PART A: ORGANIC NOMENCLATURE (these are also the answers to part B)

Give the systematic name for each compound.

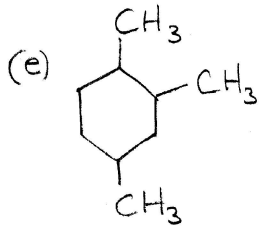
ALKANES

(a) CH_3CH_3

(b) $CH_3CH_2CH_2CH_3$

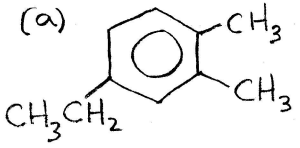
(c) $CH_3CH_2\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_3$

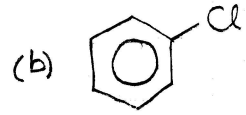
(d) $CH_3CH_2\underset{\displaystyle CH_2\\ \displaystyle CH_3}{\underset{|}{\underset{|}{C}}}HCH_2\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_3$

(e) 

(f) $CH_3\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_3$

AROMATICS

(a) 

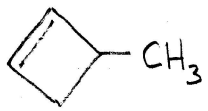
(b) 

(c) $CH_3\underset{\displaystyle C_6H_5}{\underset{|}{C}}HCH_2CH_2\overset{\displaystyle O}{\overset{\|}{C}}H$

ALKENES and ALKYNES

(a) $CH_2=CH_2$

(b) $CH_3CH_2CH_2CH=CH_2$

(c) 

(d) $CH_3CH=\underset{\displaystyle CH_3}{\underset{|}{C}}CH_2\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_2\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_2CH_3$

(e) $CH\equiv CH$

(f) $CH_3C\equiv CCH_3$

(g) $CH\equiv C\underset{\displaystyle CH_2CH_3}{\underset{|}{C}}HCH_2CH_3$

ALCOHOLS and ETHERS

(a) CH_3CH_2OH

(b) $CH_3CH_2CH_2\underset{\displaystyle OH}{\underset{|}{C}}HCH_3$

(c) $CH_3\underset{\displaystyle OH}{\underset{|}{C}}H\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_3$

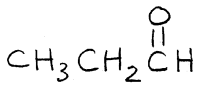
(d) $CH_3OCH_2CH_2CH_2CH_3$

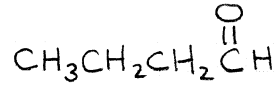
(e) CH_3OCH_3

(f) $CH_3CH_2CH_2OCH_2CH_3$

(g) $CH_3\underset{\displaystyle F}{\underset{|}{\overset{\displaystyle OH}{\overset{|}{C}}}}CH_3$

ALDEHYDES and KETONES

(a) 

(b) 

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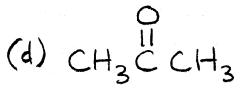
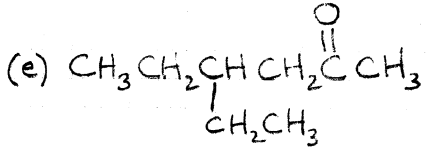
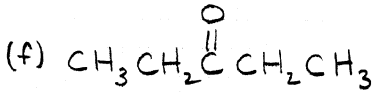
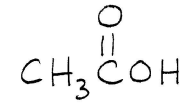
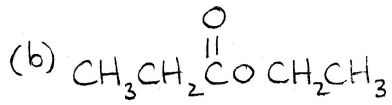
(d) 

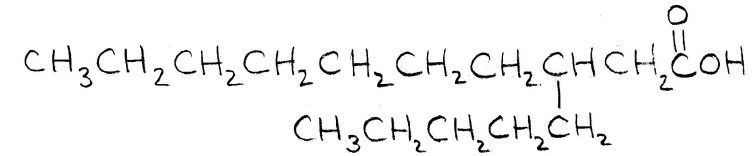
(e) 

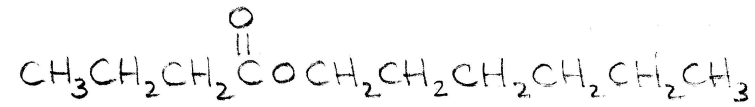
(f) 

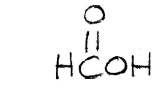
CARBOXYLIC ACIDS and ESTERS

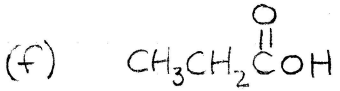
(a) 

(b) 

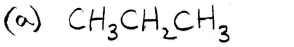
(c) 

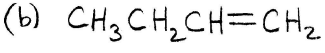
(d) 

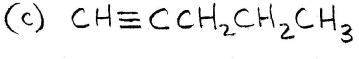
(e) 

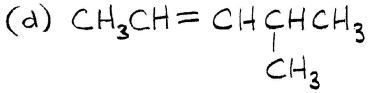
(f) 

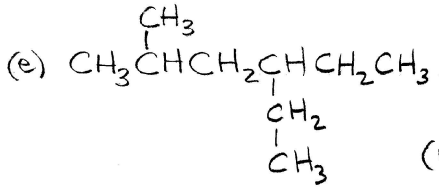
ALL

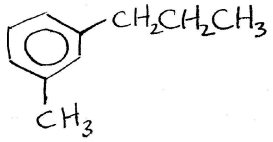
(a) 

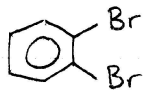
(b) 

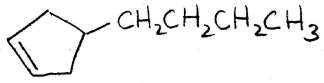
(c) 

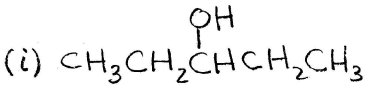
(d) 

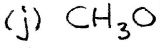
(e) 

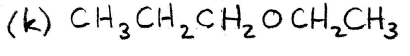
(f) 

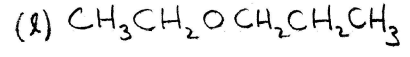
(g) 

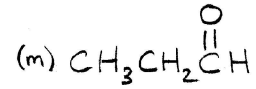
(h) 

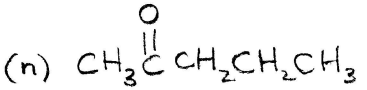
(i) 

(j) 

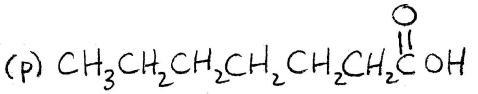
(k) 

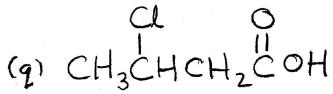
(l) 

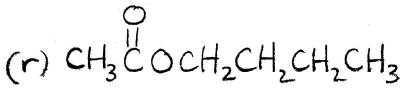
(m) 

(n) 

(o) 

(p) 

(q) 

(r) 

PART B: ORGANIC STRUCTURES (these are also the answers to part A)

Draw the structure for each compound.

ALKANES

(a) ethane
(b) butane
(c) 2-methylbutane
(d) 4-ethyl-2-methylhexane
(e) 1,2,4-trimethylcyclohexane
(f) isopropylcyclobutane

ALKENES and ALKYNES

(a) ethene
(b) pent-1-ene
(c) 3-methylcyclobut-1-ene
(d) 3,5,7-trimethylnon-2-ene
(e) ethyne
(f) but-2-yne
(g) 3-ethylpent-1-yne

AROMATICS

(a) 4-ethyl-1,2-dimethylbenzene
(b) chlorobenzene
(c) 4-phenylpentanal

ALCOHOLS and ETHERS

(a) ethanol
(b) pentan-2-ol
(c) 3-methylbutan-2-ol
(d) 1-methoxybutane
(e) methoxymethane
(f) 1-ethoxypropane
(g) 2-fluoropropan-2-ol

ALDEHYDE and KETONES

(a) propanal
(b) butanal
(c) methanal
(d) propan-2-one
(e) 4-ethylhexan-2-one
(f) pentan-3-one

CARBOXYLIC ACIDS and ESTERS

(a) ethanoic acid
(b) ethyl propanoate
(c) 3-pentyldecanoic acid
(d) hexyl butanoate
(e) methanoic acid
(f) propanoic acid

ALL

(a) propane
(b) but-1-ene
(c) pent-1-yne
(d) 4-methylpent-2-ene
(e) 4-ethyl-2-methylhexane
(f) 1-methyl-3-propylbenzene
(g) 1,2-dibromobenzene
(h) 4-butylcyclopent-1-ene
(i) pentan-3-ol
(j) methanol
(k) 1-ethoxypropane
(l) 1-ethoxypropane
(m) propanal
(n) pentan-2-one
(o) cyclohexa-1,3-diene
(p) heptanoic acid
(q) 3-chlorobutanoic acid
(r) butyl ethanoate

PART C: REACTIONS INVOLVING ORGANIC COMPOUNDS

- Draw the structural diagram equation for each chemical reaction.
- Include any necessary conditions.
- Name the product(s).

(a) Dehydration of propan-2-ol.

(b) Hydrogenation of pent-1-ene.

(c) Esterification between methanoic acid and butan-1-ol.

(d) Controlled oxidation of hexan-3-ol.

(e) Chlorination (halogenation with chlorine) of ethene.

(f) Combustion of acetone.

(g) Substitution reaction on 1-methylcyclopentan-1-ol using hydrogen bromide.

(h) Hydration of cyclohexene.

(i) Neutralization of heptanoic acid using potassium hydroxide.

(j) Hydrohalogenation of but-1-ene using hydrogen chloride.

(k) Controlled oxidation of propanal.

(l) Hydrogenation of butan-2-one.

(m) Substitution reaction on benzene using bromine.

(n) Synthesis of methoxymethane from methanol.

(o) Treating ethyl propanoate with lithium hydroxide.