EXAM PAPERS PRACTICE

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE
BIOLOGY

H

Higher Tier Paper 1H

Predicted paper 2023 Morning Time allowed: 1 hour 45 minutes

Materials

For this paper you must have:
- a ruler
- a scientific calculator.

Instructions
- Use black ink or black ball-point pen.
- Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

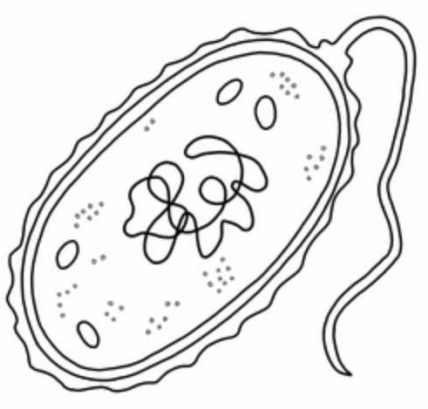
Information
- The maximum mark for this paper is 105
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	

Answer **all** questions in the spaces provided.

Do not write outside the box

0 1 Shown in the diagram below is a prokaryotic cell



0 1 . 1 Outline three differences between a eukaryotic and prokaryotic cell

[3 marks]

1 _____

2 _____

3 _____

0 1 . 2 The average diameter of a spherical bacterial is 1.5 x10^{-6} m
Convert this to **µm.** Tick only one box

[1 mark]

- ☐ 1500 µm
- ☐ 150 µm
- ☐ 15 µm
- ☐ 1.5 µm
- ☐ 0.15 µm

Do not write outside the box

0 1 . 3 Both eukaryotic and prokaryotic cells have ribosomes. What is the function of the ribosomes?

[1 marks]

0 1 . 4 The first light microscopes were developed in the 17th Century and more recently in the 20th century Electron microscopes were discovered.

Explain how biological knowledge has increased as a result of this discovery.

[3 marks]

0 1 . 5 A cell of size 2.6 x10^{-4}m was examined with an electron microscope of magnification x1500. Find the size of the image of the cell, giving your answer in **centimetres**.

[3 marks]

Answer _____ cm

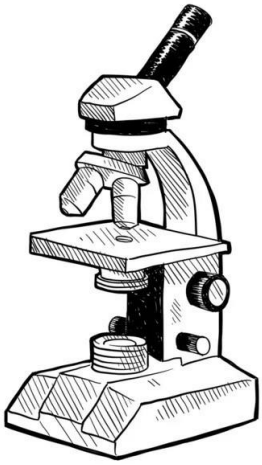
Do not write outside the box

0 1 . 6 A student wishes to observe and label the viewable structures of an onion.
How could the student carry out their investigation?

You must consider:

- The preparation of a microscopic slide
- How the student view the specimen under a microscope

[6 marks]



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0 2 . 1 The process by which cells become specialised is also known as what?

[1 mark]

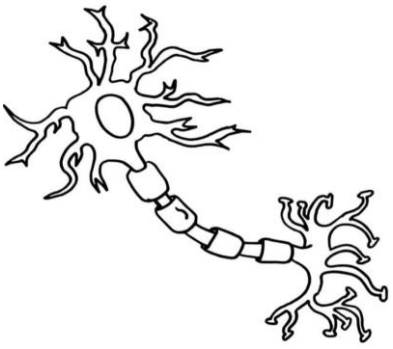
0 2 . 2 Most types of animal cell differentiate at an early stage of development. Many types of plant cells retain the ability to differentiate throughout their life

What is the purpose of cell specialisation?

[2 marks]

0 2 . 3 Shown below is a nerve cell that is designed to transmit electrical impulses throughout the body. **Suggest and explain** two specialised features of the cell that make it suited it to carry out this function efficiently.

[4 marks]



Do not write outside the box

0 2 . 4 A bacterial cell divides once every 35 minutes.
Starting from one cell, how many **new** cells will be present after 7 hours?

[2 marks]

0 2 . 5 The cells produced are genetically identical. Why?

[2 marks]

0 2 . 6 A scientist is trying to isolate a pure culture of bacteria to investigate gut microbial composition and which species of bacteria may lead to intolerances.

Describe how the scientist should prepare an uncontaminated culture using aseptic technique.

[4 marks]

15

Do not write outside the box

0 3 . 1 Three factors affect the rate of diffusion. Explain how each factor affects the rate of diffusion in terms of particle movement.

[4 marks]

0 3 . 2 The "Enterococcus faecalis" bacteria is a cube with side length $5x10^{-9}$ **cm**. Calculate the surface area to volume ratio of this bacteria.

[3 marks]

Answer _____

7

Do not write outside the box

0 4 A student decided to investigate the effect of different sucrose solutions on the mass of potato cylinders. They used the following method:

1. 5 potato cylinders were cut out using a cork borer and measured with a ruler so that they were all a consistent length
2. The mass of each potato cylinder was measured and recorded.
3. A test tube stand containing 5 test tubes was set up; four test tubes have a different concentration of sucrose solution (mol dm^{-3}) and one test tube contains distilled water.
4. One potato cylinder is placed in each test tube and left for 30 minutes
5. The student measures and records the new mass of each potato cylinder

The student's results are shown below:

Concentration of sucrose solution (mol dm^{-3})	Initial mass of potato (g)	Final mass of potato (g)	Change in mass (g)	Percentage change in mass
0	6.2	6.60	+0.4	6.5
0.2	6.19	6.35	+0.16	2.6
0.4	6.18	6.23	+0.05	
0.6	6.22	6.08	-0.14	-2.3
0.8	6.21	6.00	-0.21	-3.4

0 4 . 1 Complete the table above

[1 mark]

0 4 . 2 What is the independent variable in the student's investigation?

Concentration of the sugar solution ☐

Length of time the pieces of potato are in the solution ☐

Change in mass of the potato cylinders ☐

Initial mass of the pieces of potato ☐

[1 mark]

Do not write outside the box

0 4 . 3 The student's method could have been improved. Suggest and explain an improvement to the student's method between steps 4 and 5.

[2 mark]

0 4 . 4 Explain why the masses of the potato cylinders increased.

[3 mark]

0 4 . 5 Describe how the student could alter the investigation to determine the concentration of the solution inside the potato cells

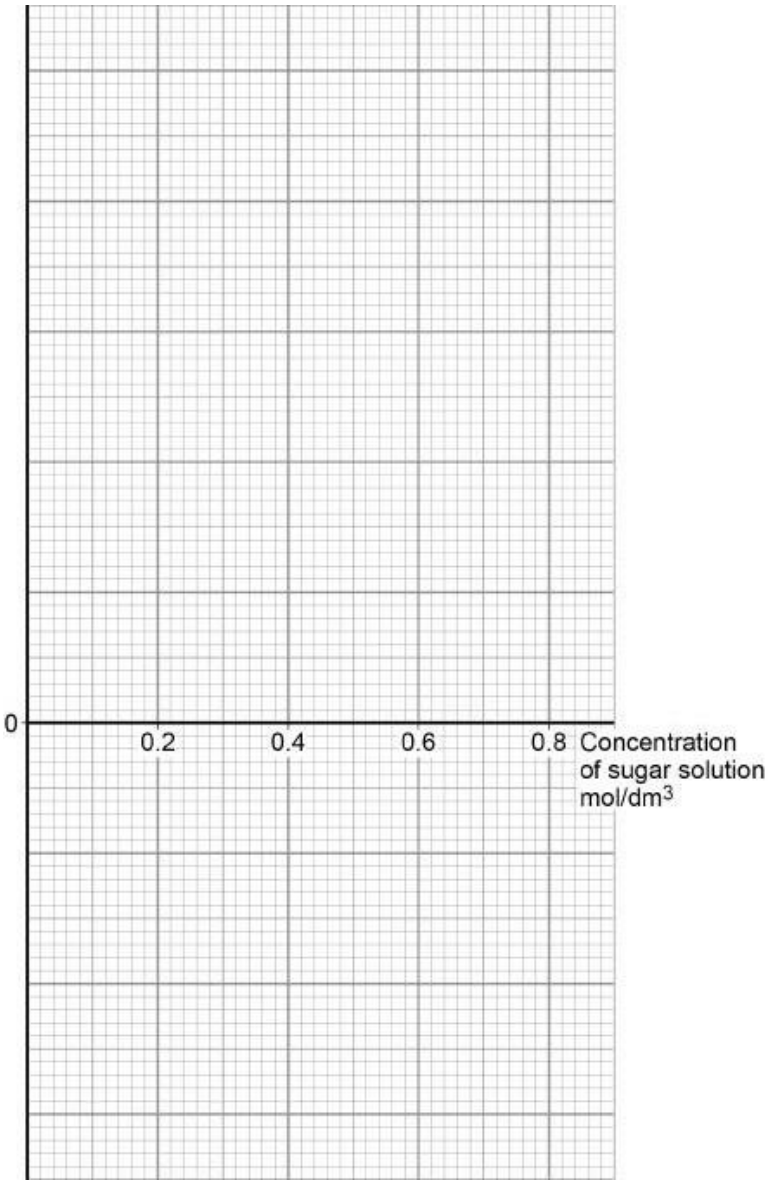
[3 mark]

Do not write outside the box

0 4 . 6 Complete the graph below the results in the student's table

- Choose a suitable scale and label for the y-axis.
- Plot the results.
- Draw a line of best fit.

[4 marks]



0 4 . 7 The student repeated the investigation using boiled leeks

Unlike the potato cylinders, there was no change in mass

Suggest why.

[1 mark]

15

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0 5 . 1 Bile is produced in the liver and stored in the gall bladder. What are the two main roles of bile within the body?

[2 marks]

0 5 . 2 Metabolism is the sum of all reactions that occur inside the body of an organism. Through metabolism, energy is released to fulfil essential life processes.

Describe the key metabolic processes within the human body and plants **[4 marks]**

Do not write outside the box

0 5 . 3 A student is provided with four food samples and wants to identify which of the samples contain protein. Describe a method that the student could use to carry out the investigation.

You should include:

- The preparation of a food sample
- How the student should carry out the investigation
- Safety considerations

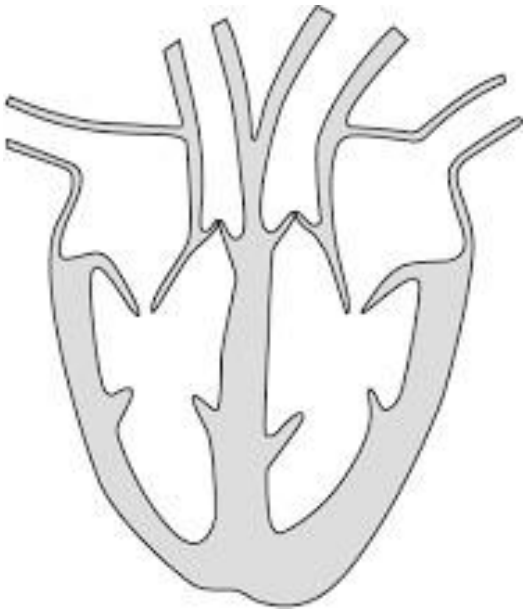
[6 marks]

12

Do not write outside the box

0 6 . 1 Label the vena cava on the diagram below with an X:

[1 mark]



0 6 . 2 How is the heart adapted for its function?

[4 marks]

Do not write outside the box

0 6 . 3 The structures of arteries, veins and capillaries relate to their specific function(s)
Compare the structure of an artery and a capillary

[3 marks]

0 6 . 4 Describe the process of inhalation in the lungs

[4 marks]

12

Do not write outside the box

0 7 . 1 Why are viruses not classified as living organisms?

[1 mark]

0 7 . 2 HIV is a viral infection that can lead to the onset of AIDS.

Explain three ways in which the virus is spread. **[3 marks]**

0 7 . 3 Vaccination will help to prevent illness of an individual by providing artificial immunity

Explain how a vaccine works. **[4 marks]**

8

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0 8 . 1 During photosynthesis plants light energy is taken in via the chloroplasts

What type of reaction is photosynthesis ?

[1 mark]

0 8 . 2 Write a balanced symbol equation for photosynthesis

[2 marks]

0 8 . 3 State four uses of the glucose produced in photosynthesis for plants

[4 marks]

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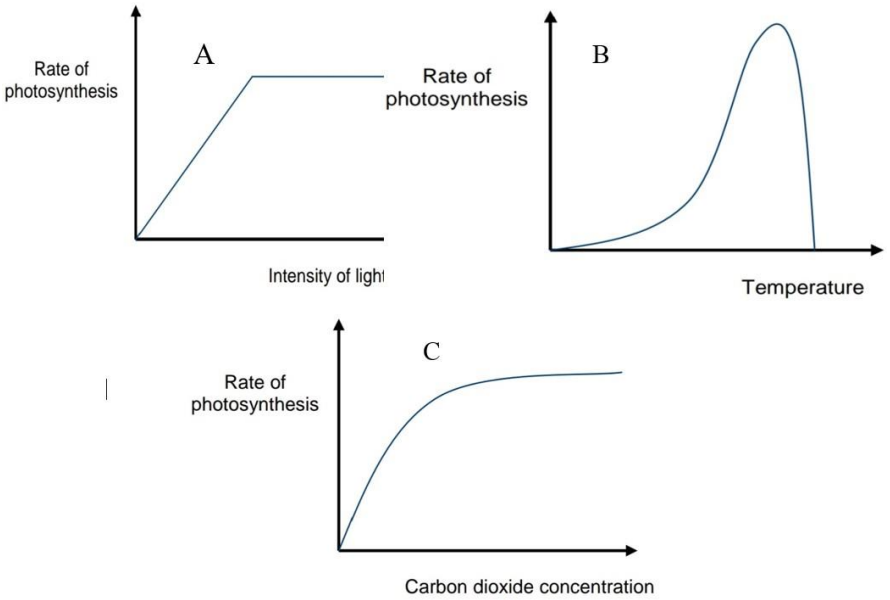
0 8 . 4 Temperature, light intensity and carbon dioxide concentration all affect the rate of photosynthesis.

Using the graph below explain how each of these factors affects the rate of photosynthesis

[5 marks]



12

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0 9 . 1 Monoclonal antibodies have a variety of medical applications; they can be used to treat some diseases effectively. Explain how.

[3 marks]

0 9 . 2 Evaluate advantages and disadvantages of monoclonal antibody use

[4 marks]