F214

Name	

Duration	**1 HOUR & 15 MINUTES**
Total Marks Available	**60 MARKS**

Targets

For examiner's use only

Question Number	*Leave Blank*
1	
2	
3	
4	
5	
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Total marks	

Answer **all** questions

1 All organisms must excrete.

Substances that are excreted include carbon dioxide and urea.

(a) State what is meant by the term *excretion*.

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[2 marks]

Carbon dioxide is a product of aerobic respiration.

(b) (i) What stage(s) of aerobic respiration produce carbon dioxide?

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[1 mark]

(ii) Outline how this carbon dioxide is produced.

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[3 marks]

(c) Explain how **and** why carbon dioxide is excreted from the body.

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[3 marks]

Urea is another substance that needs to be excreted.

(d) In what organ is urea **produced**?

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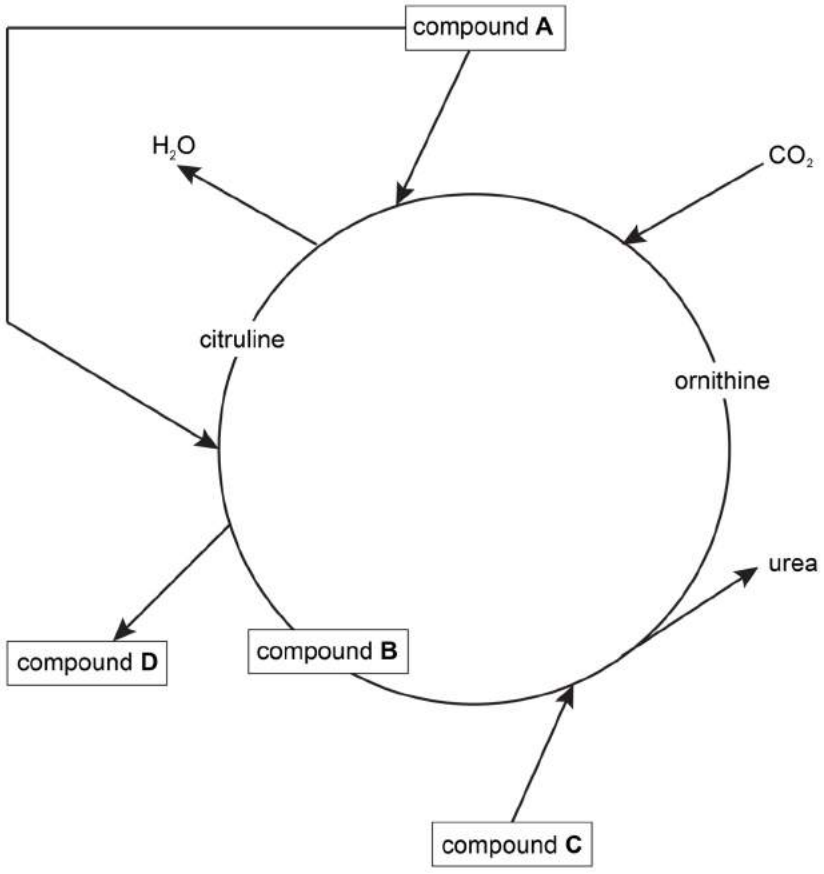
[1 mark]

Urea is produced from the breakdown of amino acids in two-stages.

The second stage is the ornithine cycle.

The diagram below shows an illustration of the ornithine cycle.



(e) State the names of

Compound **A**.....

Compound **B**.....

Compound **C**.....

Compound **D**.....

[3 marks]

[Total: 13]

2 Photosynthetic pigments assist the mechanism of photosynthesis.

(a) State **precisely** where these pigments are found.

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[1 mark]

(b) Distinguish between primary pigments and accessory pigments.

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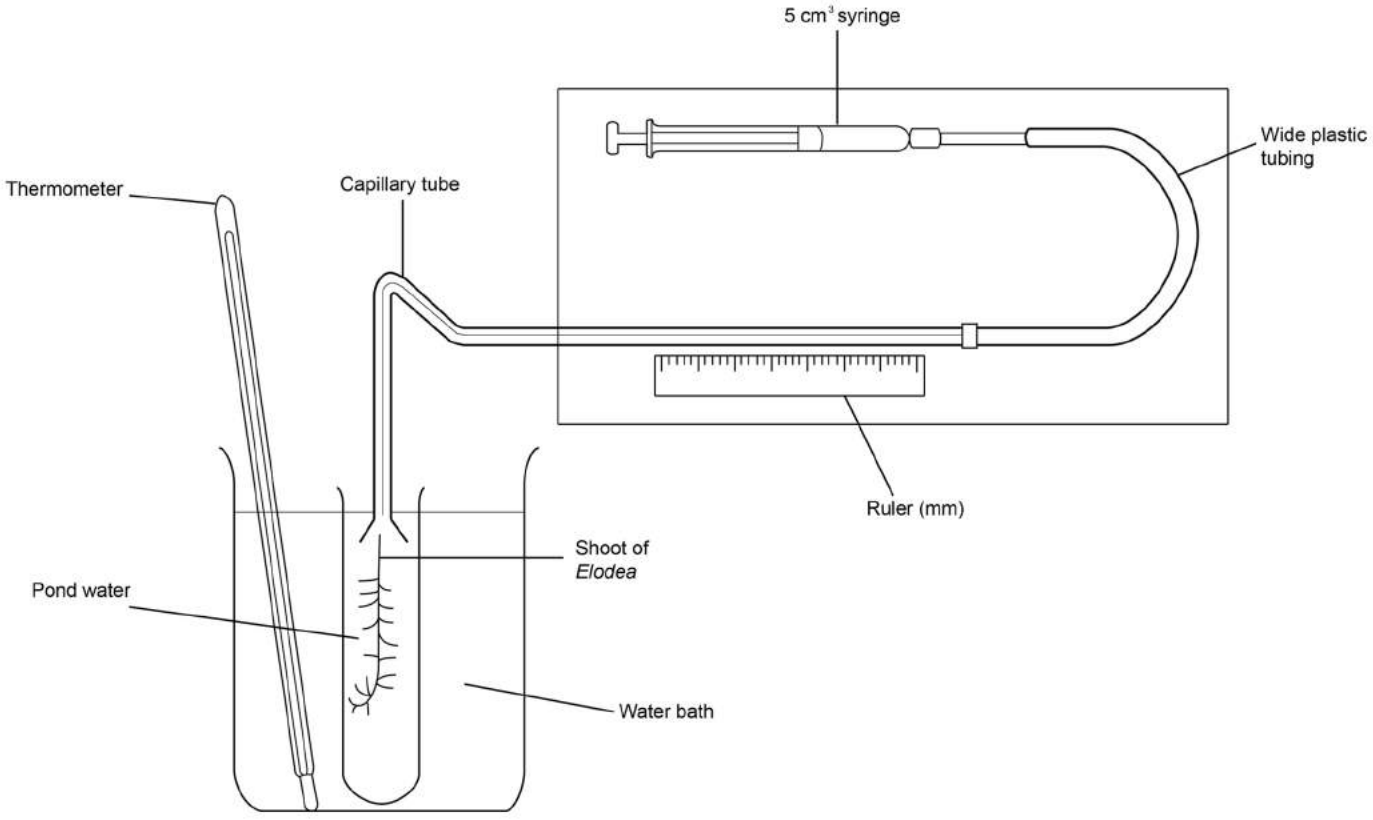
[3 marks]

Jean is going to conduct an investigation to observe the effects of light intensity on the rate of photosynthesis.

The diagram below shows the setup of her equipment.



(c) (i) Describe how she can use her equipment to obtain data.

The quality of your written communication will be assessed in this question.

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[3 marks]

(ii) State **two** limitations of her experiment and suggest how she can overcome these.

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[4 marks]

Turn over for the remainder of the question

Jean also investigates the effect of temperature on the rate of photosynthesis.

Her data is shown below in Table 1.

Table 1

Temperature (°C)	Rate of photosynthesis (mm CO_2 g^{-1} dry mass $hour^{-1}$)			
	Trial 1	Trial 2	Trial 3	Average
5	1.3	1.5	1.4	
10	2.4	2.6	2.2	
15	3.0	3.0	3.1	
20	3.3	3.5	3.4	
25	3.0	2.8	3.2	
30	2.2	2.3	2.1	

(d) Calculate the average rate of photosynthesis for the different temperatures.

You should write your answers in the table. **[2 marks]**

(e) Describe and explain Jean's results.

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[4 marks]

[Total: 15]

3 State the correct biological term(s) used for the following statements.

(a) The production of glucose by the conversion from amino acids and fats.

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[1 mark]

(b) The conversion of glucose to glycogen.

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[1 mark]

(c) The gland that secretes adrenaline.

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[1 mark]

(d) The collection of cells that possess a complementary receptor to a signal on their cell surface membrane.

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[1 mark]

(e) The structural arrangement that allows fluid to flow in opposite directions to create high concentration gradients.

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[1 mark]

[Total: 5]

4 Many people in the UK suffer from a condition called diabetes mellitus.

(a) Describe what is meant by diabetes mellitus.

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[1 mark]

(b) Distinguish between the terms hyperglycaemia and hypoglycaemia.

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[2 marks]

Hyperglycaemia can result in many complications for an individual.

One complication is that it hinders the synthesis of neutrophils in the body.

(c) Suggest why this is harmful.

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[2 marks]

Hyperglycaemia can also be dangerous to an individual infected by bacteria.

(d) Suggest why.

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[2 marks]

Suffers from diabetes mellitus, particularly Type I, are required to take insulin injections.

(e) Discuss the advantages and disadvantages of using genetically engineered bacteria to manufacture human insulin.

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[3 marks]

[Total: 10]

5 Many of the changes in the body are activated by negative feedback loops.

(a) Explain what is meant by negative feedback.

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[2 marks]

The release of ADH is controlled by a negative feedback loop.

(b) Explain the significance of ADH.

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[2 marks]

ADH is secreted by neurosecretory cells.

ADH is manufactured in the cell body of these cells and then flows down the axon of these neurones to the terminal bulb, where it is stored.

When ADH is required, an action potential travels down the neurone and triggers the release of ADH.

(c) Suggest how the action potential is generated in the neurosecretory cells.

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[2 marks]

(d) Suggest how the action potential triggers the secretion of ADH.

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[4 marks]

(e) Myelinated neurones have a faster transmission rate than neurones without myelination. Suggest why neurosecretory cells are unmyelinated.

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[1 mark]

(f) Explain how action potentials are transmitted along an unmyelinated neurone **and** describe how this is different to myelinated neurones.

The quality of your written communication will be assessed in this question.

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[6 marks]

[Total: 17]

END OF TEST