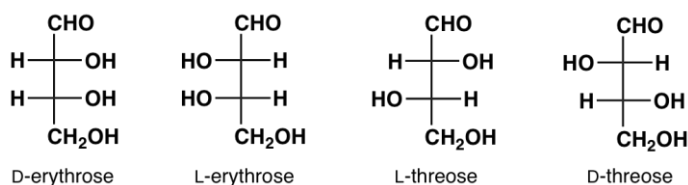
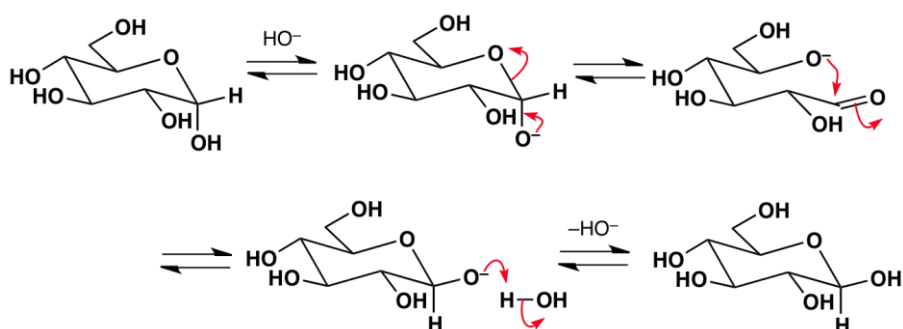


Solutions to Exercises, Chapter 24

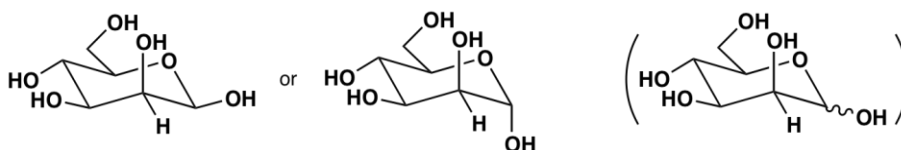
24.1



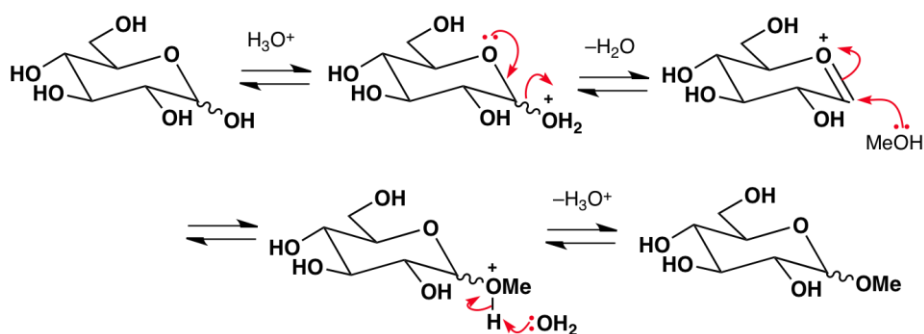
24.2



24.3 D-Mannose is different from D-glucose only at C2. Two pyranose anomers are possible, and they are collectively represented with a wavy bond, as shown in parentheses.



24.4

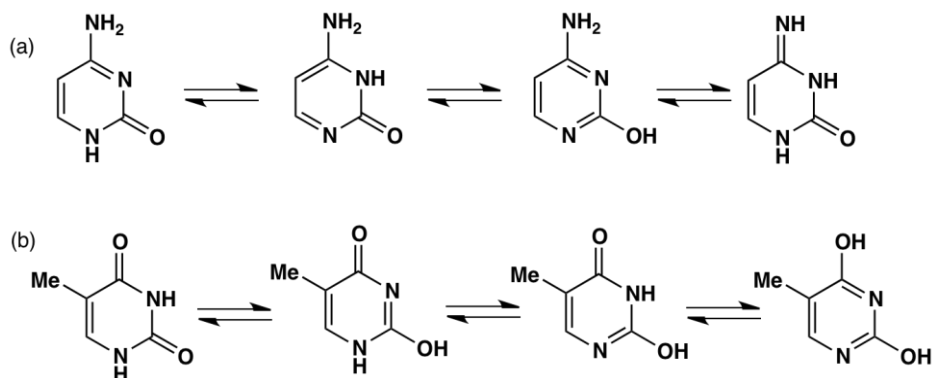


24.5 Xylitol is a *meso* compound so (2*S*,4*R*) and (2*R*,4*S*) structures are identical and the C which relates to the chiral centre of glyceraldehyde (C2) can be either *R* or *S* depending on which end of xylitol we take as C1. Alternatively, we could say that whether xylitol is D or L is not a legitimate question because it may be obtained by reduction of either D- or L-xylose.

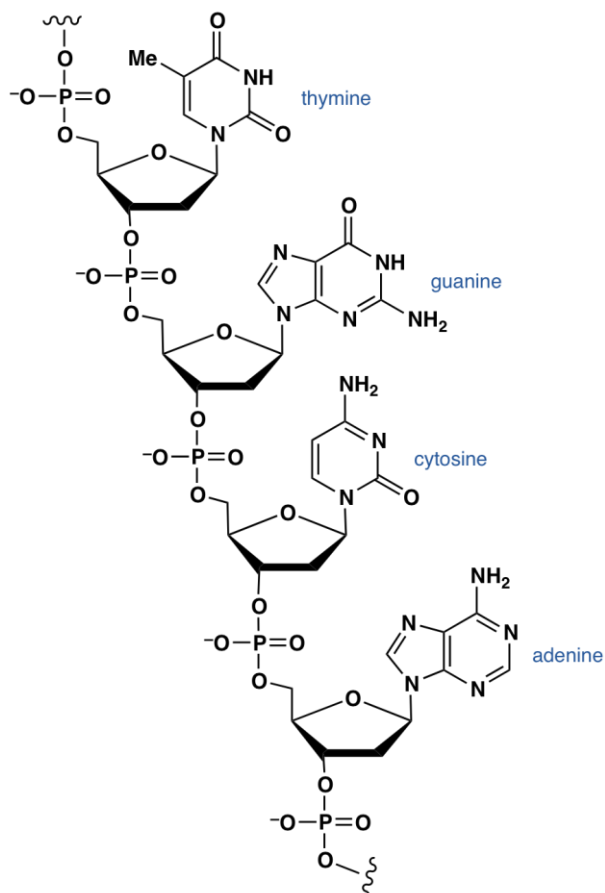
24.6 Only (c) gives an optically inactive (*meso*) aldaric acid.

24.7 Lactose has a hemiacetal structure which is easily converted to the aldehyde form, so it is a reducing sugar. In contrast, sucrose is formed by bonding between the anomeric positions of the two monosaccharide units, so it is not a hemiacetal which can be converted into an aldehyde form, and is a non-reducing sugar.

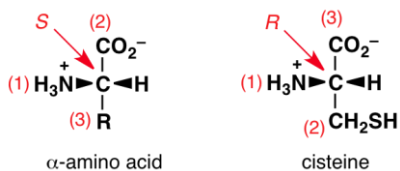
24.8



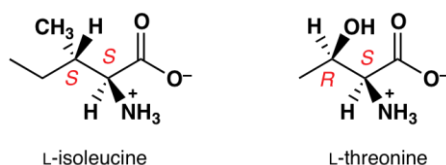
24.9 The structure of the fragment of DNA complementary to –ACGT– is –TGCA–:



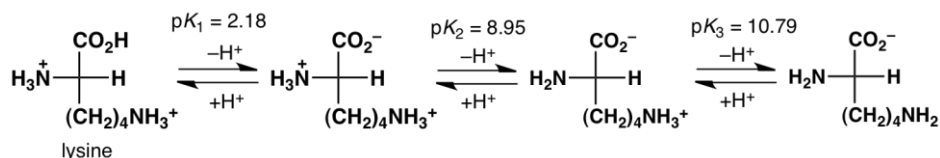
24.10 The priority order of groups attached to the α carbon of an amino acid is usually as shown on the left below, but the R group in cysteine is CH_2SH which has priority over CO_2^- . This causes the configuration of the α carbon of cysteine to be *R*.



24.11



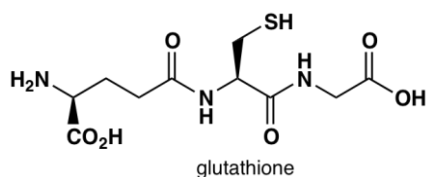
24.12 As illustrated in the scheme below for the dissociation of lysine, the first dissociation (corresponding to pK_1) of a basic amino acid is from the doubly positive cation to the singly positive form, which then becomes the neutral form corresponding to pK_2 ; this then gives the anionic form corresponding to pK_3 , so, $pI = (pK_2 + pK_3)/2$. Thus, pI for lysine is 9.87.



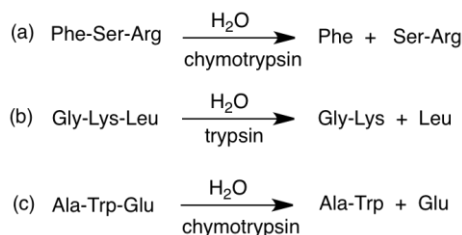
24.13

(a) Alanine: $pI = (pK_1 + pK_2)/2 = 6.02$. (b) Glutamic acid: $pI = (pK_1 + pK_2)/2 = 3.22$. (c) Histidine: $pI = (pK_2 + pK_3)/2 = 7.61$.

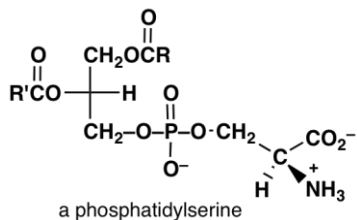
24.14



24.15



24.16



24.17

Monoterpenes (terpenoids): myrcene, geraniol, limonene, both carvones, and menthol.

Sesquiterpene: α -farnesene. Diterpenoid: vitamin A.

Tetraterpenes: lycopene and β -carotene.

24.18

(a) 8 (b) 7