

1.5: Solutions to Chapter 1 Exercises

E1.1:

a) The atomic number of P (phosphorus) is 15, meaning there are 15 protons. The mass number for the ^{31}P isotope is 31, so:

15 protons + **16 neutrons** = mass number 31

(recall that mass number is number of protons and neutrons).

(for parts b-d, use the same reasoning as above)

b) 15 protons + **17 neutrons** = mass number 32

c) 17 protons + **20 neutrons** = mass number 37

d) 1 proton + **2 neutrons** = mass number 3

e) 6 protons + **8 neutrons** = mass number 14

E1.2:

a) $1s^2 2s^2 2p^3$

b) $1s^2 2s^2 2p^4$

c) $1s^2 2s^2 2p^5$

d) $1s^2 2s^2 2p^6 3s^2$

e) $1s^2 2s^2 2p^6$ (same as Neon atom)

f) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$

g) $1s^2 2s^2 2p^6 3s^2 3p^6$ (same as Argon atom)

h) $1s^2 2s^2 2p^6 3s^2 3p^6$ (same as Argon atom)

i) $1s^2 2s^2 2p^6 3s^2 3p^4$

j) $1s^2$ (same as Helium atom)

k) $1s^2 2s^2 2p^6 3s^2 3p^6$ (same as Argon atom)

E1.3:



a) ammonia



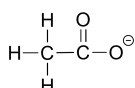
b) ammonium ion



c) amide ion



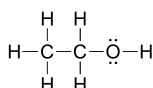
d) formaldehyde



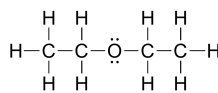
e) acetate ion



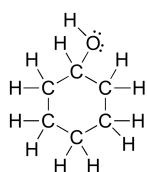
f) methylamine



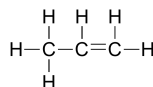
g) ethanol



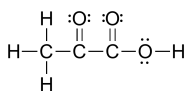
g) diethylether



i) cyclohexanol

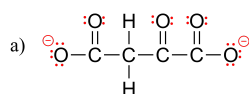


j) propene

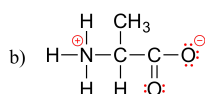


k) pyruvic acid

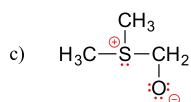
E1.4:



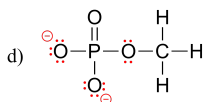
malate



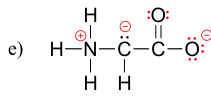
alanine



c)



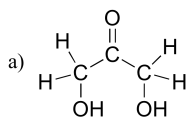
d)



e)

E1.6: Below are full structural drawings, showing all carbons and hydrogens:

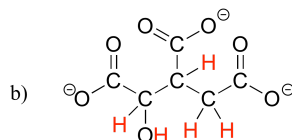
6 hydrogens



a)

dihydroxyacetone

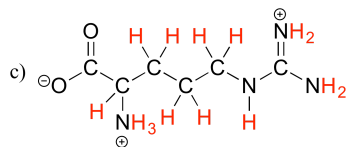
5 hydrogens



b)

isocitrate

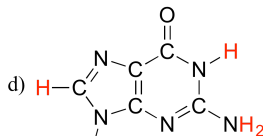
15 hydrogens



c)

arginine

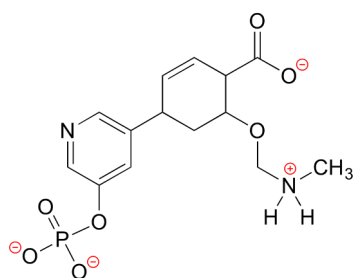
5 hydrogens



d)

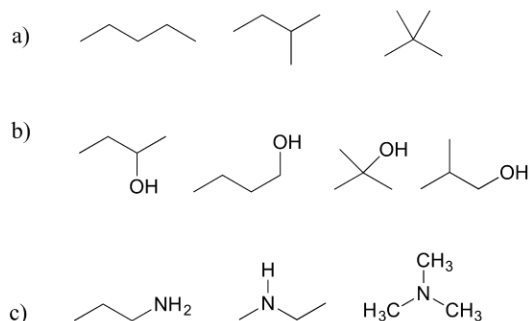
guanine

E1.8:



E1.10: There is only one constitutional isomer of ethanol: dimethyl ether CH_3OCH_3

E1.11:



E1.12:

a) carboxylate, sulfide, aromatic, two amide groups (one of which is cyclic)

b) tertiary alcohol, thioester

c) carboxylate, ketone

d) ether, primary amine, alkene

E1.14:

acetic acid: ethanoic acid

chloroform: trichloromethane

acetone: propanone (not 2-propanone, because the '2' in this case would be redundant: if the carbonyl carbon were not in the #2 position, the compound would be an aldehyde not a ketone)

E1.17: The linking group is a phosphate diester

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