Answers for support worksheet – Chapter 6

1 **a** Digestion is the process that converts large molecules into small ones, which can be absorbed into the body. (2)

b fatty acids and glycerol (1)

c P = capillaries
Q = lacteal
R = microvilli (3)

d The villus provides a large surface area for absorption; rich blood supply to carry away digested materials; lacteal to carry away digested lipids; short distance for the diffusion of digested materials from the lumen of the intestine to the blood capillaries and lacteal. (3)

2 **a** five from: oxygen, carbon dioxide, urea, glucose, amino acids, hormones, antibodies (5)

b coronary arteries (1)

c **i** true (1)

ii true (1)

iii false (1)

iv false (1)

3 **a** RNA (1)

b helper T-cells (1)

c In the early stages, some T-cells remain active so there are no symptoms; over time more T-cells are destroyed. Eventually the person has insufficient T-cells to fight infections and symptoms develop. (3)

d The HIV virus is most frequently passed from person to person in bodily fluids during sex. Transmission is particularly rapid among individuals who engage in unprotected sex with multiple partners. The spread of HIV could be reduced, therefore, by encouraging people to use condoms when they have sex.

HIV is also transmitted when syringe needles are shared between individuals, often to administer legal or illegal drugs. Educating people about this danger, and providing sterile needles, could therefore help to reduce the spread of the virus.

In some countries, HIV has been transmitted in blood transfusions. However, in most places with medical care facilities, blood for transfusion is now screened for the virus, which prevents transmission by this method. (4 – 2 marks per method)

e Antibiotics affect the metabolic processes of bacteria; viruses use host body cells' metabolism to make new virus units. Antibiotics only affect prokaryotic cells, not eukaryotic cells in which viruses are found. (1)

4 When a person breathes in, the diaphragm **contracts** and changes from a **domed** shape to a **flat** shape. At the same time, the **external intercostal** muscles contract and the **internal intercostal** muscles relax. This moves the ribcage upwards and **outwards**, increasing the volume of the thorax. Pressure inside the **thoracic cavity** decreases, which means that the lungs increase in volume and this **reduces** the pressure in the **alveoli** where gas exchange takes place. Air rushes in through the nose, down the **trachea** and **bronchi** to adjust the pressure. When a person breathes out, the diaphragm and **abdominal** muscles relax and the **external intercostal** muscles relax. The pressure in the thorax **increases** and air is forced **out** of the **lungs**. (16)

5 **a** brain and spinal cord (2)

b motor neurons (1)

c **i** in a synapse between the ends of two neurons, or between the end of a neuron and an effector (1)

ii covering the axon of a motor neuron (1)

iii at the end of a motor neuron where it meets an effector (such as a muscle) (1)

d Enzymes and metabolic processes work best within narrow limits; if the body temperature moves away from this optimum temperature, metabolism will be affected. (2)

e Hormones are produced in **endocrine glands** and carried to their target cells by the **blood**. The hormone insulin is produced in the **β (beta)** cells of the pancreas and it helps to control **blood sugar level**. A person who does not produce insulin suffers from the condition known as **diabetes**. (5)

6 **a** **i** A – eggs are produced in the ovaries. (1)

ii C – fertilisation usually happens in one of the oviducts. (1)

iii A – estrogen and progesterone are produced in the ovaries, when a woman is not pregnant (strictly, by the follicle and corpus luteum, but these not shown specifically on the diagram). (1)

b **i** Estrogen is shown by the dotted line in the lower graph, which peaks at about day 13. (1)

ii Progesterone is shown by the dashed line in the lower graph, which rises gently during the second half of the cycle, and begins to fall again at around day 26. (1)

iii The cross denoting ovulation should be at day 14. (1)

c IVF may have unforeseen consequences to the health of the child; there are many unwanted babies who could be adopted; religious reasons (interfering with a natural process); or other suitable suggestions. (3)

