Answer all the questions.

 (b) Fig. 1.1 is an electron micrograph of the junction between two neurones. Fig. 1.1 (i) State the name given to the gap between the two neurones at this junction. 	1 (a	nicate with one another.
(b) Fig. 1.1 is an electron micrograph of the junction between two neurones. Fig. 1.1 (i) State the name given to the gap between the two neurones at this junction. (ii) Outline how the first neurone communicates with the second neurones.		of communication.
Fig. 1.1 (i) State the name given to the gap between the two neurones at this jur. (ii) Outline how the first neurone communicates with the second neurone		[1]
(i) State the name given to the gap between the two neurones at this jur (ii) Outline how the first neurone communicates with the second neurone	(b	ne junction between two neurones.
(i) State the name given to the gap between the two neurones at this jur (ii) Outline how the first neurone communicates with the second neurone		first neurone gap between the two neurones second neurone
(ii) Outline how the first neurone communicates with the second neurone		Fig. 1.1
(ii) Outline how the first neurone communicates with the second neurone		petween the two neurones at this junction.
		[1]
In your answer, you should use appropriate technical terms, spelt con		nmunicates with the second neurone across the gap.
	6	ppropriate technical terms, spelt correctly.

.....[3]

	[3]
tempera (c) Giv	rvous system and the hormonal system are involved in the maintenance of core body ature. The the most suitable word or term that has the same meaning as each of the following scriptions:
tempera (c) Giv	ature.
tempera (c) Giv des	ature. The most suitable word or term that has the same meaning as each of the following scriptions: animals that are able to regulate and maintain their core body temperature within narrow
tempera (c) Giv des	we the most suitable word or term that has the same meaning as each of the following scriptions: animals that are able to regulate and maintain their core body temperature within narrow limits;
tempera (c) Giv de:	the most suitable word or term that has the same meaning as each of the following scriptions: animals that are able to regulate and maintain their core body temperature within narrow limits; the increase in the diameter of the lumen of an arteriole to allow more blood to flow
tempera (c) Giv de: (i)	the most suitable word or term that has the same meaning as each of the following scriptions: animals that are able to regulate and maintain their core body temperature within narrow limits; the increase in the diameter of the lumen of an arteriole to allow more blood to flow through.
tempera (c) Giv de: (i)	the the most suitable word or term that has the same meaning as each of the following scriptions: animals that are able to regulate and maintain their core body temperature within narrow limits; [1] the increase in the diameter of the lumen of an arteriole to allow more blood to flow through.
tempera (c) Giv de: (i)	the most suitable word or term that has the same meaning as each of the following scriptions: animals that are able to regulate and maintain their core body temperature within narrow limits;
tempera (c) Giv de: (i)	the the most suitable word or term that has the same meaning as each of the following scriptions: animals that are able to regulate and maintain their core body temperature within narrow limits; [1] the increase in the diameter of the lumen of an arteriole to allow more blood to flow through. [1] Name a hormone that increases the metabolic rate and so generates heat. [1]

2 The kidney is composed of many nephrons.

Fig. 2.1 is a diagrammatic representation of a nephron. The numbers represent the relative concentrations of solutes in the tubule and the tissue fluid surrounding the tubule.

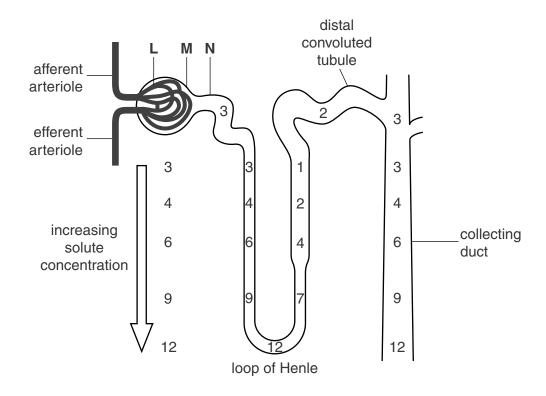


Fig. 2.1

(a) Name the parts of the nephron labelled L, M and N.

L	
M	
N	[3]

(b) Which part(s) of the nephron corresponds to each of the statements in the table below?

statement	part(s) of the nephron
walls are impermeable to water	
glucose is reabsorbed into the blood	
ADH acts on the walls	
contains podocytes	
most of the water is reabsorbed into the blood	
	[E]

	most of the water is reabsorbed into the blood	
		[5]
(c	With reference to Fig. 2.1, explain the role of the	ne loop of Henle in the production of urine.
	In your answer, you should use appropriate te	chnical terms, spelt correctly.
		[5]

3 The compound 2,3,5-triphenyl-tetrazolium chloride (TTC) is an electron acceptor. TTC will diffuse into actively respiring cells and accept electrons from the electron transport chain.

When TTC accepts electrons and becomes reduced, it changes from colourless to pink. The tissues in which this reaction takes place will be stained a pink colour.

(a) State the **precise** location of the electron transport chain in the cell.

[1]

(b) A student carried out an investigation into the respiratory activity of plant tissue. She used three groups of germinating broad bean seeds. These were first treated as shown in Table 3.1.

Table 3.1

seed	treatment
group A	kept at 22 °C for 24 hours before the investigation
group B	kept at 6°C for 24 hours before the investigation
group C	kept at 22 °C for 24 hours and then placed in water at 90 °C for 5 minutes before the investigation

The groups of seeds were then sliced longitudinally and placed, cut surface down, in a shallow dish containing a small volume of TTC solution. The cut surfaces remained in contact with the solution for 10 minutes.

The seeds were then removed from the dish. The excess TTC solution was wiped off and the cut surfaces of the seeds in each group were observed.

The appearance of the seeds in each group is shown in Fig. 3.1. The shaded areas are the regions where the tissues have stained a pink colour.

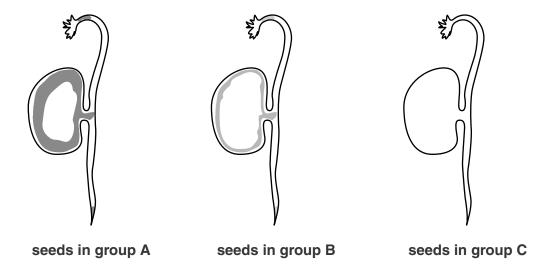


Fig. 3.1

(i)	Describe the differences observed in the seeds in groups A, B and C.
	[1]
(ii)	Suggest reasons for the results observed in the seeds in group A .
	[2]
(iii)	Suggest reasons for the difference in the amount of staining observed in the seeds in groups B and C when compared to those in group A .
	[2]

(c) If oxygen is not present or is in short supply, respiration can take an anaerobic pathway after

gly	colysis. In plant cells, this pathway is the same as the one used in yeast cells.
(i)	Name the hydrogen acceptor in this pathway.
	[1]
(ii)	Name the intermediate compound in this pathway.
<i>,</i> ,,,,,	[1]
(iii)	Name the products of this pathway. [1]
(iv)	Explain why this pathway is important for the plant cell.
,	
	re1
	[2]

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PLEASE DO NOT WRITE ON THIS PAGE QUESTION 4 STARTS ON PAGE 10

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4	One way to	determine the	rate of p	photosynthes	is is to	measure th	e uptake c	of carbon	dioxide.
---	------------	---------------	-----------	--------------	----------	------------	------------	-----------	----------

(a)	Discuss why measuring carbon dioxide uptake may or may not give a better indication of
	photosynthetic activity than measuring oxygen production.

	ro1

(b) Fig. 4.1 shows the relationship between light intensity and the relative carbon dioxide uptake and production in a plant.

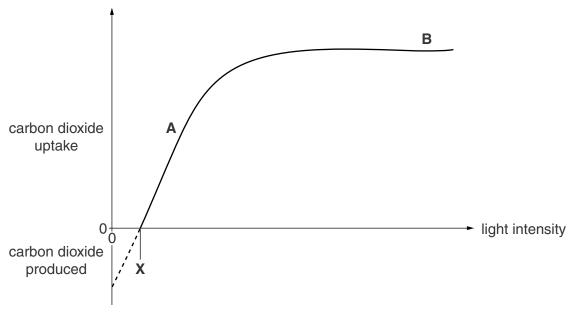


Fig. 4.1

(i)	State the factor that is limiting the rate of photosynthesis at A on the graph.
	[1]

(ii) Suggest one factor that may limit the rate of photosynthesis at ${\bf B}$.

-4
 L I

(iii) Carbon dioxide is given off by the plant when the light intensity is lower than **X**.

Name the process that **produces** carbon dioxide in the plant.

(iv)	With reference to Fig. 4.1, explain the biochemical processes that are occurring in the plant:
	 as light intensity increases from 0 (zero) to X.
	• at light intensity X .
	• at light intensities greater than X.
	[3]
(c) (i)	
	[3]
(ii)	Paraquat is a weedkiller. It binds with electrons in photosystem I.
	Suggest how paraquat results in the death of a plant.
	[2]
	[Total: 13]

The cont	_	llation of blood glucose concentration is important for homeostasis and involves hormonal
(a)	(i)	Name the endocrine tissue in the pancreas that is responsible for secretion of hormones.
		[1]
	(ii)	Identify the specific cell type in pancreatic tissue that secretes the hormone insulin.
		[1]
(b)		incomplete flowchart below outlines the way in which the secretion of insulin from a creatic cell is controlled.
	Con	nplete the flowchart by inserting the most appropriate word(s) in the spaces provided.
	lı	nsulin secretion is stimulated when the blood glucose concentration
		<u> </u>
		Glucose enters the pancreatic cell through channel proteins. The glucose
	e	enters the pathway and ATP
	is	s produced.
	Т	The increase in ATP causes ATP-controlled potassium ion channels to close
	а	and the cell membrane becomes
	Т	This results in the opening of voltage-gated
	ic	on channels and the concentration of this ion inside the cell increases.
	 T	The increased concentration of these ions causes the secretion of insulin from
	tl	ne cell by the process of

(c) (i)	Insulin is a polypeptide molecule.
	State where in a pancreatic cell insulin molecules are synthesised.
	[1]
(ii)	Outline the events that occur after the synthesis of an insulin molecule until it is ready to be secreted from the pancreatic cell.
	[3]
	[Total: 11]

END OF QUESTION PAPER