cookie

Practice paper

GCSE Biology Higher, practice paper 1 (AQA style)

In the style of AQA GCSE Biology (8461) Paper 1 Higher

Practice paper written by cookie in the style of AQA GCSE Biology (8461) Paper 1 Higher. Not an AQA paper; not affiliated with or endorsed by AQA.

Time allowed: 1 hour 45 minutes

Total marks: 100

Name _____

Instructions

- Answer all questions in the spaces provided.
- The maximum mark for this paper is 100. The marks for each question are shown.
- You may use a calculator.
- Show your working in calculations: you may get marks for a correct method even if your final answer is wrong.
- For multiple-choice questions, choose one answer only.
- In questions marked 6, you will be assessed on your ability to write a clear, logically ordered answer using correct scientific terms.
- This paper covers Cell biology, Organisation, Infection and response, and Bioenergetics.

Information

- The marks for each question are shown in brackets.
- The maximum mark for this paper is 100.

Do it online, timed and marked:
cookie.education/past-papers/gcse/cookie/biology-aqa-style

Answer all questions in the spaces provided.

0 1 This question is about cells and microscopy.

0 1 . 1 Which structure is not found in a prokaryotic cell?

A Cell membrane ☐

B Cell wall ☐

C Cytoplasm ☐

D Nucleus ☐

[1 mark]

0 1 . 2 A student peeled a thin strip of epidermis from a rhubarb stalk to look at with a light microscope. Describe how the student should prepare a slide of the epidermis and then bring the cells into focus.

[3 marks]

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0 1 . 3 The image of one cell was 27 mm long. The magnification was ×150. Calculate the real length of the cell. Give your answer in micrometres (µm).

[3 marks]

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0 1 . 4 Give the real length of the cell in metres (m). Give your answer in standard form.

[1 mark]

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0 1 . 5 A scientist wants to study the ribosomes in these cells. Give one reason why the scientist would use an electron microscope rather than a light microscope.

[1 mark]

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0 2 This question is about cell division and growing microorganisms.

0 2 . 1 Body cells divide in a series of stages called the cell cycle. Describe what happens during the cell cycle to produce two new cells.

[3 marks]

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0 2 . 2 A culture of bacteria started with 400 bacteria. The bacteria divided by binary fission once every 25 minutes. Calculate the number of bacteria in the culture after 5 hours. Assume that no bacteria died. Give your answer in standard form to 2 significant figures.

[3 marks]

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0 2 . 3 In school laboratories, cultures of bacteria are usually incubated at a maximum temperature of 25 °C. Give one reason why.

[1 mark]

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0 2 . 4 A student placed paper discs soaked in different antiseptics on an agar plate covered with bacteria. After incubation, there was a clear zone around some discs. The table shows the results. Calculate the area of the clear zone around antiseptic B. Use the equation: area = πr^2. Give your answer to 3 significant figures.

Antiseptic	Diameter of clear zone in mm
A	12
B	18
C	0
D	15

[2 marks]

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0 2 . 5 Where are stem cells found in a plant?

A Meristem tissue ☐

B Palisade mesophyll ☐

C Phloem tissue ☐

D Xylem tissue ☐

[1 mark]

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0 3 A student investigated the effect of the concentration of sucrose solution on the mass of carrot tissue. The student cut five cylinders of carrot, measured the mass of each and placed each one in a different concentration of sucrose solution. After 60 minutes the student removed each cylinder, blotted it dry and measured its mass again. The table shows the results.

Concentration of sucrose solution in mol/dm^3	Mass at start in g	Mass after 60 minutes in g	Percentage change in mass
0.0	2.50	2.78	+11.2
0.2	2.40	2.52	+5.0
0.4	2.60	2.55	X
0.6	2.50	2.30	−8.0
0.8	2.45	2.18	−11.0

0 3 . 1 Give one variable the student should keep the same in this investigation.

[1 mark]

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0 3 . 2 Calculate value X in the table. Give your answer to 1 decimal place.

[2 marks]

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0 3 . 3 Why did the student calculate the percentage change in mass rather than the change in mass?

[1 mark]

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0 3 . 4 Use the table to estimate the concentration of sucrose solution that would cause no change in the mass of the carrot tissue.

[1 mark]

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0 3 . 5 Explain why the mass of the carrot cylinder in the 0.8 mol/dm^3 sucrose solution decreased.

[3 marks]

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0 3 . 6 Root hair cells absorb mineral ions from the soil. Root hair cells contain many mitochondria. Explain why.

[3 marks]

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0 4 This question is about digestion and enzymes.

Sample	Benedict's test (after heating)	Iodine test	Biuret test
P	blue	blue-black	purple
Q	brick red	orange-brown	purple
R	brick red	blue-black	blue
S	blue	orange-brown	blue

0 4 . 1 Where is bile produced?

A Gall bladder ☐

B Liver ☐

C Pancreas ☐

D Stomach ☐

[1 mark]

Turn over

0 4 . 2 Explain how bile increases the rate of lipid digestion in the small intestine.

[3 marks]

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0 4 . 3 A student tested four food samples, P, Q, R and S. The table shows the results. Which sample contains sugar and protein but no starch?

[1 mark]

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0 4 . 4 The student then investigated the action of amylase on starch. The student mixed amylase with 5 cm^3 of starch solution at pH 7. The starch solution contained 10 g of starch per dm^3. All the starch was broken down in 80 seconds. Calculate the mean rate at which starch was broken down. Give your answer in mg per minute. (1 dm^3 = 1000 cm^3)

[3 marks]

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0 4 . 5 Plan an investigation to find how pH affects the rate at which amylase breaks down starch. You should use iodine solution in your method.

[6 marks]

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0 5 This question is about the heart and coronary heart disease.

	Stent	**Statins**
How it is given	A small mesh tube placed inside the narrowed artery, inserted through a blood vessel under local anaesthetic	A tablet taken every day
How long before it has an effect	Immediately	Several weeks
Possible problems	A blood clot may form near the stent; the artery may narrow again	Some people get side effects, such as muscle pain

0 5 . 1 The natural resting heart rate is controlled by a group of cells that act as a pacemaker. Where are these cells found?

A Left atrium ☐

B Left ventricle ☐

C Right atrium ☐

D Right ventricle ☐

[1 mark]

0 5 . 2 Name the blood vessel that carries blood from the heart to the lungs.

[1 mark]

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0 5 . 3 The wall of the left ventricle is thicker than the wall of the right ventricle. Explain why.

[2 marks]

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0 5 . 4 Explain how coronary heart disease can damage the heart muscle.

[3 marks]

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0 5 . 5 A patient has coronary heart disease. The table gives information about two treatments. Use the information in the table and your own knowledge to evaluate the use of stents and statins to treat this patient.

[6 marks]

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0 6 This question is about transport in plants. A student used a potometer to measure the rate of water uptake by a leafy shoot. An air bubble moved along a capillary tube as the shoot took up water. The radius of the capillary tube was 0.5 mm. The table shows how far the bubble moved in 10 minutes in two conditions.

Condition	**Distance bubble moved in 10 minutes in mm**
Still air	36
Air moved by a fan	58

0 6 . 1 Which tissue transports dissolved sugars from the leaves to the rest of the plant?

A Epidermis ☐

B Phloem ☐

C Spongy mesophyll ☐

D Xylem ☐

[1 mark]

0 6 . 2 Calculate the rate of water uptake when the air was moved by a fan. Use the equation: volume of water taken up = πr^2 × distance moved by the bubble. Give your answer in mm^3 per minute to 3 significant figures.

[3 marks]

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0 6 . 3 Explain why the rate of water uptake was higher when the air was moved by a fan.

[2 marks]

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0 6 . 4 A farmer notices that a crop is growing slowly and its leaves are turning yellow. A soil test shows that the soil is low in magnesium ions. Explain why a lack of magnesium ions causes the crop to grow slowly.

[3 marks]

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0 7 This question is about communicable diseases. The table gives information about four diseases.

Disease	Type of pathogen	How it is spread
Measles	virus	inhaling droplets from sneezes and coughs
Gonorrhoea	(i)	sexual contact
Rose black spot	fungus	spores carried by wind or water
Malaria	(ii)	by mosquitoes (vectors)

0 7 . 1 Give the type of pathogen that causes gonorrhoea, (i), and the type of pathogen that causes malaria, (ii).

[2 marks]

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0 7 . 2 A child has measles. Explain why a doctor would not give the child antibiotics to treat measles.

[2 marks]

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0 7 . 3 Explain how vaccinating a child against measles prevents the child from becoming ill if they are later exposed to the measles virus.

[3 marks]

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0 7 . 4 The data below are for one country. 2014: 71% of children vaccinated, 4820 cases of measles. 2016: 80%, 2150 cases. 2018: 88%, 640 cases. 2020: 93%, 210 cases. 2022: 95%, 95 cases. Describe the relationship shown by the data, and suggest one reason why there were still cases of measles in 2022.

[2 marks]

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0 8 This question is about developing and using medicines. Scientists tested a new drug to lower blood pressure in a clinical trial. Patients with high blood pressure were split into four groups. Each group was given a different daily dose for 12 weeks. The trial was a double blind trial. The table shows the results.

Group	**Daily dose in mg**	**Patients whose blood pressure fell to a healthy level in %**	**Patients who reported side effects in %**
1	0 (placebo)	8	6
2	10	34	7
3	20	61	9
4	40	64	27

0 8 . 1 Which drug was first extracted from foxgloves?

A Aspirin ☐

B Digitalis ☐

C Penicillin ☐

D Statins ☐

[1 mark]

0 8 . 2 Why did the scientists give group 1 a placebo?

[1 mark]

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0 8 . 3 What is meant by a double blind trial, and why is this type of trial used?

[2 marks]

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0 8 . 4 The scientists want to choose the best dose to recommend. Which dose should they recommend? Use data from the table to justify your answer.

[2 marks]

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0 8 . 5 Monoclonal antibodies are produced from a single clone of cells. Describe how monoclonal antibodies are produced.

[4 marks]

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0 8 . 6 Give one use of monoclonal antibodies.

[1 mark]

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0 9 This question is about photosynthesis and respiration. A student investigated the effect of light intensity on the rate of photosynthesis in pondweed. The student placed the pondweed in a test tube of water and put an LED lamp at different distances from it. At each distance the student counted the number of oxygen bubbles released in one minute, three times. The table shows the results.

Distance of lamp from pondweed in cm	**Bubbles per minute, trial 1**	**Trial 2**	**Trial 3**	**Mean**
5	61	63	62	62
10	59	61	60	60
20	30	19	32	Y
40	8	10	9	9

0 9 . 1 Photosynthesis is an endothermic reaction. What does endothermic mean?

A Energy is released by the reaction ☐

B Energy is transferred from the environment ☐

C Energy is transferred to the environment ☐

D The reaction needs an enzyme ☐

[1 mark]

0 9 . 2 Calculate value Y in the table. Ignore any anomalous result.

[2 marks]

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0 9 . 3 Suggest why the student used an LED lamp rather than a filament lamp.

[1 mark]

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0 9 . 4 Light intensity is inversely proportional to the square of the distance from the light source. Calculate how many times greater the light intensity was at 10 cm than at 40 cm.

[2 marks]

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0 9 . 5 The rate of photosynthesis was almost the same at 5 cm and at 10 cm. Explain why.

[2 marks]

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0 9 . 6 An athlete ran a 400 m race as fast as she could. These measurements were taken at rest before the race, at the end of the race and 10 minutes after the race. Heart rate in beats per minute: 64 at rest, 182 at the end, 98 after 10 minutes. Breathing rate in breaths per minute: 14 at rest, 46 at the end, 22 after 10 minutes. Concentration of lactic acid in the blood in mmol/dm^3: 1.1 at rest, 12.4 at the end, 6.0 after 10 minutes. Explain the changes in the measurements during and after the race.

[6 marks]

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END OF QUESTIONS