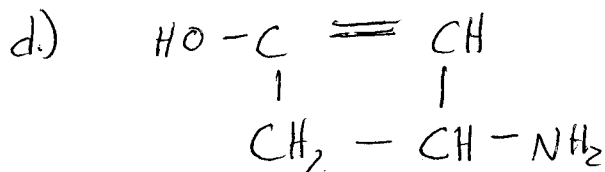
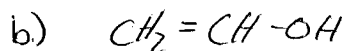




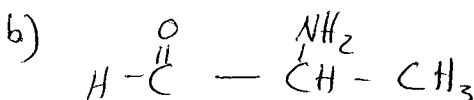
Journal of Management Education 36(7) 809–824

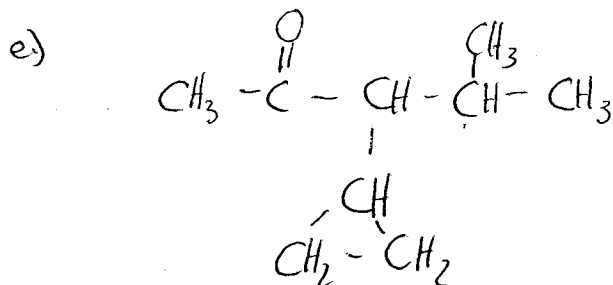
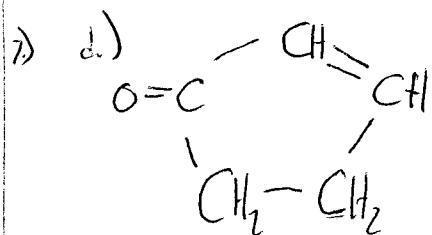
Journal of Management Education 36(7) 809–824

Journal of Management Education 36(7) 809–824

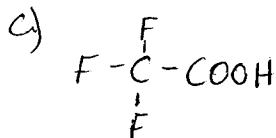


b.) 2-chloroethanol c.) cyclohexanol

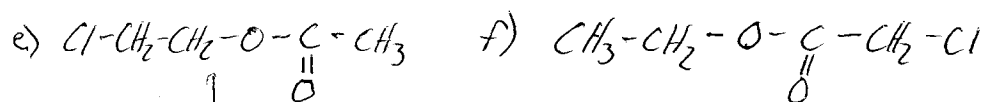
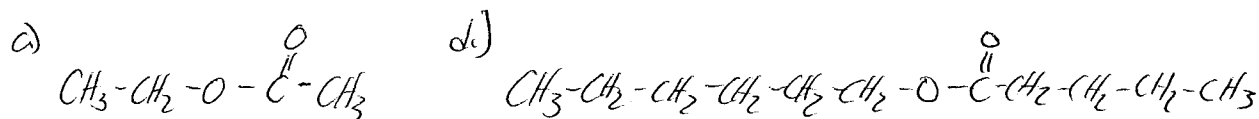
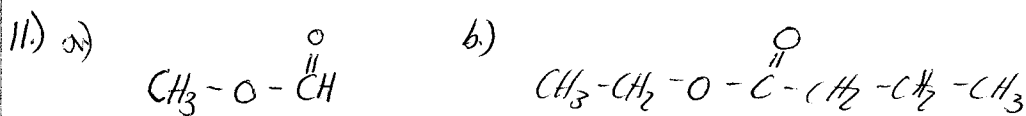
$$d^2 + 4d + 3 = (d+1)(d+3)$$




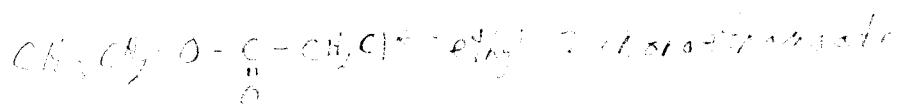
- 8.) a) propanal b) 2-butanone c) 2-aminoethanal
 d) cyclopropanone e) 4-nitro-2-pentanone
 f) 2-bromo-4-chloro-3-pentanone g) 2-propynal
 h) 2-aminocyclobutanone

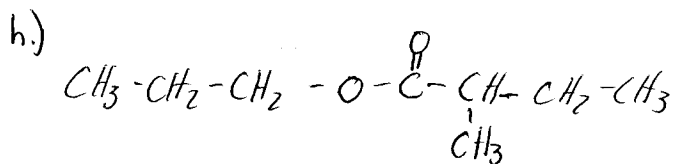
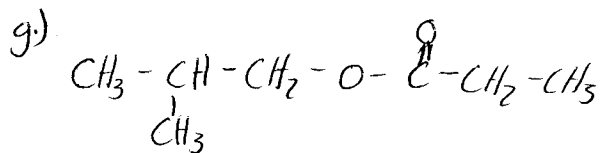


- 10.) a) methanoic acid b) 2-pentenoic acid
 c) 2,2-difluoropropanoic acid d) 2-bromo-2-chloropropanoic acid

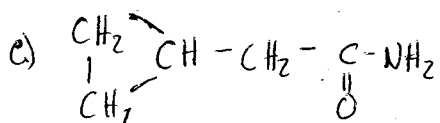
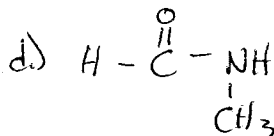
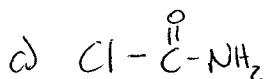
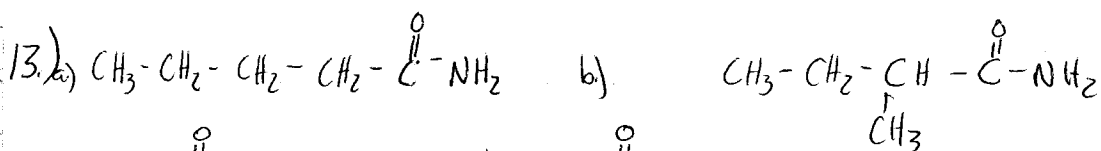


g) chloroethyl acetate

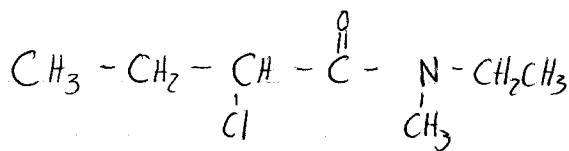




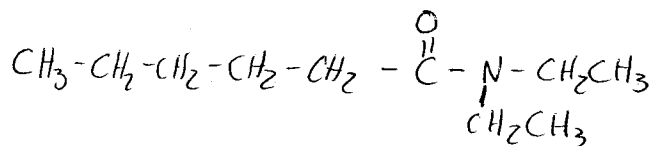
- 12) a) propyl propanoate b) methyl 2-methylpropanoate
 c) methyl 2-propenoate d) 2-chloromethyl 3-chloropropanoate
 e) cyclohexyl 3-aminopropanoate



f.)

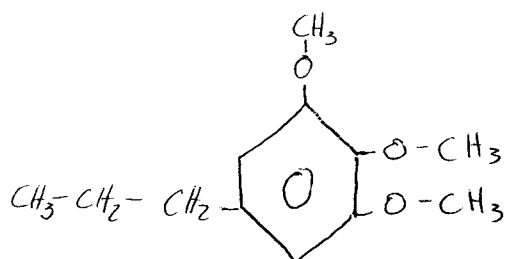


g.)



- 14) a) methanamide b) ethanamide c) 2-propynamide d) N-propylpropanamide
 e) N,N-diethyl-2-methylpropanamide

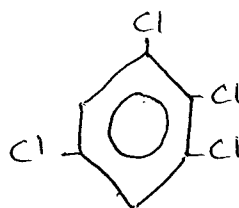
15.) a)



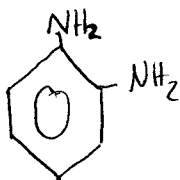
b)

~~c)~~

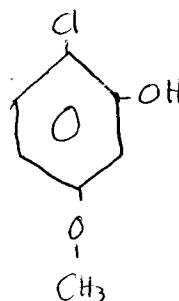
c)



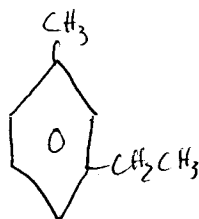
d)



e)



f)



o-hydroxyaniline benzene

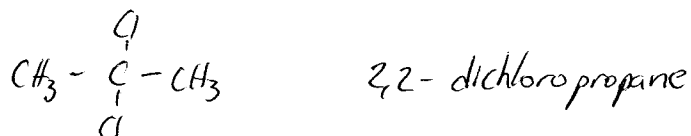
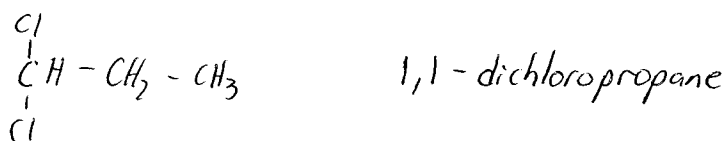
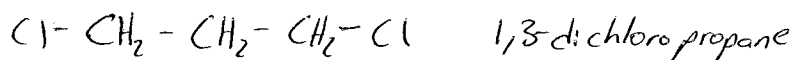
16.) a) 1,3,5-trimethylbenzene b) 4

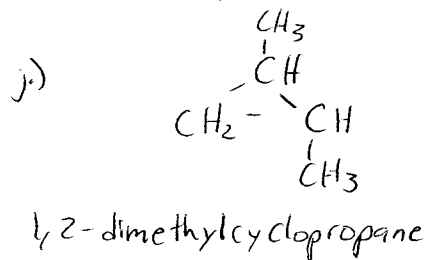
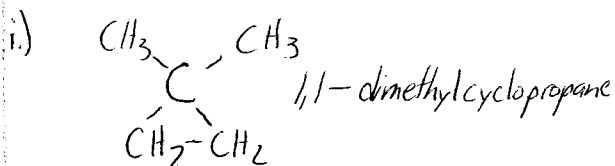
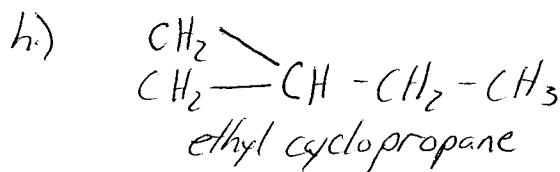
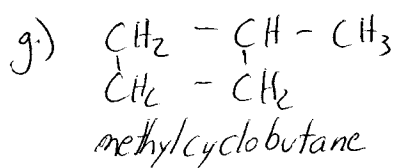
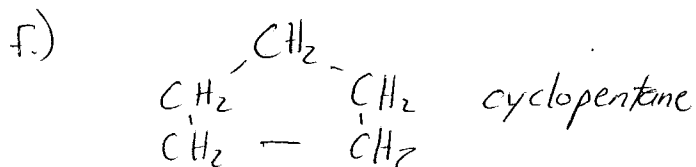
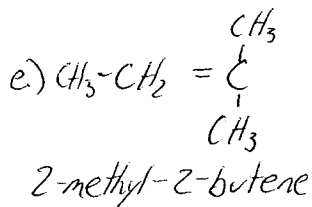
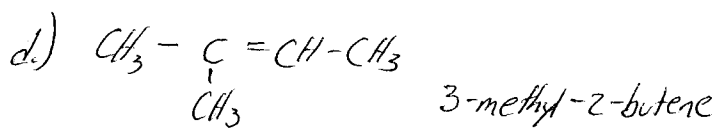
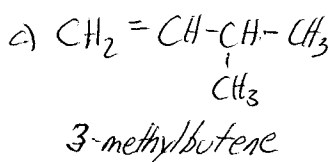
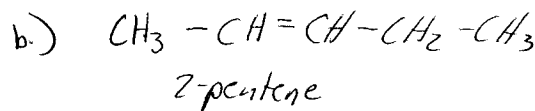
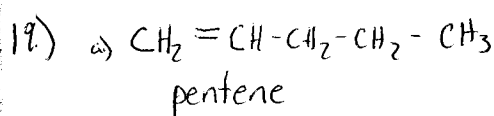
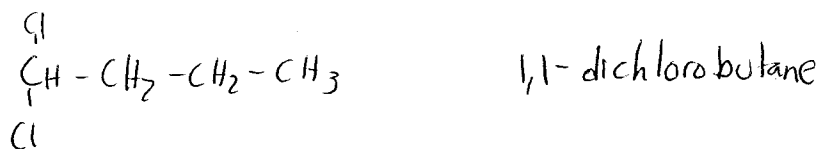
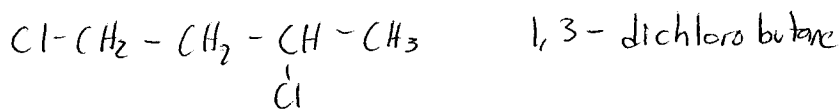
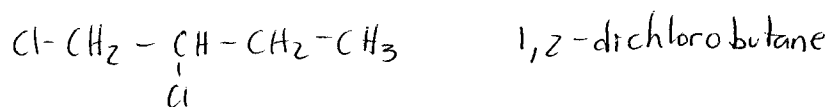
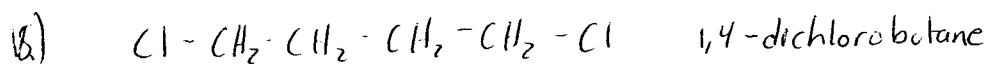
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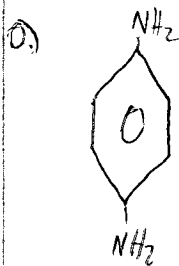
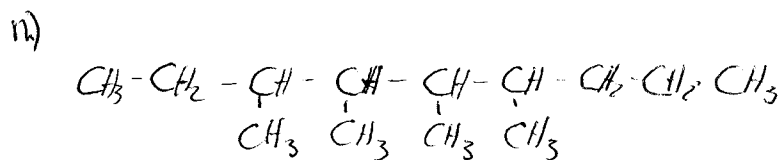
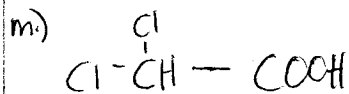
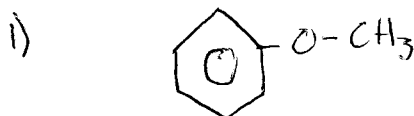
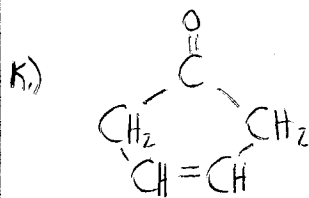
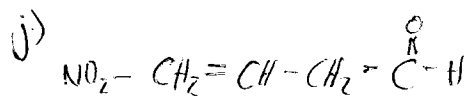
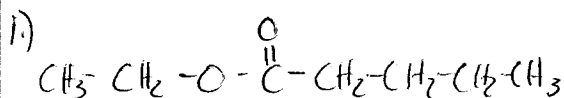
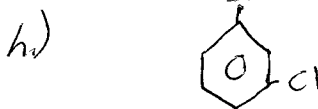
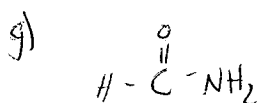
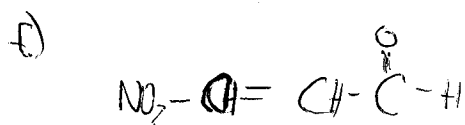
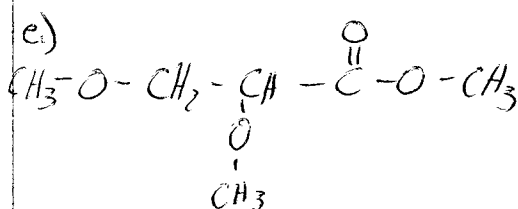
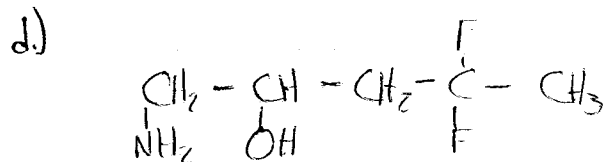
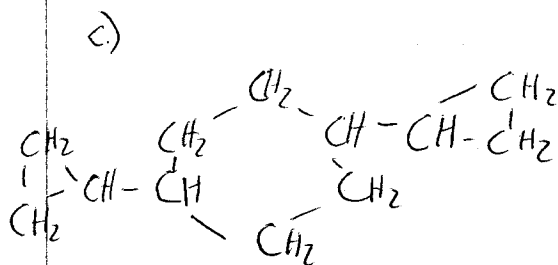
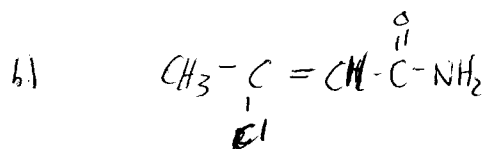
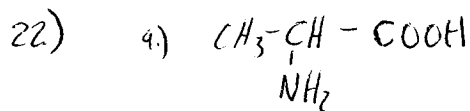
o-hydroxyaniline benzene

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17)

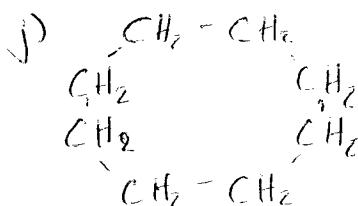
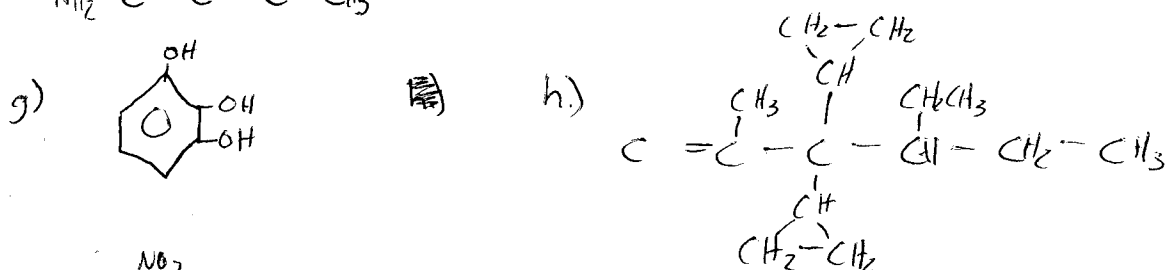
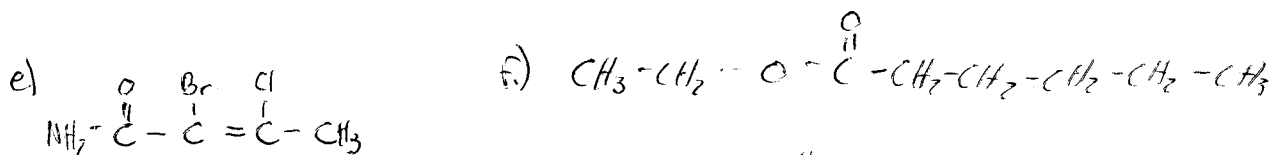
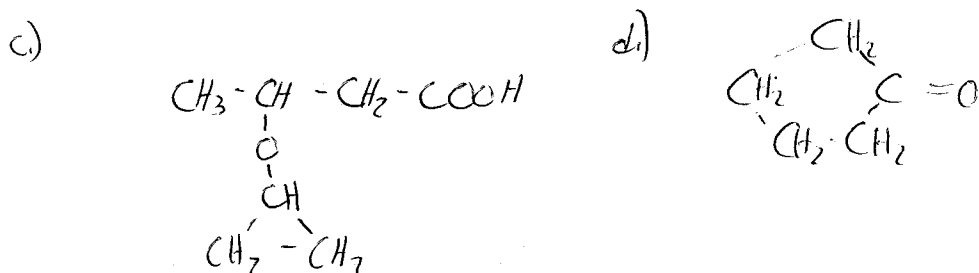
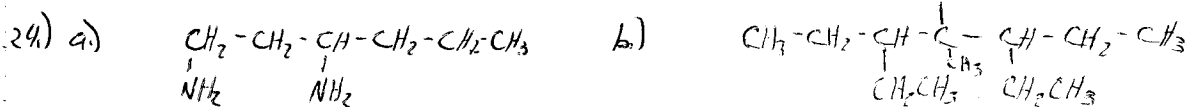


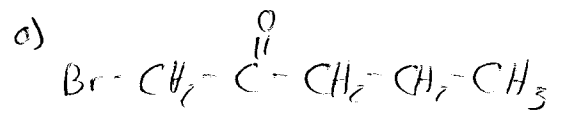
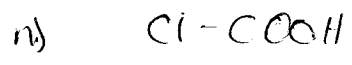
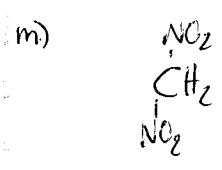
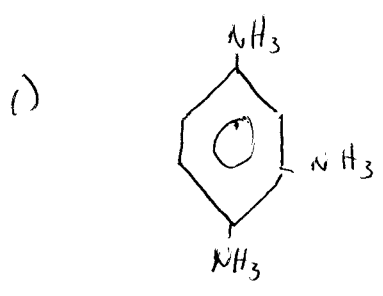
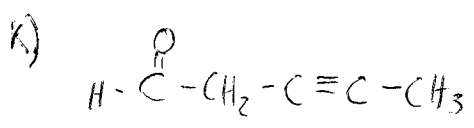




- 23) a) propene b) 1,2,3-trimethylcyclopropane
 c) tetraiodomethane d) 2-aminopropane
 e) cyclopropoxycyclopropane f) butanal g) cyclopropanol
 h) propyne i) 1,3-dichlorocyclobutene j) 3-nitropropene
 k) methoxybutane l) 2-pentanol m) 4-amino-2-butanol
 n) 1-ethoxy-2-propanone o) 4-nitro-2-pentenal p) pentanoic acid
 q) 4-amino-4-cyclopropylbutanoic acid r) pentanamide
 s) 2,6-dimethyloctane t) cyclobutanone u) ethyl pentanoate
 v) methyl 2-propynoate w) 3-aminobutanamide

x) y)





- 25.) a) 1,3-dichloro-2-methoxypropane
 a) 1-amino-3-chloro-2-butanone
 e) 1,3-diamino-5-chlorobenzene
 g)-
 i) 1-ethyl-2-pentylbenzene
 k) 1,1,2,2-tetraminoethane
 m) 2,4-dimethyl-3-hexanone
 p) 1,3,5-trinitrobenzene

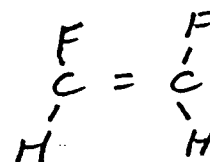
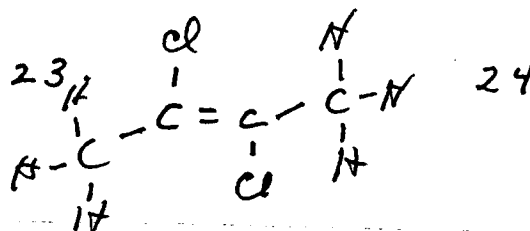
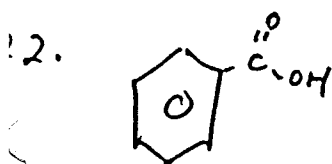
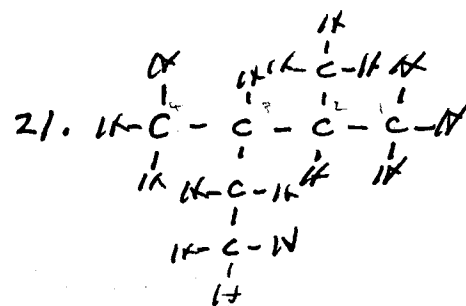
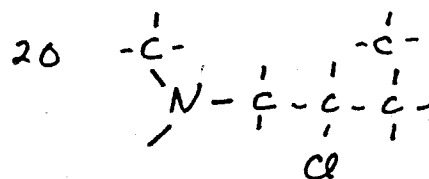
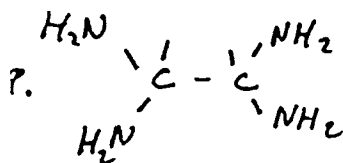
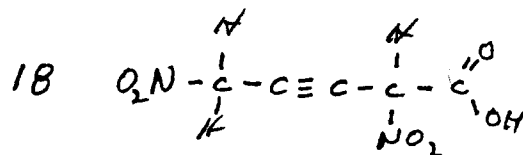
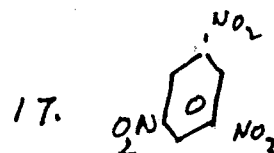
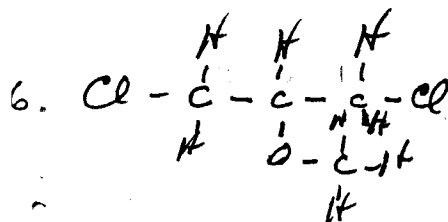
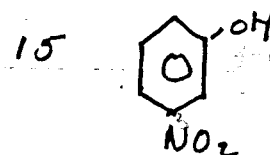
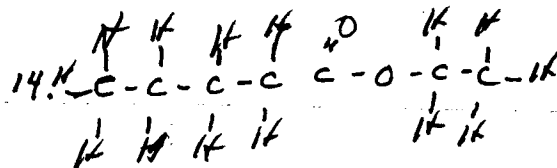
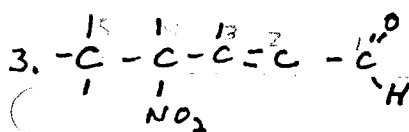
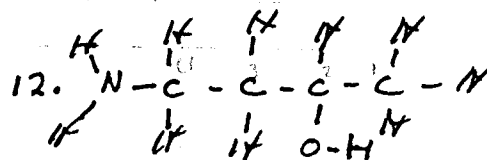
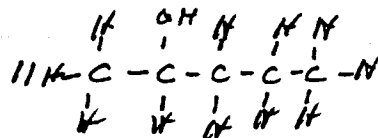
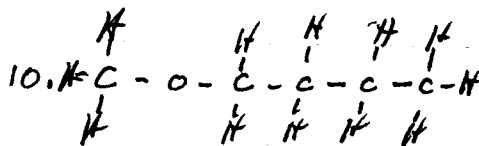
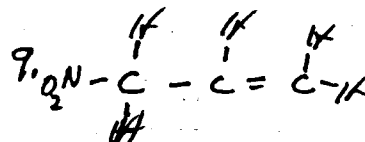
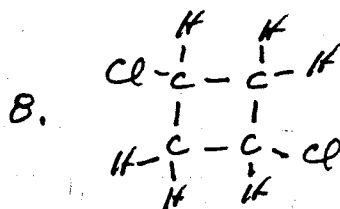
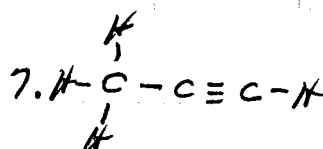
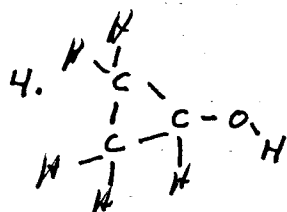
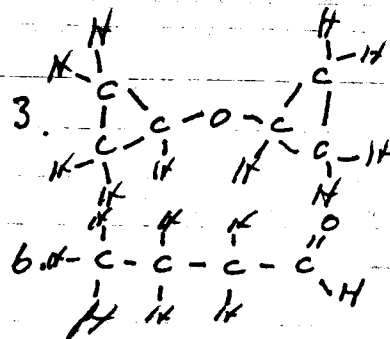
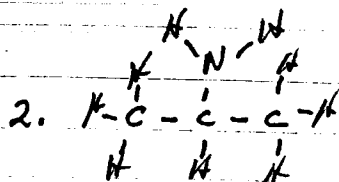
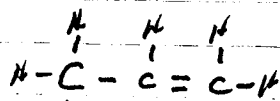
- b) -
 d.) 5-oxo-2-nitro-3-pentenal
 f.)
 h.) 2,3-dimethyl-2-cyclobutenol
 j) cyclopentoxycyclohexane
 l)
 n) cyclopropyl methanoate

f) 3-bromo-3,5,5-trimethylhexane

g) pyranose and

h) 2,5-dimethyl-3-pentenal and

Name the following:



Draw the structures for the following:

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1. 1,3-diaminohexane.
2. 3-pentynal.
3. 1-bromo-2-pentanone
4. 4-ethyl-2-methyl-3,3-dicyclopropyl-1-hexene.
5. Chloromethanoic acid.
6. cyclooctane.
7. 1,3,4-triaminobenzene
8. ethyl hexanoate
9. cyclopentanone.
10. O-dinitrobenzene
11. methoxybenzene
12. 4-nitro-3-butenal
13. 1-amino-4,4-difluoro-2-pentanol
14. para diaminobenzene
15. dichloroethanoic acid
16. ethyl pentanoate.
17. 2-aminopropenoic acid.
18. 2,3-diethoxybutane.
19. 3,4,5,6-tetramethylnonane.
20. 1,2,3-trihydroxybenzene.

Review of Organic nomenclature

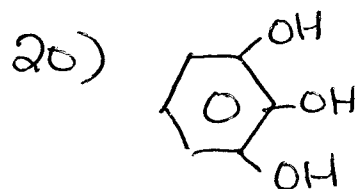
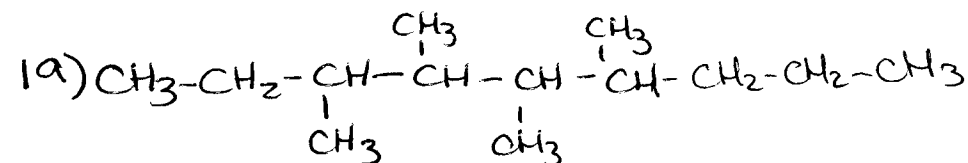
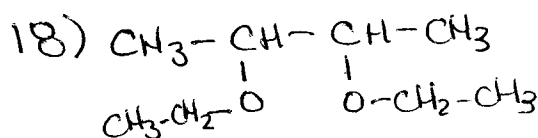
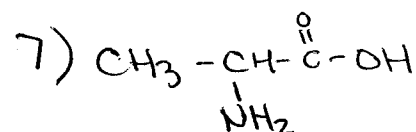
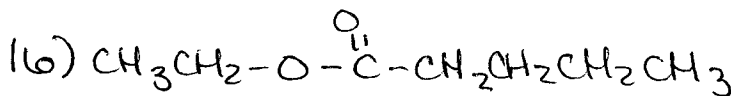
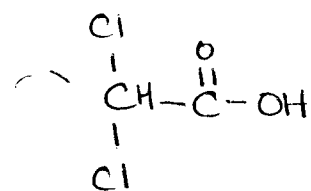
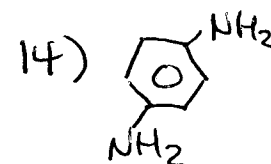
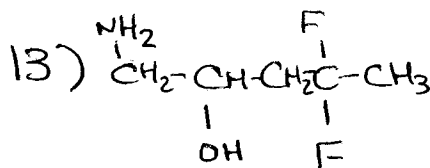
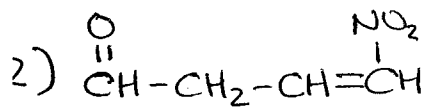
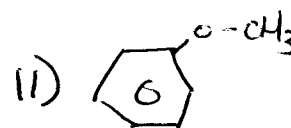
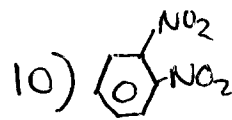
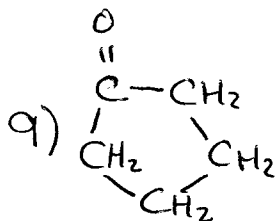
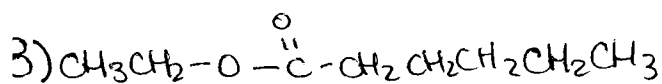
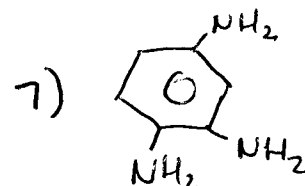
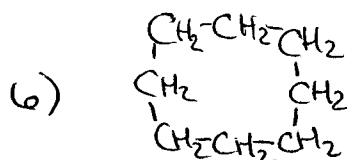
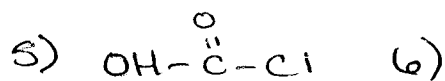
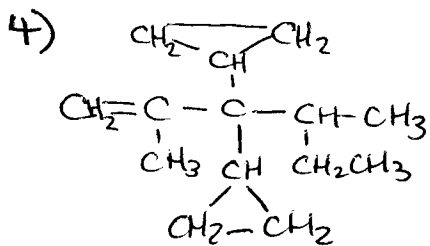
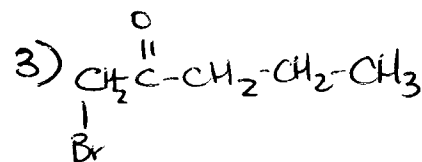
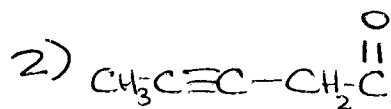
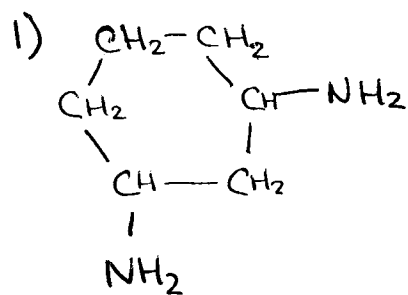
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Name the following:

- 1) 1-propene
- 2) 2-aminopropane
- 3) cyclopropyloxycyclopropane
- 4) cyclopropanol
- 5) 1,2,3,4-tetraiodomethane
- 6) butanal
- 7) 1-propyne
- 8) 1,3-dichlorocyclobutane
- 9) 3-nitro-1-propene
- 10) 1-methoxybutane
- 11) 2-pentanol
- 12) 4-amino-2-butanol
- 13) 4-nitro-2-hexenal
- 14) ethyl butanoate
- 15) 1-hydroxy-3-nitrobenzene
- 16) 1,3-dichloro-2-methoxypropane
- 17) 1,3,5-trinitrobenzene
- 18) 2,5-dinitro-3-pentynoic acid
- 19) 1,1,2,2-tetraminoethane
- 20) 1-methylamino-2,3-dichloropropane
- 21) 2-methyl-3-propylbutane
- 22) benzoic acid
- 23) trans-1,2-dichloro-2-butene
- 24) 1,2-difluoroethene

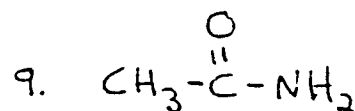
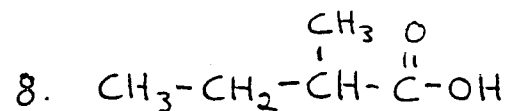
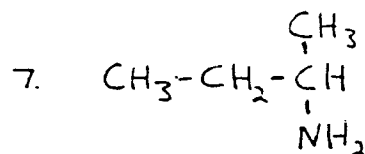
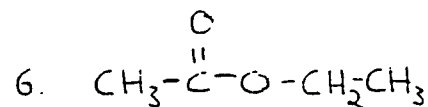
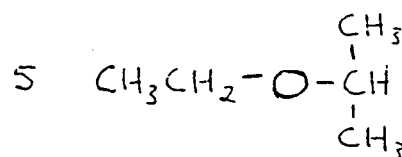
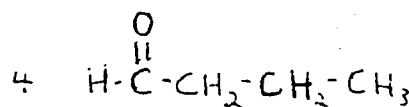
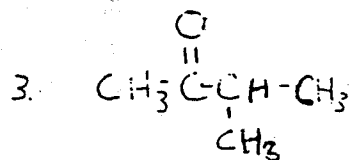
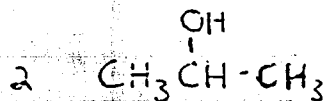
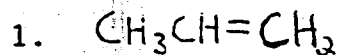
Draw the structures for the following

19



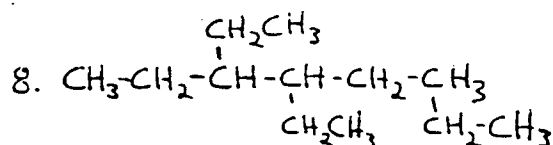
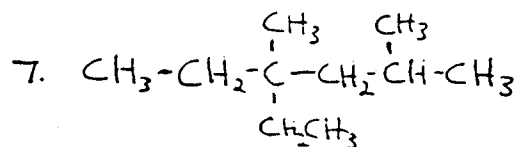
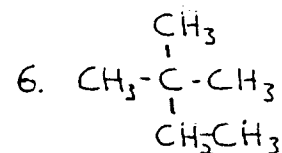
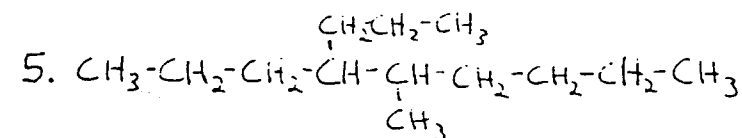
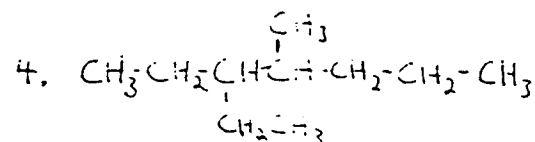
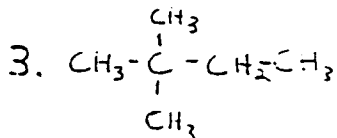
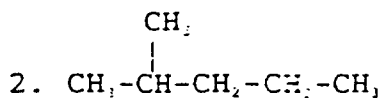
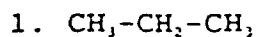
Functional Group Recognition Sheet

Name the functional groups represented in the following compounds.



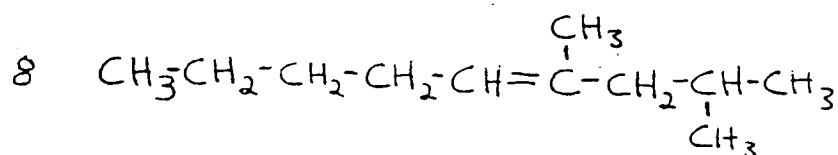
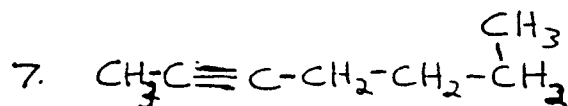
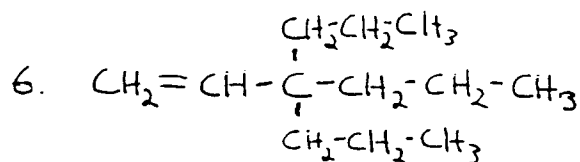
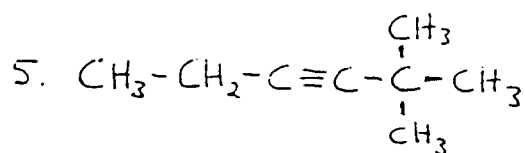
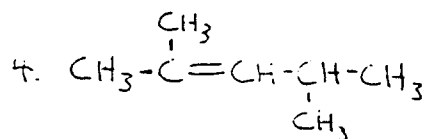
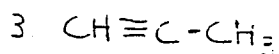
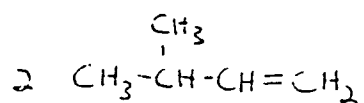
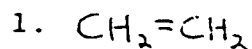
Alkane Nomenclature Practise Sheet

Give the correct IUPAC name for each of the following compounds.
Hint: it is a good idea to draw a rectangle around the longest carbon chain and number your carbon atoms.



Alkene and Alkyne Nomenclature Practise Sheet

Give the correct IUPAC name for each of the following compounds. Remember to give the location of the carbon-carbon double bond in the chain the lowest possible number unless there is a carbon-carbon triple bond which takes precedence over the double bond. Also remember to change the ending on the root carbon chain to -ene if there is a double bond present and to -yne if there is a triple bond present.



Drawing Structural Formulas

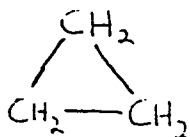
Draw the correct structural formula for each of the following compounds.

1. 2-methylbutane
2. 2,2-dimethylpropane
3. 4-propyl-6-methyloctane
4. 3,3,5-trimethylheptane
5. 2-butene
6. 3-ethyl-2-pentene
7. 2-methyl-3-hexyne
8. 3,3,6-trimethyl-4-octyne
9. 5,6-dimethyl-4-propyl-4-nonene
10. 3-methyl-2,4-hexadiene

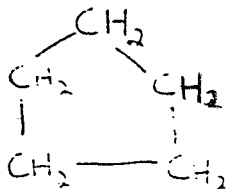
Cycloalkanes Nomenclature Practise Sheet

Give the correct IUPAC name for each of the following cycloalkanes

1.



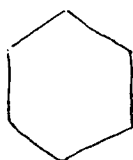
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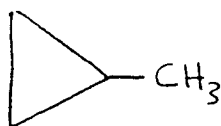
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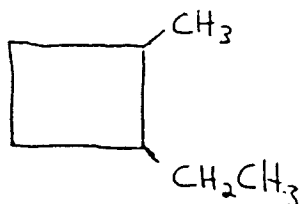
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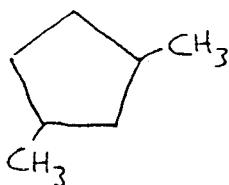
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6

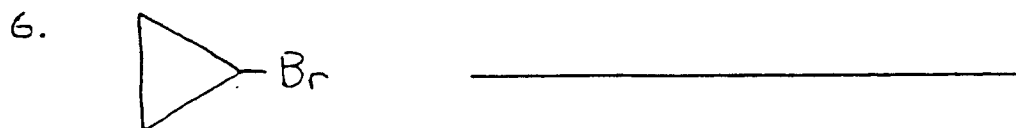
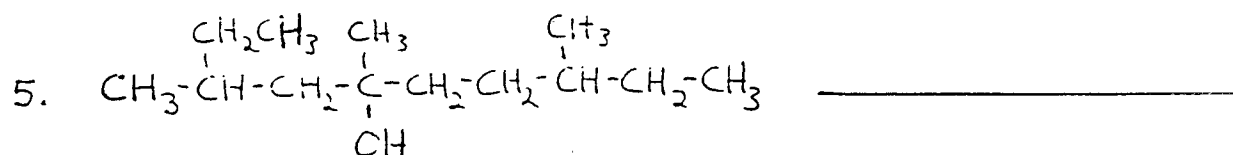
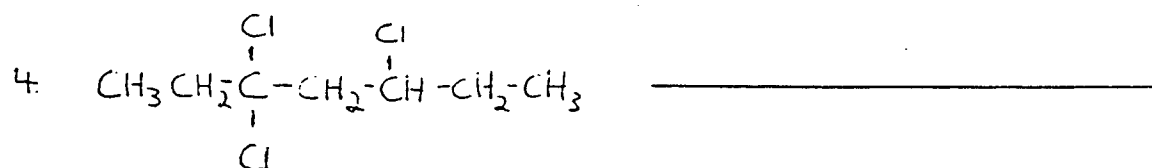
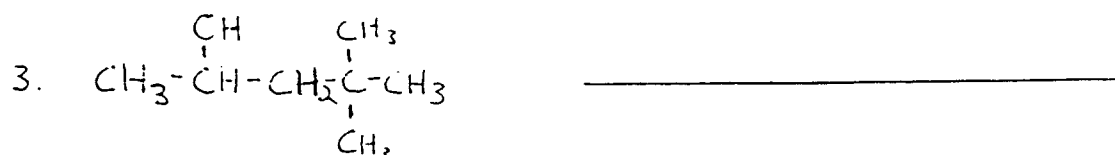
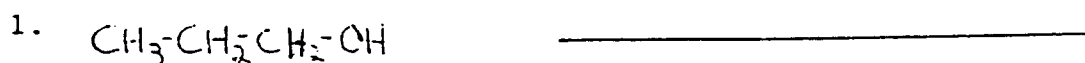


7.



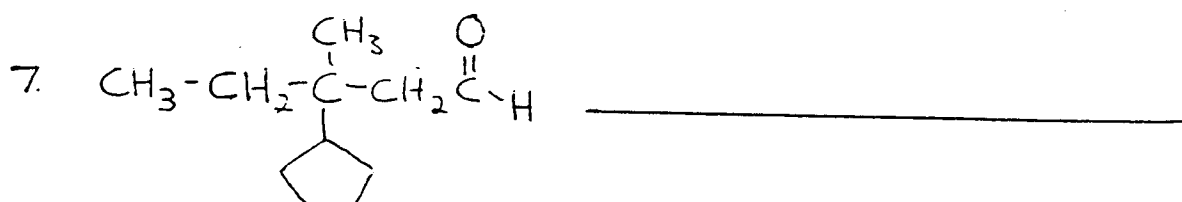
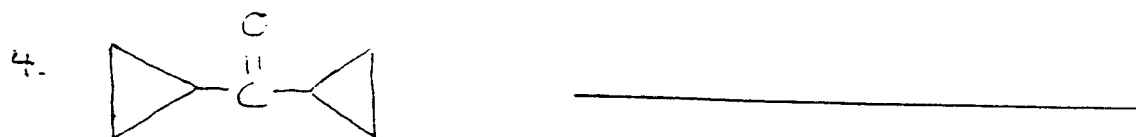
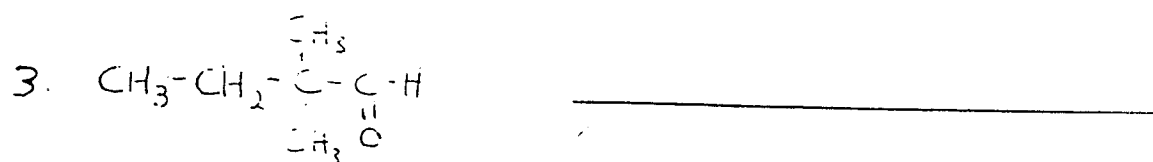
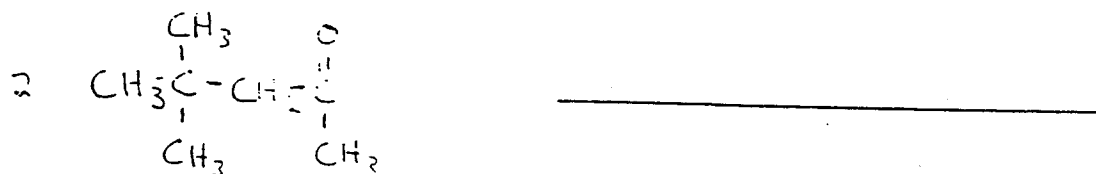
Alcohol and Halogen Nomenclature Practise Sheet

Give the correct IUPAC name for each of the following compounds. Remember alcohols and halogens are more important than alkyl groups so their position in the chain is given the lowest number. Also remember if the compound is an alcohol to change the ending of the root name to -ol.



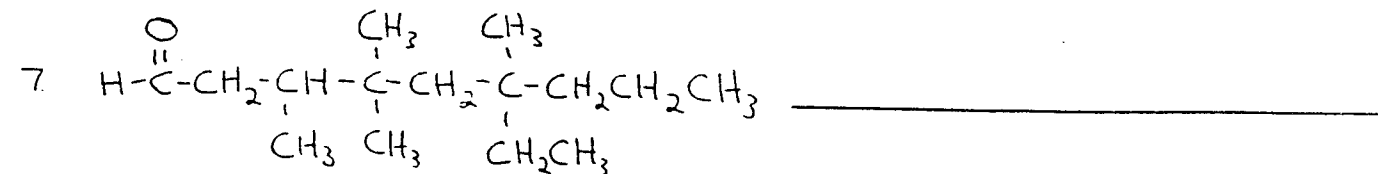
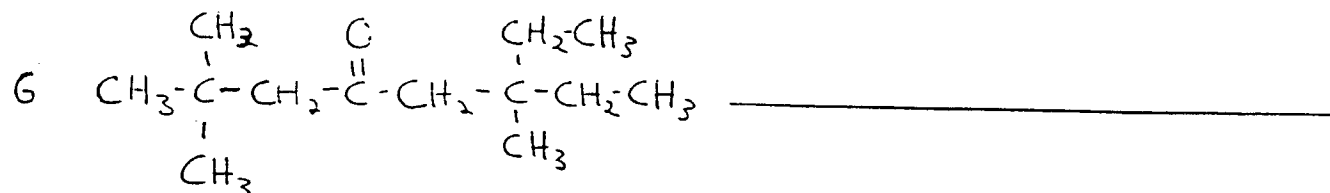
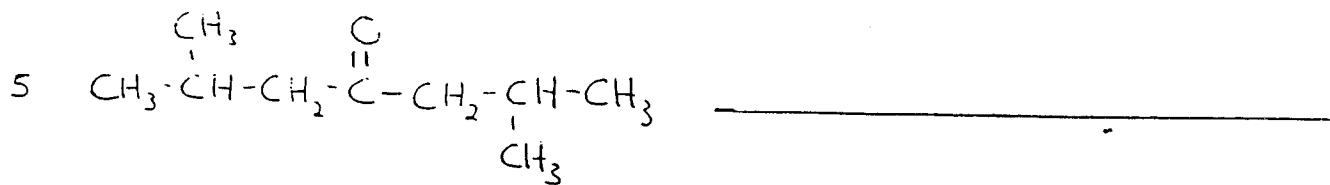
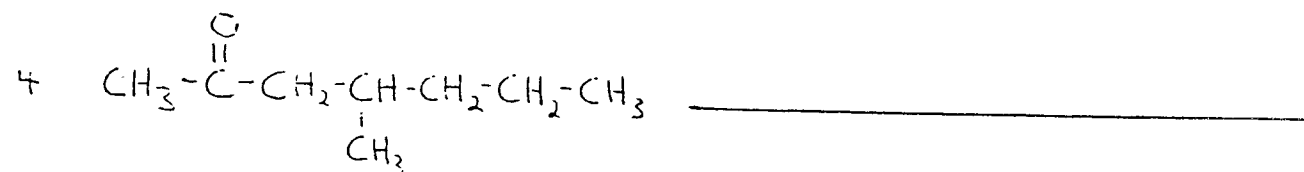
Aldehydes and Ketones Differentiation Sheet

Determine whether the following compounds are aldehydes or ketones and write the correct response in the space provided.



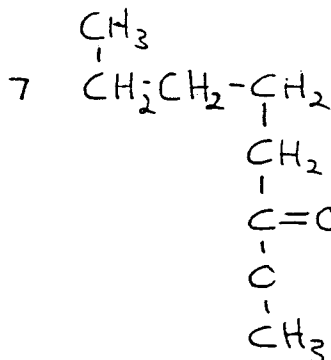
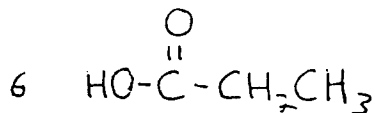
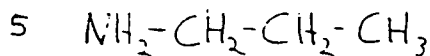
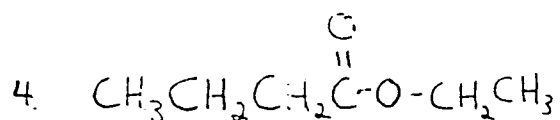
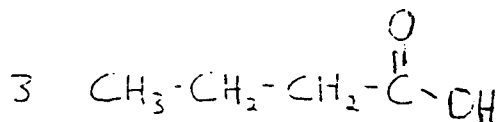
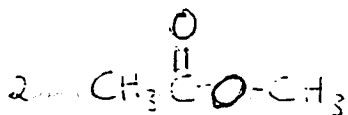
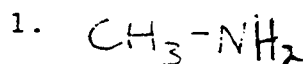
Aldehydes and Ketones Nomenclature Practise Sheet

Give the correct IUPAC name for each of the following compounds. Remember aldehydes and ketones are more important than alkyl groups so their position in the chain is given the lowest number. Also remember if the compound is an aldehyde to change the ending of the root name to -al, and if the compound is a ketone, to -one.



Simple Amines, Esters & Carboxylic Acids
Nomenclature Practise Sheet

Give the correct IUPAC name for each of the following compounds. Remember if the compound is an amine, the longest carbon chain attached to the nitrogen is the root chain and the ending -amine is added to the end of the alkyl group name. If the compound is an ester the ending -oate is added to the name of the carbon chain containing the carbonyl group, while the name of the carbon chain attached to the oxygen is simply its alkyl name. If the compound is a carboxylic acid the ending of the root name is changed to -oic acid.



Practice Sheet 1

Functional Group Recognition Sheet

- (1) propene
- (2) 2-propanol (alcohol)
- (3) 3-methyl-2-butanone (ketone)
- (4) butanal (aldehyde)
- (5) 2-ethoxy propane (ether)
- (6) ethyl ethanoate (ester)
- (7) 2-aminobutane (amine)
- (8) 2-methylbutanoic acid (carboxylic acid)
- (9) ethanamide (amide)

Practice Sheet 2

Alkane Nomenclature Practice Sheet

- (1) propane
- (2) 2-methylpentane
- (3) 2,2-dimethylbutane
- (4) 3-ethyl-4-methylheptane
- (5) 5-methyl-4-propylnonane
- (6) 2,2-dimethylbutane
- (7) 4-ethyl-2,4-dimethylhexane
- (8) 3,4-diethyloctane

Practice Sheet 4

29

- ① $\text{CH}_3 - \overset{\text{CH}_3}{\underset{|}{\text{CH}}} - \text{CH}_2 - \text{CH}_3$
- ② $\text{CH}_3 - \overset{\text{CH}_3}{\underset{\text{CH}_3}{|}{\text{C}}} - \text{CH}_3$
- ③ $\text{CH}_3 - \text{CH}_2 - \overset{\text{CH}_3}{\underset{\text{CH}_2\text{CH}_2\text{CH}_3}{|}{\text{CH}}} - \text{CH}_2 - \overset{\text{CH}_3}{\underset{|}{\text{C}}} - \text{CH}_2 - \text{CH}_3$
- ④ $\text{CH}_3 - \text{CH}_2 - \overset{\text{CH}_3}{\underset{|}{\text{C}}} - \text{CH}_2 - \overset{\text{CH}_3}{\underset{|}{\text{CH}}} - \text{CH}_2 - \text{CH}_3$
- ⑤ $\text{C} \begin{matrix} \text{cis} \\ \diagup \quad \diagdown \end{matrix} \text{C} \quad \text{trans} \quad \text{C} = \text{C}$
- ⑥ $\text{C} - \text{C} = \underset{\text{C} - \text{C}}{\text{C}} - \text{C} - \text{C}$
- ⑦ $\text{C} - \overset{\text{C}}{\underset{|}{\text{C}}} - \text{C} \equiv \text{C} - \text{C} - \text{C}$
- ⑧ $\text{C} - \text{C} - \overset{\text{C}}{\underset{\text{C}}{|}{\text{C}}} - \text{C} \equiv \text{C} - \overset{\text{C}}{\underset{|}{\text{C}}} - \text{C} - \text{C}$
- ⑨ $\text{C} - \text{C} - \text{C} - \text{C} = \overset{\text{C} - \text{C} - \text{C}}{\underset{\text{C} \quad \text{C}}{|}{\text{C}}} - \text{C} - \text{C} - \text{C}$
- ⑩ $\text{C} - \text{C} = \overset{\text{C}}{\underset{|}{\text{C}}} - \text{C} = \text{C} - \text{C}$

Cycloalkanes Nomenclature Practice Sheet AnswersNumber 5

1. cyclopropane
2. cyclopentane
3. cyclobutane
4. cyclohexane
5. methylcyclopropane
6. 1-ethyl-2-methylcyclobutane
7. 1,3-dimethylcyclopentane

Number 6

1. 1-propanol
2. 2-bromo-3-methylpentane
3. 4,4-dimethyl-2-pentanol
4. 3,3,5-trichloroheptane
5. 2-ethyl-4,7-dimethyl-4-nonanol
6. bromocyclopropane
7. 2-methylcyclopentanol

Number 7

1. propanone
2. 4,4-dimethyl-2-pentanone
3. 2,2-dimethylbutanol
4. dicyclopropylmethanone
5. cyclopentylmethanone
6. cyclohexylmethanone
7. 3-cyclopentyl-3-methylpentanal

Number 8

1. propanal
2. 4-methyl-2-pentanone
3. 3,3-diethylpentanal
4. 4-methyl-2-heptanone
5. 2,6-dimethyl-4-heptanone
6. 6-ethyl-2,2,6-trimethyl-4-octanone
7. 6-ethyl-3,4,4,6-tetramethylnonanal

*Practice Sheet 3*Alkene and Alkyne Nomenclature

- (1) ethene
- (2) 3-methyl-1-butene
- (3) propyne
- (4) 2,4-dimethyl-2-pentene
- (5) 2,2-dimethyl-3-hexyne
- (6) 3,3-dipropyl-1-hexene
- (7) 2-heptyne
- (8) 2,4-dimethyl-4-nonene

*Practice Sheet 9*Simple Amines, Esters & Carboxylic Acids

- 1) aminomethane
- 2) methyl ethanoate
- 3) butanoic acid
- 4) ethyl butanoate
- 5) 1-aminopropane
- 6) propanoic acid
- 7) methyl hexanoate