3 Biological Molecules

For each question, choose the most suitable option and write the letter (**A**, **B**, **C** or **D**) in the brackets provided.

Level 1

1. Which of the following is stored in large quantities in the liver and muscles of a mammal?
   - **A** Starch
   - **B** Glucose
   - **C** Cellulose
   - **D** Glycogen ( )

2. Proteins are essential to a human because _____.
   - **A** they are the main source of energy
   - **B** they are good energy stores in the muscles
   - **C** they are used to synthesise some hormones
   - **D** they provide insulation to prevent excessive heat loss ( )

3. Which of the following statements is/are **correct** about glucose?
   - 1 It is a carbohydrate.
   - 2 It is soluble in water.
   - 3 It is a reducing sugar.
   - **A** 1 only
   - **B** 1 and 3 only
   - **C** 2 and 3 only
   - **D** 1, 2 and 3 ( )

4. _____ is **not** a complex carbohydrate.
   - **A** Starch
   - **B** Glucose
   - **C** Cellulose
   - **D** Glycogen ( )

5. Figure 3.1 shows a polypeptide.

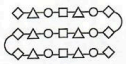

Figure 3.1

The polypeptide is made up of individual units of _____.

A glucose
B glycerol
C fatty acids
D amino acids ( )

Level 2

6. A food sample was tested to identify the nutrients present. Table 3.1 shows the test results.

Table 3.1

Test	Test Result
Benedict's test	The solution remains blue.
Biuret test	The blue solution turns violet.
Iodine test	The brown solution turns blue-black.

Which nutrients were present in the food sample?

A Proteins and starch only
B Reducing sugars and starch only
C Reducing sugars and proteins only
D Reducing sugars, proteins and starch ( )

7. Blood transports nutrients around the body. Water is an essential component of blood because _____.

A it has low viscosity
B it is an excellent solvent
C it cannot be compressed
D it has a high specific heat capacity ( )

8. Figure 3.2 shows three different types of nutrients.

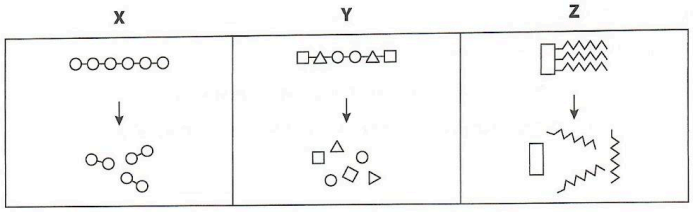

Figure 3.2

Identify nutrients **X**, **Y** and **Z**.

	X	Y	Z
A	Fats	Carbohydrate	Protein
B	Carbohydrate	Fats	Protein
C	Carbohydrate	Protein	Fats
D	Protein	Carbohydrate	Fats

( )

9. Table 3.2 shows the nutrients that were present in a food sample.

Table 3.2

Nutrient	Mass / g
Fats	2.1
Protein	3.4
Glucose	0.0
Sucrose	1.0
Starch	1.3

Some tests were carried out on the food sample. Which of the following shows the **correct** results of the food tests?

	Benedict's Test	Biuret Test	Iodine Test	Ethanol Emulsion Test
A	Blue	Violet	Blue-black	Cloudy white
B	Brick-red	Violet	Blue-black	Clear
C	Blue	Blue	Brown	Cloudy white
D	Brick-red	Blue	Brown	Clear

( )

10. Starch is a food substrate that is important to mammals. Why is it important?

    A Starch is the main energy source in mammals.

    B Starch is the main storage molecule in the liver.

    C Starch is easily digested into glucose, which is used for respiration.

    D Starch is insoluble in water and does not change the water potential of the cells. ( )

Level 3

11. A sample of energy drink was tested in a laboratory. Its components consisted of 32 % carbohydrates, 6 % protein, 1 % fats and 61 % water.

    Which of the following explains why there was a much higher percentage of carbohydrates compared to fats in the energy drink?

    A Carbohydrates provide a healthier option compared to fats.

    B Carbohydrates contain a higher amount of energy than fats.

    C Carbohydrates can be converted to energy quicker than fats.

    D Carbohydrates release less heat than fats when metabolised. ( )

12. A sample of starch was mixed with amylase for 15 minutes. After 15 minutes, the sample was tested separately using iodine test and Benedict's test.

    What were the results obtained from the tests done?

	Iodine Test	Benedict's Test
A	Brown	Blue
B	Brown	Brick-red
C	Blue-black	Blue
D	Blue-black	Brick-red

( )

13. A man is going to run in a marathon in three days' time.

    Figure 3.3 shows the proportion of nutrients in four different diets.

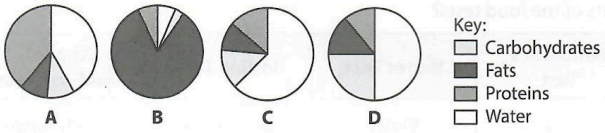

Figure 3.3

    Which diet, **A**, **B**, **C** or **D**, should the man adopt to nourish his body with the necessary nutrients? ( )

14. Water is important to living things. Which of the following statements describe(s) the function(s) of water?

1 Water enables plant cells to stay turgid.

2 Water is a solvent for many substances in blood.

3 Water helps with digestion by softening the food.

A 1 only

B 1 and 2 only

C 2 and 3 only

D 1, 2 and 3 ( )

15. A disaccharide **X** was tested using Benedict's test and a blue solution was seen. **X** was then broken down into its monosaccharides, **Y** and **Z**.

Identify **X**, **Y** and **Z**.

	X	Y	Z
A	Sucrose	Glucose	Fructose
B	Sucrose	Glucose	Glucose
C	Maltose	Glucose	Glucose
D	Lactose	Glucose	Galactose

( )

16. Equal masses of different food samples were placed above a Bunsen burner and heated. The heat produced was used to heat up a boiling tube containing water. The rise in temperature of the water was recorded.

Which of the following statements is **incorrect** with regards to this experiment?

A Carbon dioxide was released.

B The food sample that contained fats gave the highest rise in temperature.

C The energy stored in each food sample was released when the sample was heated.

D The food samples were of equal masses, so they gave the same rise in temperature.

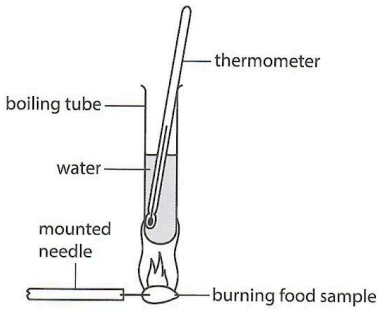

Figure 3.4

( )

17. Mary conducted a test on a food sample. Figure 3.5 shows the steps of her experiment.

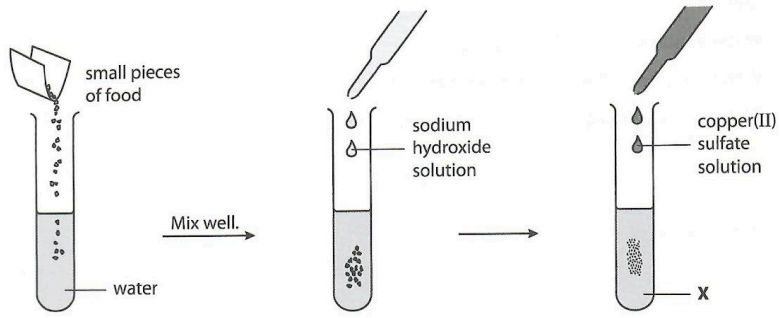

Figure 3.5

Which nutrient was she testing for? What was the colour of solution **X** at the end of the experiment if the nutrient was present?

	Nutrient	Colour of X
A	Reducing sugars	Brick-red
B	Proteins	Blue
C	Proteins	Violet
D	Fats	Cloudy white

( )