1. An athlete is running a 10 km race. They need to produce ATP in their cells during the race.

During the race, the athlete produces a substance that causes pain in their leg muscles.

Which substance causes this pain?

Put a ring around the correct answer.

amino acid **fatty acid** **hydrochloric acid** **lactic acid**

[1]

2. A chick can develop inside an egg.

The developing chick gets most of its nutrition from the egg yolk.

A student tests the yolk for **protein.**

The tables show:

- reagents that could be used to test the yolk
- possible colours of reagents if there is a positive test.

Identify the reagent the student should use and the colour that this reagent will go if protein is present.

Tick (✓) **two** boxes.

Reagent	
Benedict's	
Biuret	
Iodine solution	

Colour	
Blue-black	
Purple	
Red	

[2]

3. Which reaction produces ethanol?

A Aerobic respiration in animal cells
B Aerobic respiration in yeast cells
C Anaerobic respiration in animal cells
D Anaerobic respiration in yeast cells

Your answer ☐ **[1]**

4. An athlete is running a 10 km race. They need to produce ATP in their cells during the race.

Describe how cells make ATP.

In your answer include:

- the name of the process
- the substances that are used and made.

[4]

5. Mole rats spend most of their time burrowing underground in tunnels.

The tunnels may have only 5% oxygen in the air compared with 21% above ground.

Complete the sentences below to show how the mole rats have adapted to live in the tunnels.

Mole rats have a low respiration rate. This means they need less ..... gas from the air.

This gas can be picked up from low levels in the air by the chemical inside their red blood cells called ..... .

Mole rats also have few pain receptors in their tissues.

This means that any ..... acid produced by anaerobic respiration does not hurt.

Scientists think that mole rats have evolved these features by the process of ....

[4]

6(a). To try to lose weight some people go on a type of diet called a ketogenic diet.

In a ketogenic diet, a person eats food that is high in fat and protein but low in carbohydrates.

Complete each sentence about this diet.

Use the words from the list.

amino acids	**enzymes**	**fatty acids**	**glycerol**
glycogen	**homeostasis**	**respiration**	**sugar**

Proteins in the food are broken down to smaller molecules called

..... .

These smaller molecules are used to make more proteins in the body, such as

..... .

Fats in the food are broken down into ..... and ..... .

These are then used by the body to make lipids.

As the diet is low in carbohydrates such as starch, the person will have less

..... dissolved in their blood.

This means that the body will need to use some of its fat reserves to produce ATP by

..... .

The diet is only recommended to be used for a short period of time to lose excess fat.

[5]

(b).

Three people each make a comment about this diet.

Person **A**:	People who are very overweight could lose weight if they went on this diet and this may make them feel better about themselves.
Person **B**:	This diet could be harmful to people with underlying health conditions, such as diabetes.
Person **C**:	There are dangers to following this diet but being very overweight also causes many health issues.

Which person is discussing both the risks **and** benefits of following this diet?
Explain your answer.

Person .....

Explanation _____

_____

_____ **[3]**

(c). A class is discussing how to test food to see if it contains carbohydrates.
A student says 'You need to do **two** different named tests to see if carbohydrates are present'.

Explain why this student is **correct**.

_____

_____

_____

_____ **[2]**

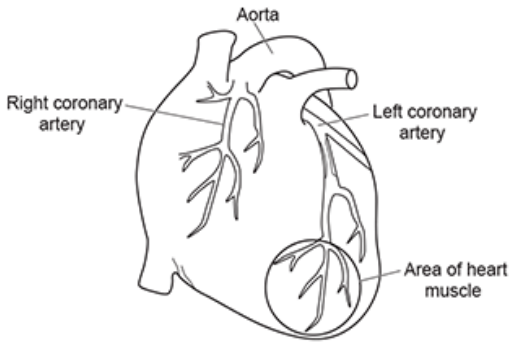
7. Bacteria can get into deep wounds in the skin and cause infection.
There is little oxygen in these wounds.

How will a lack of oxygen affect the type of bacteria in these wounds?

A Bacteria that respire using anaerobic respiration will be present.
B Most bacteria will respire aerobically and some will respire anaerobically.
C Only bacteria that respire using aerobic respiration will be present.
D The bacteria will not be able to respire, so all the bacteria will die.

Your answer ☐ **[1]**

8. The diagram shows the heart of a person who has heart disease.



Complete each sentence below about the diagram. Use words from the list.

attack	**carbon dioxide**	**fat**	**fibre**
infection	**nitrogen**	**oxygen**	**water**

Heart disease is caused by ..... blocking the blood vessels that supply the heart muscle.

This means that the area of heart muscle circled in the diagram will not get enough glucose or ..... for respiration.

This may cause it to stop beating. This is called a heart ..... .

[3]

9. What word describes the amino acids that join to make a protein molecule?

A Enzymes
B Monomers
C Nucleotides
D Polymers

Your answer ☐ **[1]**

10. Which molecule is produced in **both** aerobic and anaerobic respiration in animals?

A ATP
B Glucose
C Lactic acid
D Oxygen

Your answer ☐ **[1]**

END OF QUESTION PAPER