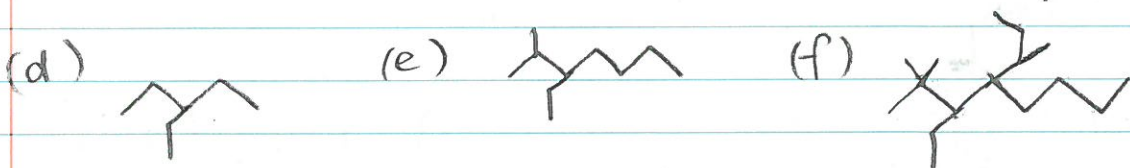
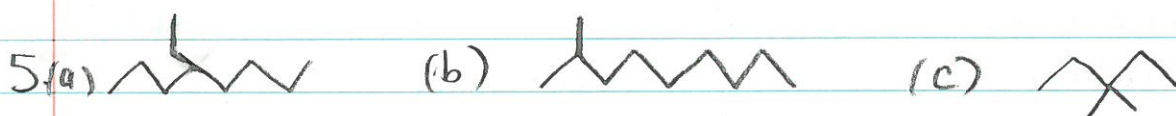
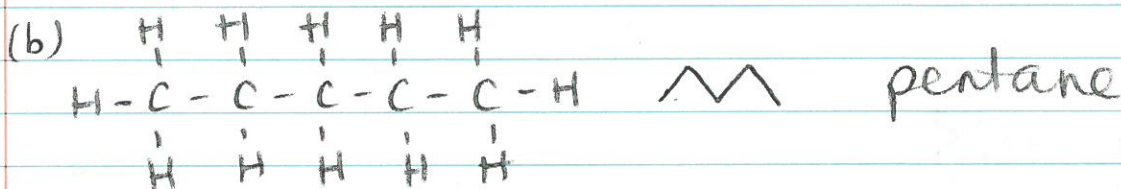
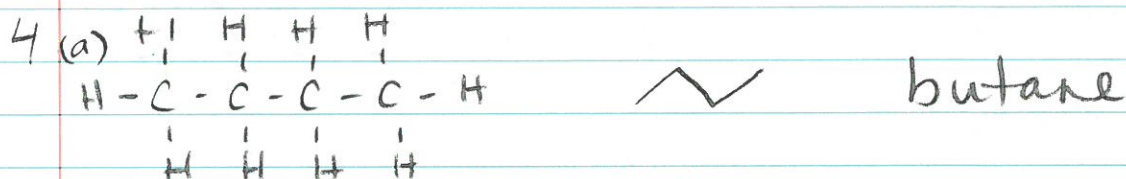
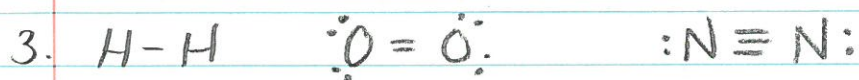


Organic Chemistry Homework Solutions

1. (a) inorganic (d) inorganic (g) inorganic
(b) organic (e) organic (h) organic
(c) inorganic (f) inorganic

2. has four unpaired valence electrons, relatively small, can form four bonds without lone pairs (versatile - lots of different ways it can bond)

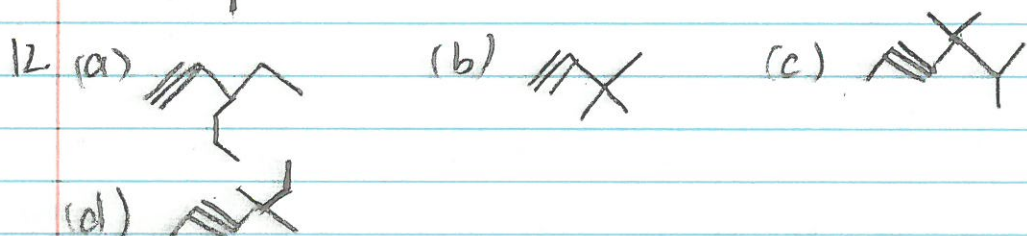
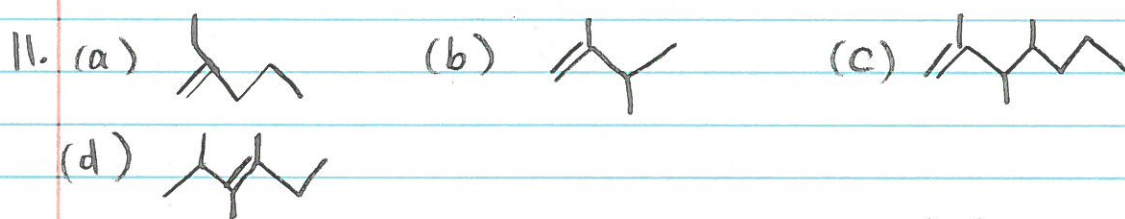


7. (a) yes (b) yes (c) yes (d) no

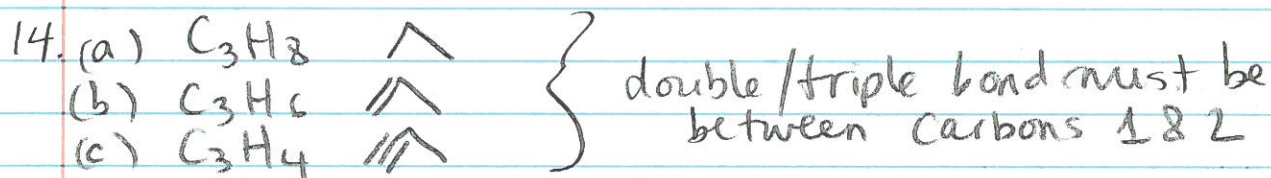
8. (a) non-polar covalent
 (b) London forces
 (c) length/size of molecule, shape of molecule






9. octane - longer chain = \uparrow IMF = \uparrow BP

10. (a) alkene (c) alkyne
 (b) alkane (d) alkene

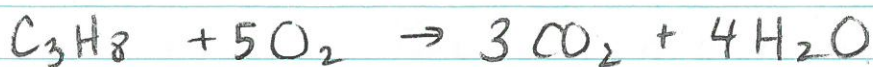
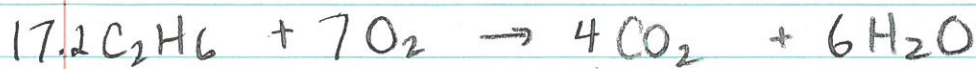
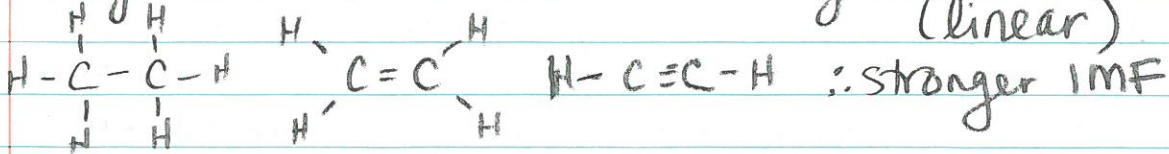


13. (a) alkane (d) alkane (g) alkyne
 (b) alkyne (e) alkene
 (c) alkane (f) alkene



15.  hexane  2,3-dimethylbutane
 3-methylpentane  2,2-dimethylbutane
 2-methylpentane
 all have non-polar bonds - soluble (like dissolves like)

16. ethyne - can fit closer to other ethyne molecules (linear)



18. it reacts with ^{→ burns} oxygen; all of the bonds are broken and reformed into simpler molecules

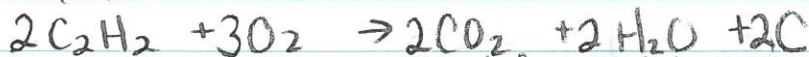
19. BIG molecules, lots of stored energy - produce lots of energy when combusted.

20. • burns faster, produces less energy (smaller molecules)

• burns cleaner - easier to break down and fewer byproducts

21. exothermic

22. (a) black soot is carbon



(b) carbon monoxide is formed



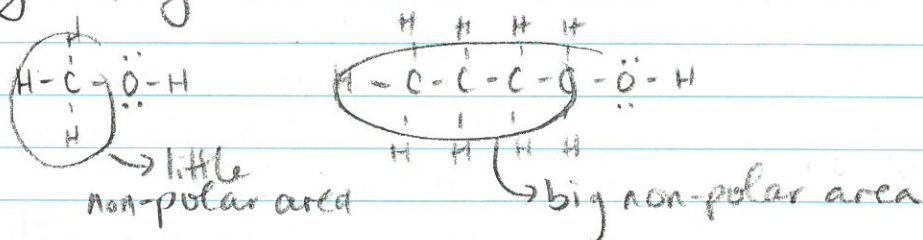
23. increases - molar mass increases, so stronger London forces, which means ↑BP

24. oil is non-polar, so will not dissolve in water
• less dense than water, so will rise to surface of water
• oil forms barrier at surface of water blocking sunlight / oxygen (needed by aquatic organisms)
25. (a) all compounds are non-polar (dissolve in each other) and will mix equally - looks like one substance, which is a solution
(b) water is polar, hydrocarbons are non-polar, so would not mix because water is more attracted to itself than oil (like dissolves like)
26. temperature decreases up the column, all compounds enter as a gas and condense at the point in the column where the temperature is at the compound's boiling point
27. 68°C (BP of hexane)
- (answers may vary)
28. gases - heating homes
naphtha - chemical products
gasoline - fuel for cars
kerosene - jet fuel
diesel - fuel for cars/trucks
lubricants - waxes, polishes
fuel oil - boilers, large scale heating
bitumen - tar and paving
29. all dipole-dipole, but iodoethane has a higher molar mass so it has stronger IMFs
30. methanol has a polar bond (OH) and methane is non-polar, so methanol is held together by hydrogen bonds instead of weaker London forces.

31. (a) ethane, fluoromethane, methanol
 LF DD HB
 (b) pentane, 1-chlorobutane, 1-butanol
 LF DD HB
 increasing BP \longrightarrow

32. propanol has stronger intermolecular forces because it has a very strong polar (O-H) bond

33. BP \rightarrow increases with higher molar mass (more carbons)
 solubility \rightarrow decreases when the non-polar carbon chain gets longer (one end of the molecule becomes less polar)



34. (a) larger molar mass = larger IMFs = \uparrow BP
 (b) esters are slightly polar ($\overset{\delta-}{\text{O}}=\text{C}-\text{O}-\text{R}$) but because the carbonyl group is in the middle of the molecule, they have weaker IMFs than other polar groups.
 (c) carboxyl group is VERY polar and at the end of the molecule (easy access)

