Answers to Workbook exercises Chapter 9

Exercise 9.1 Risk of heart attack

a She has a 13% (13 in 100) chance of having a heart attack in the next five years.

b She should stop smoking. This will reduce the risk from 13% to 7%. She cannot do anything about her diabetes. If she carries on smoking as she gets older, the risk of heart attack will rise to 22% when she reaches her 60s. If she stops smoking, it will only be 12%.

c Health records have been kept for large numbers of women over long periods of time. The records have been grouped into women in a particular age group, and into smokers and non-smokers, people with diabetes and people without. The percentage of people in each group having heart attacks has been worked out.

Exercise 9.2 The heart in a fetus

a O in the left atrium.

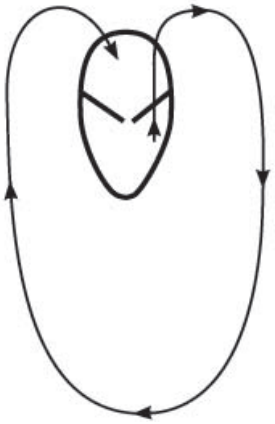
b OF in the right atrium.

c It allows oxygenated blood to flow directly from the right atrium to the left atrium. This oxygenated blood then leaves the heart in the aorta, to deliver oxygen to respiring tissues all over the fetus's body.

d This prevents oxygenated blood in the left atrium mixing with deoxygenated blood in the right atrium. If they mixed, then there would be less oxygen in the blood in the aorta, so body tissues would not get as much oxygen delivered to them and would not be able to respire as fast. The tissues might run short of energy.

Exercise 9.3 Double and single circulatory systems

a



b human (*accept any mammal or bird*)

c fish (*accept any named fish*)

d In a double circulatory system, blood is returned to heart after it has become oxygenated. The heart then pumps it at high pressure to the rest of the body. In a single circulatory system, the blood moves directly from the oxygenating organ (gills, lungs) to the rest of the body, at a relatively low pressure. A double system is therefore able to supply oxygen more quickly to respiring body cells, which allows metabolic rate to be faster.

Exercise 9.4 Changes in the blood system at high altitude

a Look for some or all of the following ideas:
- the correct data being described – that is, the lighter grey bars
- reference to the overall trend – that is, pulse rate increases at high altitude

- reference to the fall during the period at high altitude
- reference to the initial fall and then rise when returning to low altitude
- some comparison of time scales – for example, the slow fall in pulse rate over the almost two years at high altitude, compared with the very rapid fall in just a two weeks at low altitude
- reference to the slightly lower pulse rate at low altitude after having been at high altitude, compared with before travelling to high altitude
- at least two sets of figures quoted, stating both time and the value for pulse rate, including units.

b Look for some or all of the following ideas:

- the correct data being described – that is, the dark grey bars
- reference to the overall trend – that is, red blood cell concentration increases at high altitude but falls with time, then decreases again when at low altitude
- reference to the slightly lower concentration six weeks after having returned to low altitude, compared with before travelling to high altitude
- at least two sets of figures quoted, stating both time and the value for red blood cell concentration, including units.

c Oxygen transport.

d There is less oxygen available in the air at high altitude, so less diffuses into the blood. The person adapted to this by producing more red blood cells, to help to increase the amount of oxygen that could be absorbed into the blood and transported to body cells for respiration.

e A person who has trained at high altitude will have a faster pulse rate and more red blood cells. This will increase the rate at which oxygen can be supplied to muscles, making it possible for them to work faster because they can respire faster.