MAGDALEN
COLLEGE SCHOOL

16+ Entrance Exam: Biology

Time allowed: 45 minutes

Name: .....

Current school: .....

Instructions

- Use **black** ink or ball-point pen.
- Attempt **all** questions.
- Use the **answer grid** to answer the questions.
- Write your name and school on both this booklet **and** the answer grid.
- Remember to transfer your answers to the answer grid before the end of the test.
- You may use the space between questions for rough working, but nothing written in this booklet will be marked.

Information

- There is one mark per question. The total mark for this paper is 30. You will not lose marks for incorrect answers.
- Calculators are permitted.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Write your answers neatly.
- Try to answer every question.
- Check your answers if you have time at the end.

Total ____ /30 ____ %

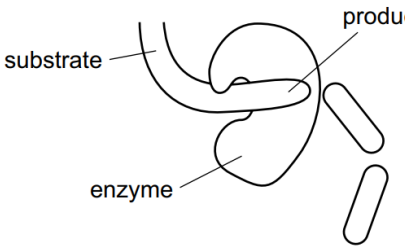
1. Lipases break down lipids. Which two products are formed when lipids are broken down? Write down **two** letters.

   A. Amino acids
   B. Fatty acids
   C. Glucose
   D. Glycerol
   E. Glycogen

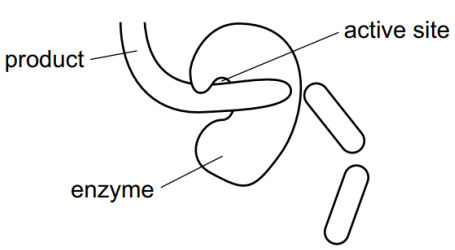
2. The diagrams show a protease enzyme catalysing the breaking of part of a protein molecule into smaller pieces.

   Which diagram has three correct labels?

A



B



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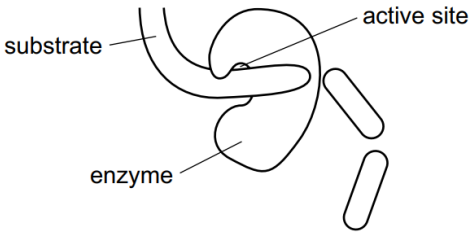

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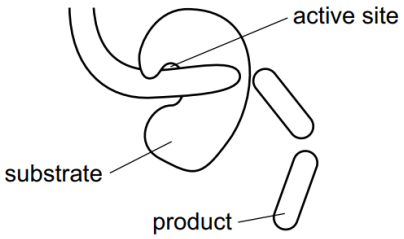
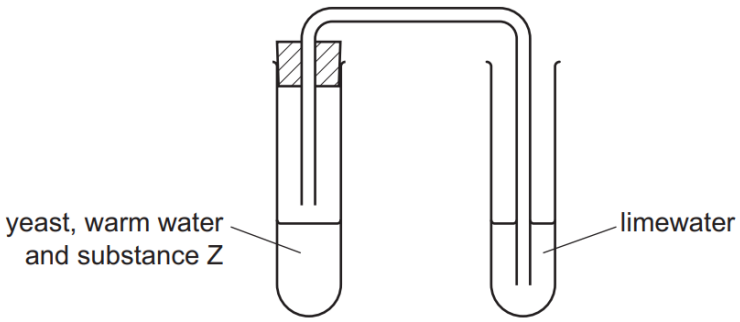


3. The diagram shows some apparatus used to investigate respiration. Yeast, warm water and substance Z were put into a test-tube. After a while, the limewater began to go cloudy.



What is substance Z?

A alcohol

B glucose

C nitrogen

D oxygen

4. Osmosis is one method that single-celled organisms, such as bacteria, use to obtain molecules from their environment.

Which of the following is a correct description of a process involving the transport of molecules?

A Diffusion is used to transport molecules against the concentration gradient

B Active transport is used to obtain molecules in a low concentration environment

C Active transport moves substances along the concentration gradient

D Diffusion uses energy to transport molecules into cells

5. A student wants to test for **protein**.

What would they use to test for protein?

A Benedict's reagent

B Biuret reagent

C Iodine solution

D Ethanol

6. A plant cell is placed in a solution with a higher solute concentration than the cell contents.

What will happen to the plant cell?

A Absorb water until it bursts.

B Absorb water until it is turgid.

C Lose cytoplasm and shrink.

D Lose water and become flaccid.

7. A cube of potato is used to investigate the effect of surface area on osmosis.

The cube is 3 × 3 × 3 cm.

What is the surface area to volume ratio of the cube?

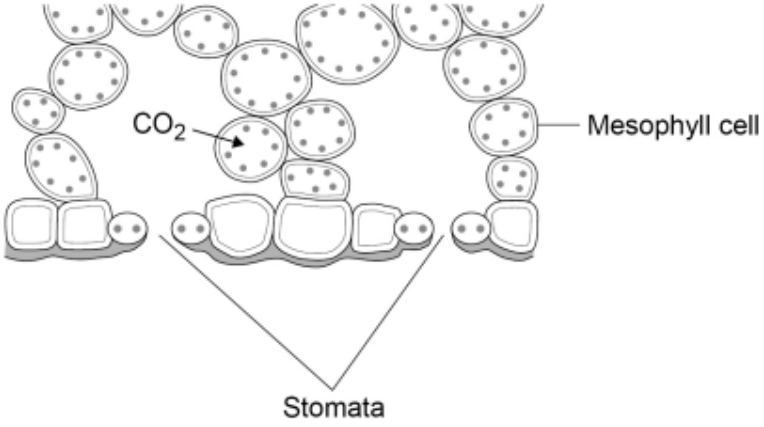
A 1:2

B 2:1

C 6:1

D 1:6

8.



Molecules of carbon dioxide diffuse from the air into the mesophyll cells.

Which **two** changes will increase the rate at which carbon dioxide diffuses into the mesophyll cells?

Write down two letters.

A. Decreased number of chloroplasts in the cells
B. Decreased surface area of cells in contact with the air
C. Increased carbon dioxide concentration in the air
D. Increased number of stomata that are open
E. Increased oxygen concentration in the air

9. The table shows changes in the forest cover in some continents of the world.

Continent	Total forest cover (millions of hectares)		
	1990	2000	2005
Africa	699	656	635
Asia	574	567	572
Europe	989	998	1001
South America	891	853	832

What is the approximate percentage decrease in the area of South America covered by forest between **1990** and **2005**?

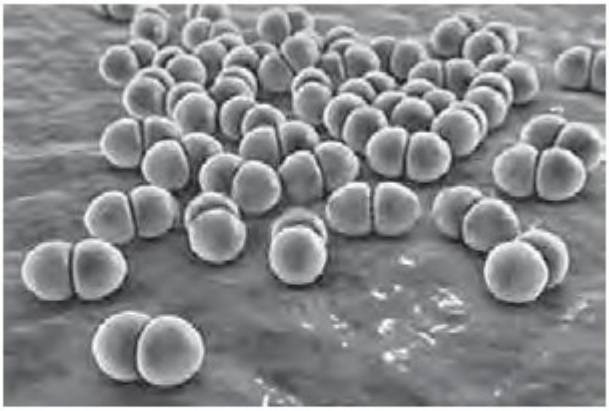
A 0.9%

B 1.1%

C 6.6%

D 7.1%

10. Figure 10 shows some *Streptococcus* bacteria.



© Kateryna Kon/Shutterstock

Figure 10

Some bacteria are motile, meaning they can move themselves.

Why is a *Streptococcus* bacterium not motile?

A it does not have flagella

B it does not have plasmids

C it does not have ribosomes

D it does not have acrosomes

11. Anaerobic respiration is a process in living organisms. Which of these is the balanced chemical equation for aerobic respiration?

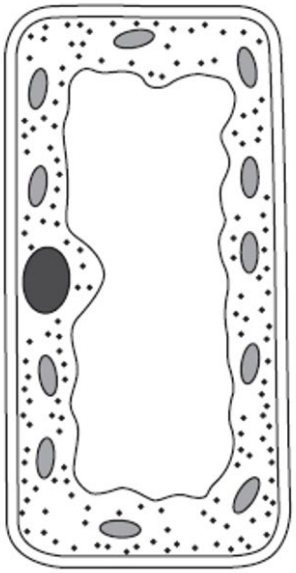
A $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2$

B $C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2$

C $C_6H_{12}O_6 + 6CO_2 \longrightarrow 6O_2 + 6H_2O$

D $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$

12. The diagram shows a cell.



Which type of cell does the diagram show?

A. An animal
B. A bacterium
C. A fungus
D. A plant

13. The statements below describe conditions required for some molecules to move into a cell.

1. a concentration gradient

2. use of ATP

Which of these statements is correct for the process of osmosis?

A. 1 only
B. 2 only
C. 1 and 2
D. Neither 1 nor 2

14. Plant and animal cells have some features in common and some differences. Which of these structures is not found in animal cells?

A. Cell membrane
B. Cell wall
C. Mitochondrion
D. Nucleus

15. Which of these substances is a carbohydrate stored in plant cells?

A. Chlorophyll
B. Glucose
C. Glycogen
D. Starch

16.

The photograph shows a type of fish called a salmon.

(Source: © Alexander Raths/Shutterstock)

Some humans eat salmon as a source of protein.

Protein is a component of a balanced diet.

Which statement describes what happens to salmon protein in the human stomach?

A it is digested into amino acids

B its surface area is increased by bile

C its pH is raised by hydrochloric acid

D it is absorbed by villi

17.

Wheat seeds contain stores of a large insoluble molecule.

This molecule is digested by amylase as the seeds germinate.

What is the name of this large insoluble molecule?

A glucose

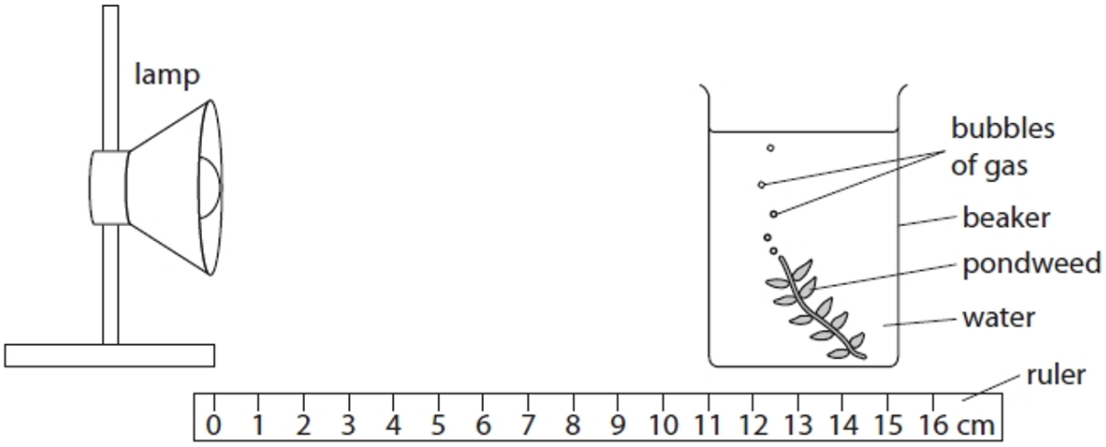
B lipid

C protein

D starch

18.

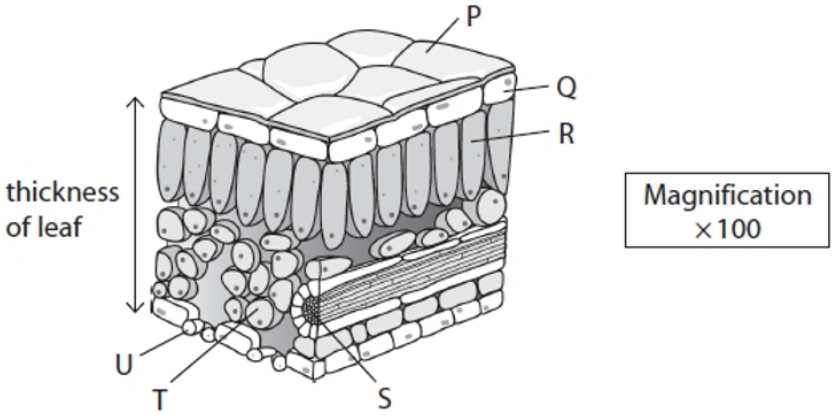
A student uses this apparatus to investigate the effect of light intensity on the rate of gas production in pondweed.



Which of these is the gas given off by the pondweed?

A carbon dioxide
B carbon monoxide
C methane
D oxygen

The diagram shows a section through a leaf with different parts labelled P to U.



19. Which part of the leaf transports amino acids?

A R
B S
C T
D U

20. Which part absorbs the most sunlight?

A P
B Q
C R
D S

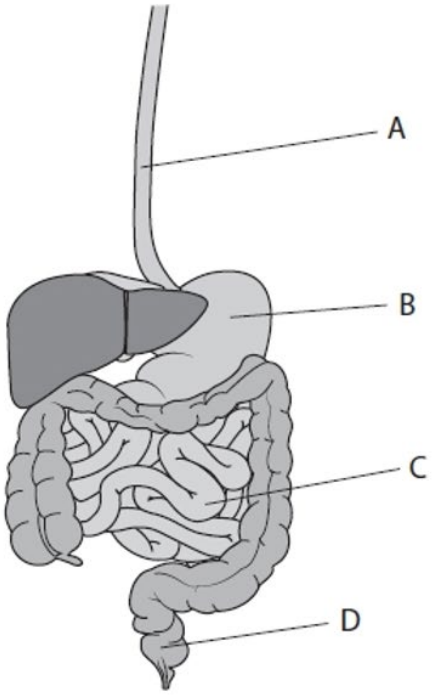
21. Which part transports the products of photosynthesis?

A Q
B R
C S
D T

22. Which part reduces the amount of water escaping?

A P
B Q
C R
D S

The diagram shows part of the human digestive system.



23. In which of these parts is hydrochloric acid produced?

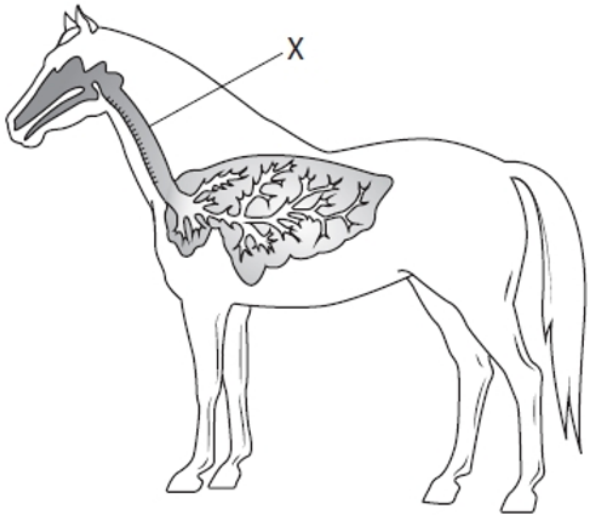
A
B
C
D

24. In which of these parts are faeces stored?

A
B
C
D

25.

The diagram shows the location of the lungs in a horse.

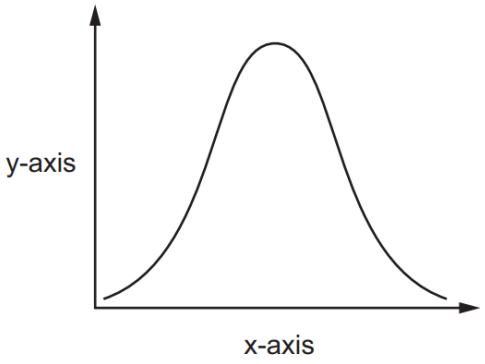


The part labelled X is the

A bronchiole
B bronchus
C oesophagus
D trachea

26.

An experiment was carried out to investigate the effect of pH on enzyme action. The graph shows the results.



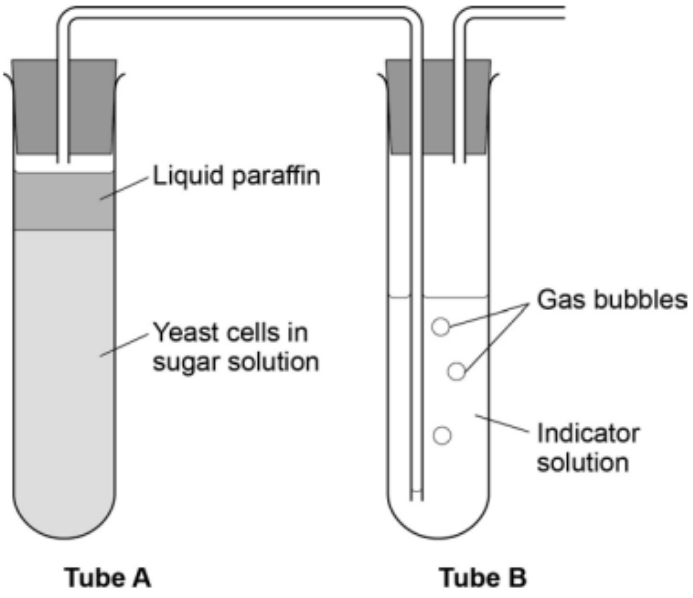
What are the labels for the x-axis and the y-axis?

	x-axis	y-axis
A	pH	rate of reaction
B	pH	time
C	rate of reaction	pH
D	time	pH

27.

Figure 2 shows an experiment to investigate **anaerobic** respiration in yeast cells.

Figure 2



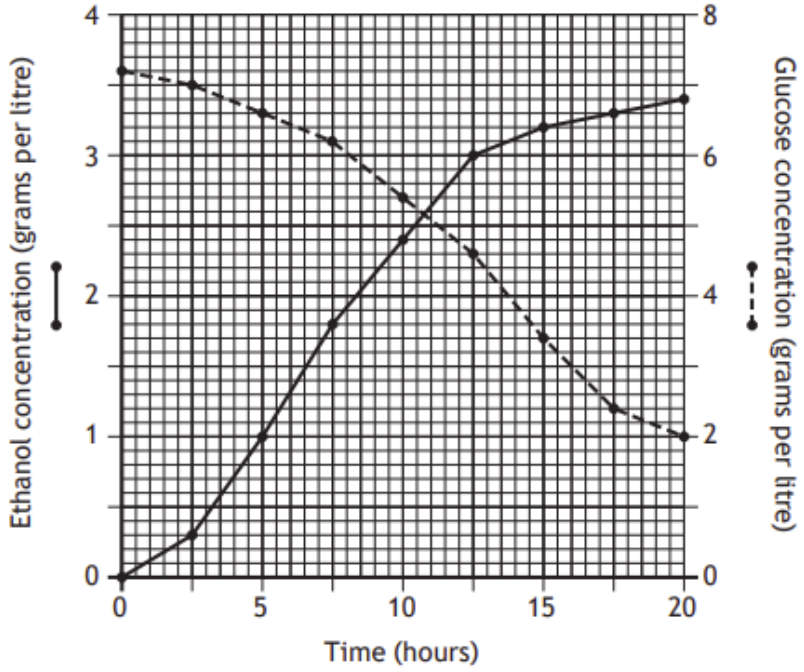
What is the purpose of the liquid paraffin in Tube **A**?

A. To prevent evaporation
B. To stop air getting in
C. To stop the temperature going up
D. To stop water getting in

28.

In an investigation into fermentation, yeast was grown in a flask of glucose solution for 20 hours at 20 °C.

The graph shows the concentrations of ethanol and glucose in the flask over the period of the investigation.



What was the glucose concentration when the ethanol concentration was 3·3 grams per litre?

A 1·2 grams per litre

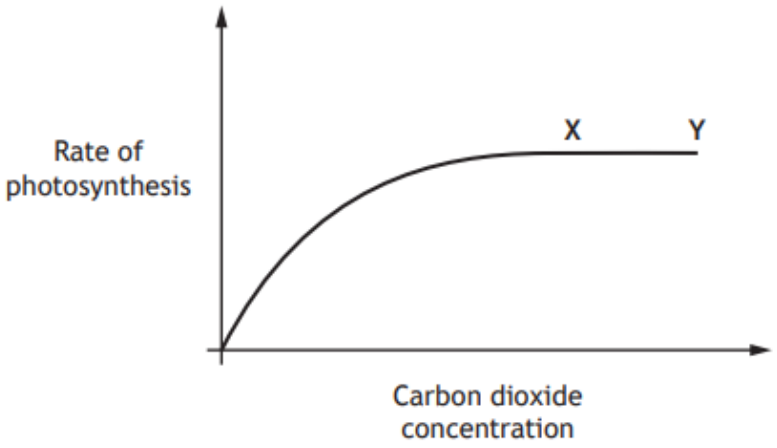
B 2·2 grams per litre

C 2·4 grams per litre

D 6·6 grams per litre

29.

The graph shows the effect of increasing carbon dioxide concentration on the rate of photosynthesis.



Two factors which could be limiting the rate of photosynthesis between points **X** and **Y** on the graph are

A starch concentration and light intensity

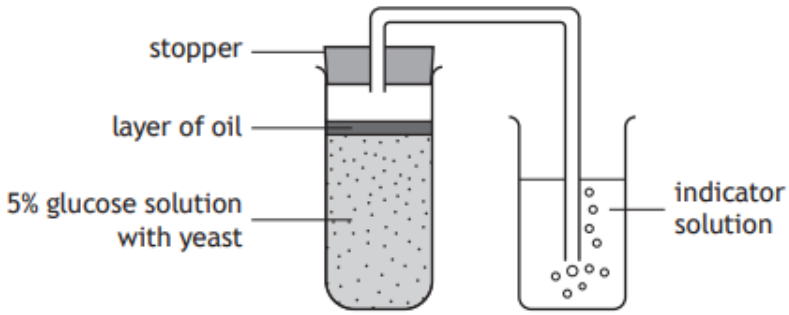
B temperature and light intensity

C temperature and carbon dioxide concentration

D sugar concentration and carbon dioxide concentration.

30.

The apparatus shown was used to investigate the rate of respiration in yeast at 20 °C.



Which of the following changes would cause a decrease in the rate of respiration of the yeast?

A Increase the thickness of the layer of oil by 1 mm.

B Increase the temperature of the glucose solution by 1 °C.

C Decrease the concentration of the glucose solution by 1%.

D Decrease the volume of indicator solution by 1 cm^3.

END OF QUESTION PAPER

16+ Biology: ANSWER GRID

For marker's use only:	
Mark	*Check*

Name:_____

Current School:_____

You will have **45 minutes** for the test, which consists of 30 multiple choice questions.
Each correct answer scores 1 mark. You will not lose marks for incorrect answers.

For each question, select the correct answer and write the corresponding letter in the answer grid below. For example, if you think the correct answer to question 2 is B, you would fill in the grid as shown in **Example 1**. If you make a mistake, clearly cross out your wrong answer and write the correct one next to it, as shown in **Example 2**.

Example 1:

Question	Answer
2	B

Example 2:

Question	Answer
2	~~B~~ D

There is space for working by each question. Remember to transfer your answers to the answer grid (below) before the end of the test.

Answer grid - write your answers here before the end of the test.

Question	Answer
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

For marker's use only:

Question	Answer
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

For marker's use only:

Question	Answer
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

For marker's use only: