AQA Biology Paper 1

Higher

Combined Science

Predicted Paper 2019

Name ……

Date ……

1 hour 15 minutes allowed

Similar to your real exam each question in this gets harder towards the end of each question, so if you find you can do the last part of a certain question, try the next question, they all start off easier then get harder.

Grade boundaries

These are VERY rough guesses! Getting an 8 or 9 on here does not guarantee you the same mark in the exam

- 9 55
- 8 45
- 7 35
- 6 25
- 5 15

Exam Analysis

Question	Marks available	Marks gained	Topic	What do you need to do to improve …
1	22		Photosynthesis	
2	17		Cells	
3	15		Enzymes	
4	16		Circulatory system	
Total 70				

Question 1

a) Give the word equation for photosynthesis

[4 marks]

Carbon dioxide + …….. → …….. + ……

b) There are four factors that limit the rate of photosynthesis. Carbon dioxide concentration is one of these limiting factors. Increasing carbon dioxide concentration will increase the rate of photosynthesis up to a certain point, beyond that point increasing carbon dioxide concentration will no longer increase the rate of photosynthesis.

List the three other factors limiting the rate of photosynthesis.

[3 marks]

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c) Sketch a graph to show the effect increasing carbon dioxide concentration can have on the rate of photosynthesis.

[3 marks]

d) A cross section of this leaf was taken and sections measured for the rate of photosynthesis. Comment on what you would expect the findings to be.

[3 marks]

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e) Describe a method to measure how **carbon dioxide concentration** can affect the rate of photosynthesis.

[6 marks]

f) The chemical formula for glucose is $C_6H_{12}O_6$. By mass there is 12 parts hydrogen, 72 parts carbon and 96 parts oxygen. Calculate the percentage mass of oxygen within glucose.

[3 marks]

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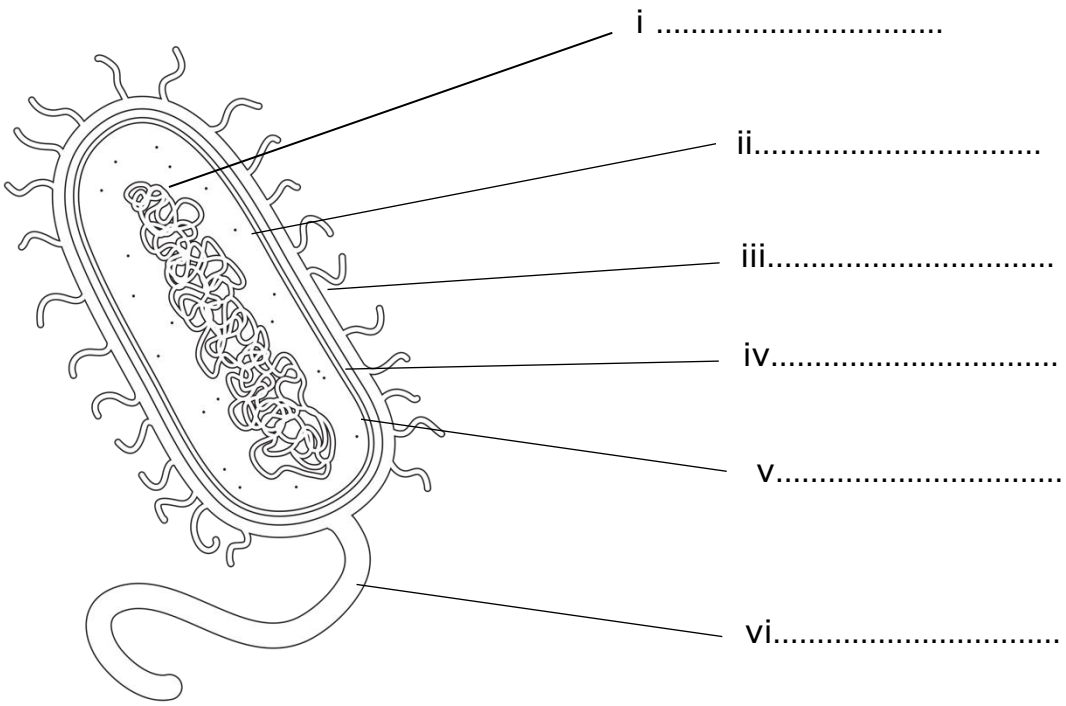
Question 2

a) Label this bacterial cell

[6 marks]



b) The bacterial cell in part a shows several adaptations to suit its function. Give three other cells that have specialised adaptations to suit their functions.

[6 marks]

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c) Osmosis, active transport and diffusion are all mechanism for moving substances in and out of cells. For each of the following situations decide which would be the best transport mechanism.

i. Movement of water into a cell [1 mark]

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ii. Carbon dioxide moving from inside a cell to the blood [1 mark]

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iii. Uptake of glucose by villi cells in the small intestine [1 mark]

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iv. Urea moving out of liver cells into the blood stream [1 mark]

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v. Movement of ions from the soil into a root hair cell [1 mark]

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Question 3

a) Bile has two important roles in the digestive system, explain these roles.

[4 marks]

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b) Enzymes play an important role in the digestive system, they work best within a narrow range of conditions.

i. Suggest why amylase has an optimal temperature range between 32°C and 37°C.

[1 mark]

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ii. Explain why enzymes do not function outside of their optimal temperature ranges.

[4 marks]

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c) Protease is an important enzyme within the digestive system.

i. State where protease is produced

[1 mark]

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ii. Describe the products of protease breaking down proteins.

[1 mark]

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iii. To test for the presence of protein in food we can use Biuret solution, this contains sodium hydroxide. Explain what precautions should be taken when carrying out this test.

[3 marks]

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iv. Describe the colour change that will indicate the presence of proteins.

[1 mark]

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Question 4

a) In humans we have a double circulatory system, describe what this means.

[2 marks]

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b) The pulmonary vein is different to other veins in the body. Explain why the pulmonary vein is different.

[2 marks]

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c) The aorta and vena cava are blood vessel that are part of the circulatory system. Compare the structures and function of the aorta and the vena cava.

[7 marks]

d) Jude and Noah carried out an experiment to measure heart rate. Noah measured his heart rate at 90 beat per minute.

i. If the average human pumps 5L of blood every minute, calculate how much Noah's heart pumps with each pump. Give your answer to two decimal places.

[3 marks]

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ii. Jude's heart was found to pump 5.2L each minute, calculate how much blood is pumped around her body each day?

[2 marks]

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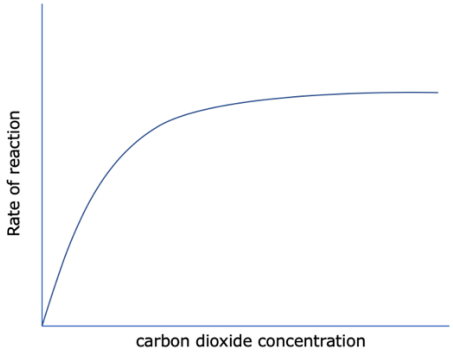
End of question!!

Biology Rocks! And so do you ☺

Answers

Question Number	Answer	Guidance
1a	Carbon dioxide + water → glucose + oxygen Light	One mark for each new part, light must be above or below the arrow and not part of the reaction
1bi	-concentration of chlorophyll -temperature -light intensity	One mark for each point
1bii	 -correctly labelled x axis -correctly labelled y axis -line of graph	One mark for each point
1c	-chlorophyll is needed for photosynthesis -green areas have lots of chlorophyll, so would show high levels of photosynthesis -white areas have lower levels (no) chlorophyll, so would show low levels of photosynthesis	One mark for each point
1d	-independent variable is the concentration of carbon dioxide in the water -dependant variable is the rate of photosynthesis. -The rate of photosynthesis can be followed by measuring the volume of gas released, or by counting the number of bubbles released. -control variables will include temperature and light intensity. -light source is needed - Keep lamp at the same distance throughout the experiment -place a freshly cut piece of pond weed in water covered with an upturned measuring cylinder, with the cut end pointing upwards -collect the bubbles/gas in a water filled measuring cylinder -note the volume of gas in the measuring cylinder before the experiment starts.	1-2 marks This answer will have some valid points but will lack structure and not be complete 3-4 marks The majority of the points are valid and correct but the answer is lacking scientific clarity 5-6 marks This is a fluid answer, all points mentioned are correct and relevant, and the SPG is almost flawless

	-use water with different concentrations of carbon dioxide -vary concentration of carbon dioxide dissolved in by adding in chemical compounds to increase carbon dioxide concentration, or by seeing if the rate of photosynthesis changes over a long period of time. Eg compare the same pond weed at the beginning and end of the day, as photosynthesis will use up carbon dioxide during the day. **For 6 pages of questions on this practical see my Required Practical's Exam Practice Workbook**	Method must be valid and give reliable results
1e	Total mass of glucose = 72 + 96 + 12 =180 96/180= 0.53 53%	One mark for each point
2ai	DNA (or nucleoid)	
2aii	Cytoplasm	
2aiii	Cell wall	
2aiv	Cell membrane	
2av	Ribosome	
2avi	Flagella	
2b	Root hair cells – large surface area to allow for more water to get into the cell Sperm cells – dense region of mitochondria for energy and tail for swimming Egg cells -large size with lots of cytoplasm Red blood cells – no nucleus to allow for carrying oxygen Nerve cells – long body to carry signals Leaf cell – large surface area and lots of chloroplasts to allow for lots of photosynthesis	First three marks comes from specialised cell, the following three marks comes from a LINKED reason. 6 marks cannot be gain from a list of 6 cell types
2ci	Osmosis	
2cii	Diffusion	
2cii	Active transport	
2civ	Diffusion	
2cv	Active transport	
3a	-emulsify fats -increases surface areas to speed up digestion -neutralises stomach acid -to protect the small intestine and provide optimal pH for enzymes	One mark for each point
3bi	-this is close to body temperate	
3bii	-too hot and enzymes get denatured -active site mis-shaped -cannot fit substrate -too cold not enough energy	One mark for each point
3ci	Stomach OR pancreas OR small intestine	

3cii	Amino acids	
3ciii	-Wash hands after use to avoid skin contact or ingestion of sodium hydroxide -wear googles and avoid touching eyes to prevent sodium hydroxide getting into contact with eyes -avoid eating or drinking in the lab as this may cause accidental ingestion of sodium hydroxide -clear up any spill immediately so to avoid an unknowing person touching the spill -keep books and coats away from lab space, to avoid contaminating them with sodium hydroxide **For 6 pages of questions on this practical see my Required Practical's Exam Practice Workbook**	Any three from list Linked reason must be given to gain marks. This is an explain question, stating the precaution is not enough to get the marks
3civ	Blue to pink/purple	Both start and end colour must be listed
4a	-two separate pathways -pumped via heart twice	One mark for each point
4b	-pumps oxygenated blood, -other veins pump deoxygenated blood	One mark for each point
4c	Similarities -both are connected to the heart -both carry blood Differences -vena cava is under low pressure then aorta -vena cava has thinner walls then the aorta -vena cava has values, aorta has no valves -vena cava carries blood towards heart, aorta carries blood away from heart -vena cava carries deoxygenated blood, aorta carries oxygenated blood	Answer must be a balance of similarities and differences 1-2 marks This answer will have some valid points but will lack structure and not be complete 3-4 marks The majority of the points are valid and correct but the answer is lacking scientific clarity 5-7 marks This is a fluid answer, all points mentioned are correct and relevant, and the SPG is almost flawless
4di	5/90= 0.06 L/pump	One mark for each point Units must be given to gain the last mark, these unit must match the answer

		0.05 is not the correct answer, as student has missed the recurring sign
4dii	5.2 x 60 x 24 = 7488L	One mark for each point Units must be given to gain the last mark