21 The figure shows the female reproductive system.
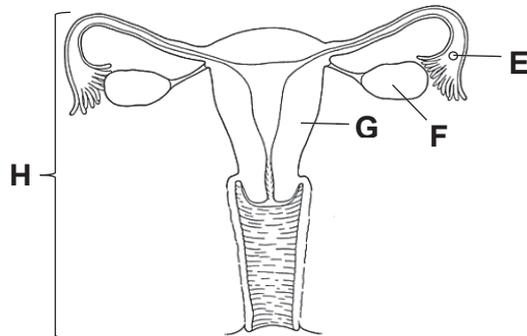
Which is correct?

	E	F	G	H
A	cell	organ	tissue	organ system
B	cell	tissue	organ	organ system
C	tissue	cell	organ	organ system
D	organ system	tissue	organ	cell

22 Which of these processes require energy?

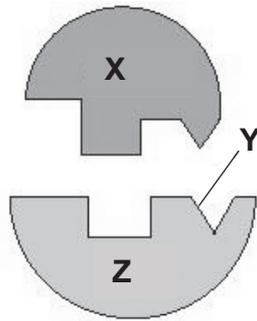|	diffusion	osmosis
A	+	+
B	-	-
C	+	-
D	-	+

key:

+ energy required
- energy not required

23 Which matches the large molecule to its basic units?

	basic unit	large molecule
A	amino acids	fat
B	glucose	glycogen
C	glycerol	glycogen
D	starch	glucose

10

24 The figure illustrates the 'lock and key' hypothesis of enzyme action.

Which are the substrate, the enzyme and the active site?

	substrate	enzyme	active site
A	X	Y	Z
B	X	Z	Y
C	Y	X	Z
D	Z	X	Y

25 The table shows the amount of certain substances in different blood vessels.

	oxygen	carbon dioxide	digested nutrients
A	+++	+	+
B	+	+++	+
C	+++	+++	+++
D	+	+	+++

key:
+   low amounts
++   moderate amounts
+++ high amounts

Which best represents the hepatic portal vein?

26 Which describes the function of chlorophyll during photosynthesis?

    A absorb carbon dioxide

    B absorb oxygen

    C trap light energy for production of starch

    D trap light energy for conversion of light energy into chemical energy

27 Which conditions will cause a plant to transpire the most?

	temperature /°C	humidity /%	light intensity /arbitrary units
A	15	30	16
B	25	30	16
C	37	20	14
D	37	60	14

**28** The table shows the full blood count of a child suffering from Thalassemia, a type of blood disorder.

	Thalassemia	Normal range
number of red blood cell per litre of blood	2.77×10^{12}	$3.9 - 5.3 \times 10^{12}$
number of white blood cell per litre of blood	8.4×10^9	$5.0 - 17.0 \times 10^9$
number of platelet per lire of blood	192×10^9	$150 - 450 \times 10^9$
amount of haemoglobin / g/d*l*	7.5	$11.5 - 13.5$

Which statement describes the effect Thalassemia may have on the child's health?

    A He is often pale and breathless.

    B His blood does not clot.

    C He is unable to fight against bacterial infections.

   **D** His red blood cells are not able to carry oxygen.

29 The figure shows the double circulation of blood.
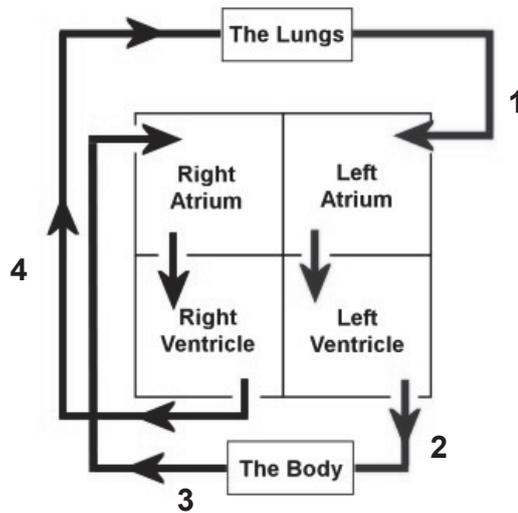
Which of the following statements is correct?

A   Blood vessel **1** carries blood under high pressure.

B   Blood vessel **2** is an artery.

C   Blood vessel **3** carries oxygenated blood.

D   Blood vessel **4** have thick and muscular walls.

30 The figure shows the effect of vigorous exercise on blood pH.
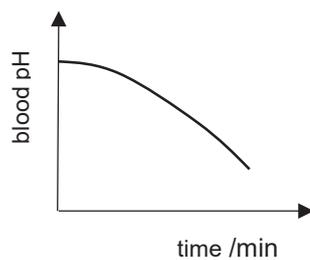

Which statement explains the change in blood pH?

A   There is an increase in oxygen levels in the blood.

B   There is an increase in carbon dioxide levels in the blood.

C   The muscles are undergoing anaerobic respiration.

D   The muscles are suffering from aches and fatigue.

31 In the nervous system, which of the following are NOT considered effectors?

I photoreceptors

II salivary glands

III sensory cells in the skin

IV sphincter muscles of the alimentary tract

A I and III

B II and III

C II and IV

D III and IV

32 The figure shows the blood glucose concentration of two individuals, **P** and **Q**.
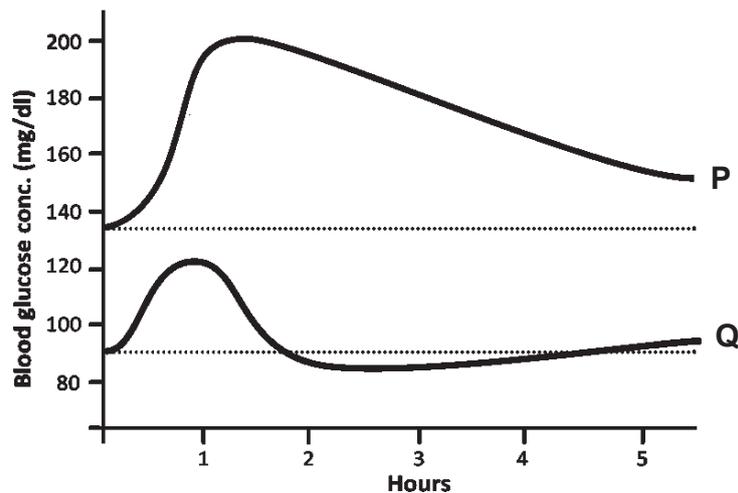
Based on the figure, which hormone is responsible for regulating the blood glucose concentration for individual **P** and how much is it found in the blood?

	hormone involved	hormone levels in blood
A	glucagon	high
B	glucagon	low
C	insulin	high
D	insulin	low

33 Which of the following correctly describes the relationship between genes, DNA and chromosomes?

A A gene is a short segment of DNA.

B Base pairing of chromosomes results in the double helix structure.

C DNA is made up of many chromosomes joined together.

D The condensed form of genes is DNA.

34 What causes sickle cell anaemia?

A a change in chromosome number

B a change in the structure of a gene

C a virus infection

**D** uncontrolled cell division of red blood cells

35 The figure shows a leaf with buds growing from it.

Which row describes the type of reproduction and the genotype of the offspring?

|	reproduction	genotype
A	asexual	genetically dissimilar
B	asexual	genetically identical
C	sexual	genetically dissimilar
D	sexual	genetically identical

36 The figure shows the cross section of a flower.
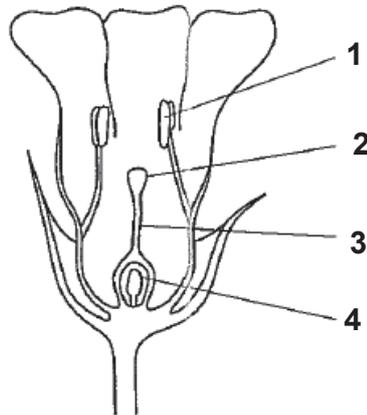
Where does pollination and fertilisation take place?

|	pollination	fertilisation
A	1	2
B	2	1
C	1	4
D	2	4

37 The figure shows the fertilisation of the human ovum and subsequent development.
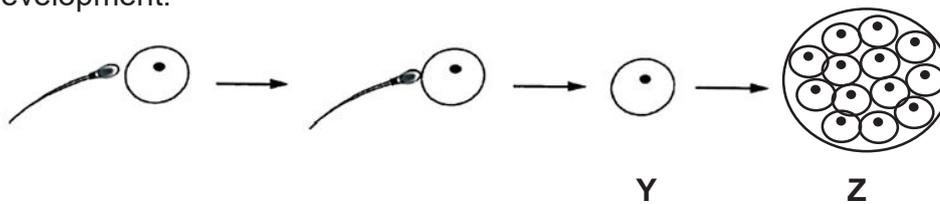
Which statement is correct?

A **Y** is an ovum released by the ovary.

B **Z** is the zygote.

C **Y** is implanted into the uterine lining.

D **Z** is implanted into the uterine lining.

38 The figure shows the number of people in country **X** infected with HIV from 2012 to 2016.
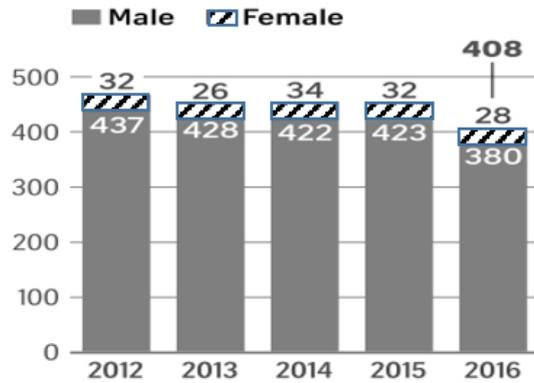
What conclusion may be drawn from the figure?

A The number of women infected decreases every year.

B More men died from AIDS than women.

C The decrease in number of men and women infected by HIV could be due to effective programmes that educate the public on HIV infections.

D The increase in tax on condoms resulted in the rise of HIV infections.

39 The table shows the amount of energy available when man feeds on a producer and a primary consumer.

	producer	primary consumer
amount of energy available /KJ	1 000	100

Based on your knowledge on energy transfer, which statement best explains the table?

A Less energy is available in producers as not all light energy from the sun can be absorbed.

B Less energy is available in the primary consumer as it stored most of the energy as carbohydrates.

C More energy is available to man if they feed on producers as most of the energy is lost as it is transferred from one trophic level to another.

D More energy is available in producers as they exist in greater numbers.

17

40 The figure shows the amount of submerged aquatic plants present and the bacterial count in four different rivers.

In which river has eutrophication occurred?

key: —— submerged aquatic plants

      --- bacteria
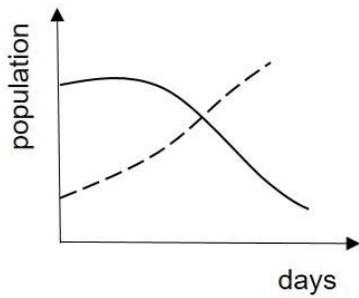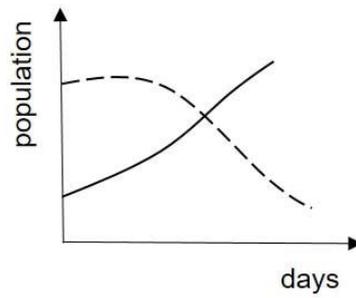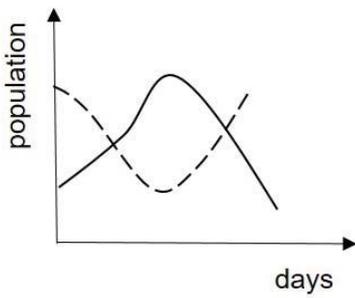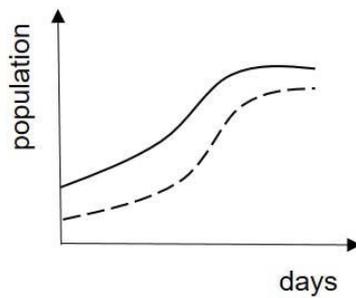
- End of Paper -

1 **(a)** Fig. 1.1 shows an animal cell.
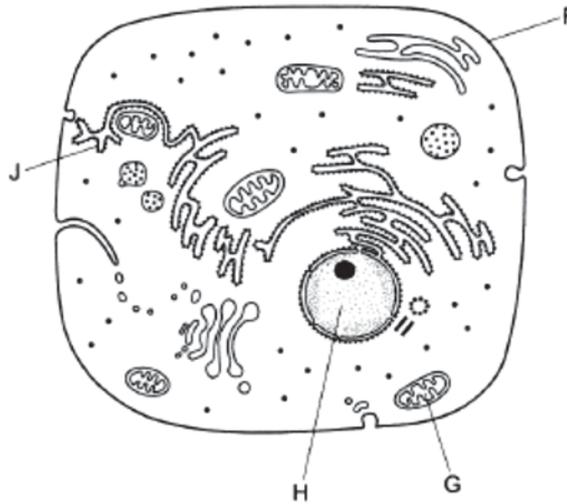
Fig. 1.1

(a) Name the following labelled organelles as shown in Fig. 1.1. [2]

(i) **G** …………………..………….

(ii) **H** ……………………………

(b) State the function of the organelles labelled [2]

(i) **F** ……………………………………………………………………..

…………………………………………………………………………..

(ii) **G** ……………………………………………………………………..

…………………………………………………………………………

(c) Table 1.1 shows the number of organelle **G** in different types of cells.

cell type	red blood cell	muscle cell	skin cell
number of organelle **G** / arbitrary units	0	1400	200

Table 1.1

(i) Suggest why the red blood cell contains no organelle **G**. [1]

………………………………………………………………………………......

………………………………………………………………………………......

(ii) Suggest why the number of organelle **G** between muscle cells and skin cells differ in great numbers. [1]

………………………………………………………………………………......

………………………………………………………………………………......

2 (a) Fig. 2.1 shows an experimental set-up. The height of the liquid level in the capillary tube was measured at regular time intervals and recorded in Table 2.1.

Fig. 2.1

3

Time /minutes	Height of liquid level in capillary tube /mm
0	20
30	22
60	25
90	29
120	34

Table 2.1

(i) On the grid provided on the next page, plot a graph of height of liquid in capillary tube against time using the results in Table 2.1.

On your graph, use appropriate scales, label the axes and draw a curve of best fit. [4]

(ii) With reference to the shape of the graph you have drawn in part **(i)**, suggest an appropriate sugar concentration for sugar solutions **X** and **Y**: [2]

sugar solution **X**: …….. % sugar

sugar solution **Y**: …….. % sugar

(iii) Explain your answer for part **(ii)** above. [3]

…………………………………………………………………………......

…………………………………………………………………………......

…………………………………………………………………………......

…………………………………………………………………………......

4

3 The enzyme lipase digests fat molecules. During this process acids are formed which decrease the pH of the mixture.

Four different tubes, **A**, **B**, **C**, **D** and **E** were set up to investigate the effect of lipase on fat in different conditions. The initial pH of each mixture was pH 8.0.

Table 3.1 shows the results obtained.

tube	condition				pH of mixture after 10 min
	amount of lipase added /mg	amount of fat added /mg	amount of substance **P** added /mg	temperature /°C	
A	0	4	0	37	8.0
B	0	4	5	37	8.0
C	10	4	5	37	5.5
D	10	4	0	37	7.0
E	10	4	5	75	

Table 3.1

(a) Based on the results in Table 3.1, list the conditions necessary for most fat digestion. [3]

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

(b) Identify substance **P**. [1]

……………………………………………………………………………………………

(c) Name and describe the process involved when substance **P** is added to fats. [2]

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

(d) Complete Table 3.1 by filling in an appropriate pH value for test tube **E**. [1]

(e) Explain your answer for part **(d)** above. [2]

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

(f) State the end-product(s) of fat digestion. [1]

……………………………………………………………………………………………

4   Fig. 4.1 shows the internal structure of a dicotyledonous green leaf.
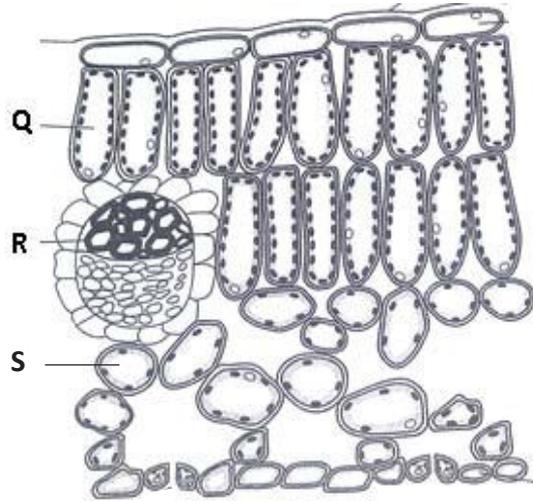
Fig. 4.1

(a)   Name the parts labelled **Q** and **R**.   [2]

Q …………………………………………………..

R …………………………………………………..

(b)   Describe and explain how chloroplast distribution differs between cell **Q** and cell **S**.   [3]

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

(c) State the process by which carbon dioxide gas from the surroundings reaches cell **Q**. [1]

…………………………………………………………………………………………………

(d) Describe and explain two ways in which cell **R** is adapted to its function. [4]

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

…………………………………………………………………………………………………

9

5 **(a)** A group of scientists created 2 artificial nucleotides, named **P** and **Q**.

Fig. 5.1 shows a segment of DNA containing the artificial nucleotides.
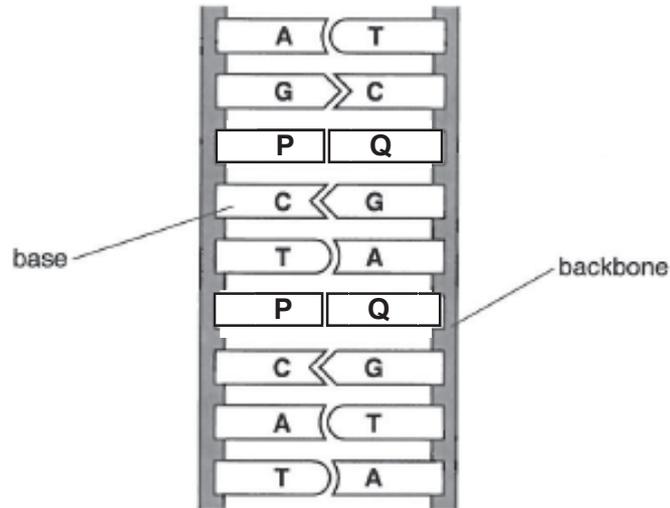
Fig. 5.1

(i) State what the letters **A**, **T**, **G** and **C** represents. [2]

A ……………………………………………………

T ……………………………………………………

G ……………………………………………………

C ……………………………………………………

(ii) Use the information given in Fig. 5.2 to explain how creating the two artificial nucleotides, **P** and **Q**, leads to more different types of proteins produced. [2]

natural DNA

only 20 different types of proteins produced (only some examples shown here)

DNA with artificial nucleotides

more than 20 different types of proteins produced (only some examples shown here)

Fig. 5.2

……………………………………………………………………………......

……………………………………………………………………………......

……………………………………………………………………………......

……………………………………………………………………………......

11

(b) Niemann-Pick disease is a rare genetic disorder that causes the nervous system and the muscular system to degenerate from birth. Children born with this disease inherited defective genes from their parents.

Fig. 5.3 describes how the defective genes of the parents are passed on to the children.

Fig. 5.3

(i) Using suitable letters, suggest the genotype of the   [2]

father ……………………………………

child …………………………………………

12

(ii) Explain why the parents are not affected by the disease. [1]

…………………………………………………………………………........

…………………………………………………………………………........

(iii) Use a genetic diagram to work out the chance of the child having Niemann-Pick disease. [3]

Section B [20 marks]
Answer **any 2** of the 3 questions.
Write your answers in the spaces provided.

6 **(a)** Fig. 6.1 shows a section through an alveolus and an adjacent blood capillary in a human lung.

The arrows shows the passage of oxygen.

Fig. 6.1

Using Fig. 6.1, describe and explain how oxygen is rapidly absorbed into the blood.
Suggest how the absorption and transport of oxygen will be affected by cigarette smoke.

[6]

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

14

(b) Oxyhaemoglobin is formed when oxygen binds to haemoglobin.

Fig. 6.2 shows how the concentration of oxyhaemoglobin changes during exercise.
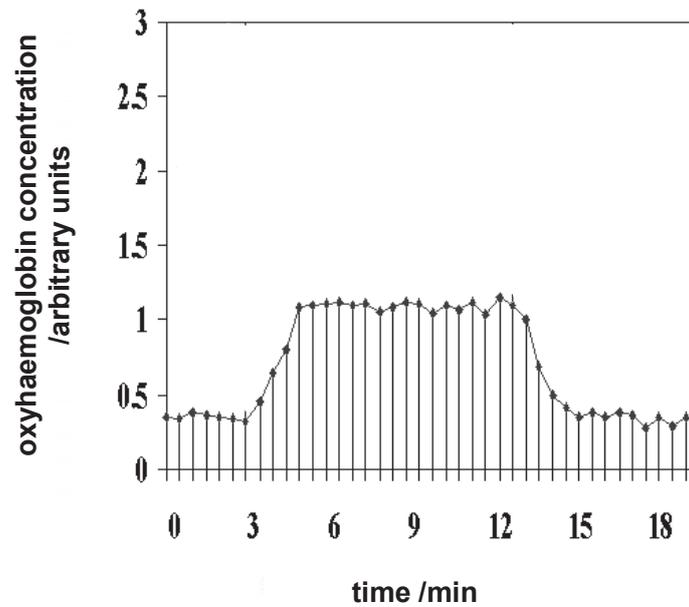

Fig. 6.2

Explain why the concentration of oxyhaemoglobin in blood rises and falls as shown in Fig 6.2. [4]

....

....

....

....

....

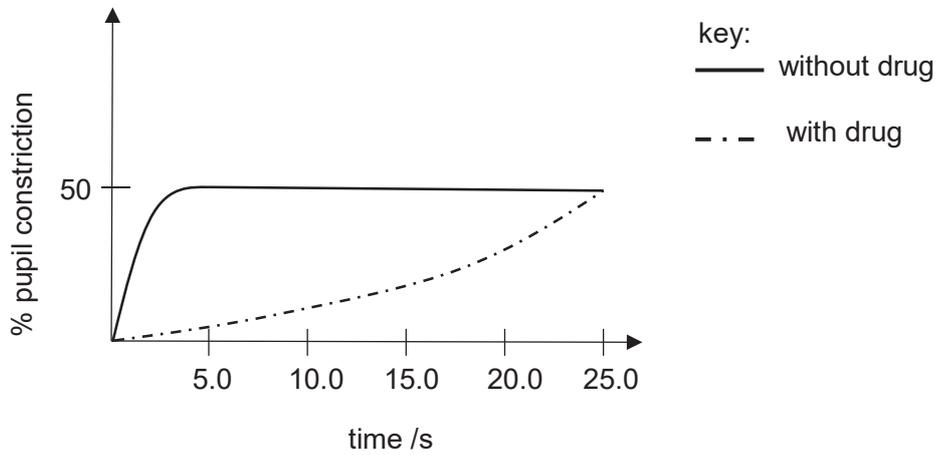...

7 (a) Fig. 7.1 shows how a human eye responds to bright light with and without the administration of a drug, which targets the circular muscles.

key:
—— without drug

– · – with drug

Fig. 7.1

Using Fig. 7.1 and your knowledge of the eye and the nervous system, describe how the eye's response to bright light differs with and without the drug. [6]

....

....

....

....

....

....

....

....

....

....

(b) The change in pupil size is an example of a reflex action. Describe, using an example, how this differs from an action controlled by conscious thought.
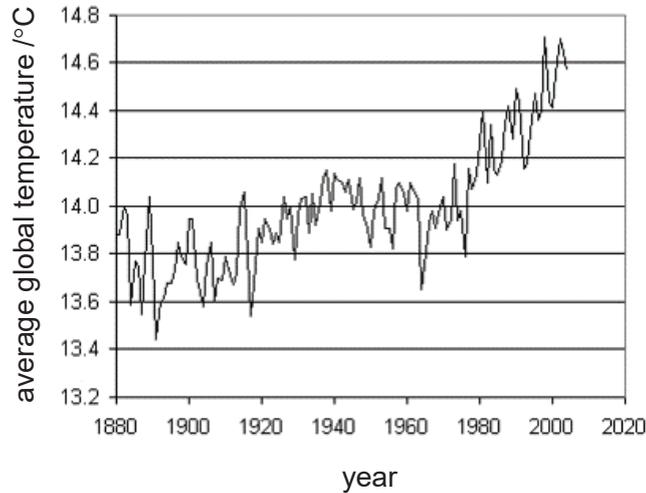
[4]

....

....

....

....

....

....

8 **(a)** Fig. 8.1 shows the change in average global temperature from 1880 to 2004.

Fig. 8.1

One of the main cause of the current global warming trend is the increase in carbon dioxide emission caused by human activities.

Suggest possible reasons for the trend in average global temperature shown in Fig. 8.1 and explain the effect increasing carbon dioxide emission will have on the carbon cycle. [6]

....

....

....

....

....

....

....

....

....

....

(b) Scientists are carrying out trials of 'carbon farming', where large masses of the jatropha plant, which absorbs and stores large amounts of carbon dioxide are grown.

Using your knowledge of carbon sinks, suggest how this may reduce global warming. [4]

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

- End of Paper -

21	A	26	D	31	A	36	D
22	B	27	C	32	D	37	D
23	B	28	A	33	A	38	C
24	B	29	B	34	B	39	C
25	D	30	C	35	B	40	A

Section A [45 marks]
Answer all the questions in the spaces provided.
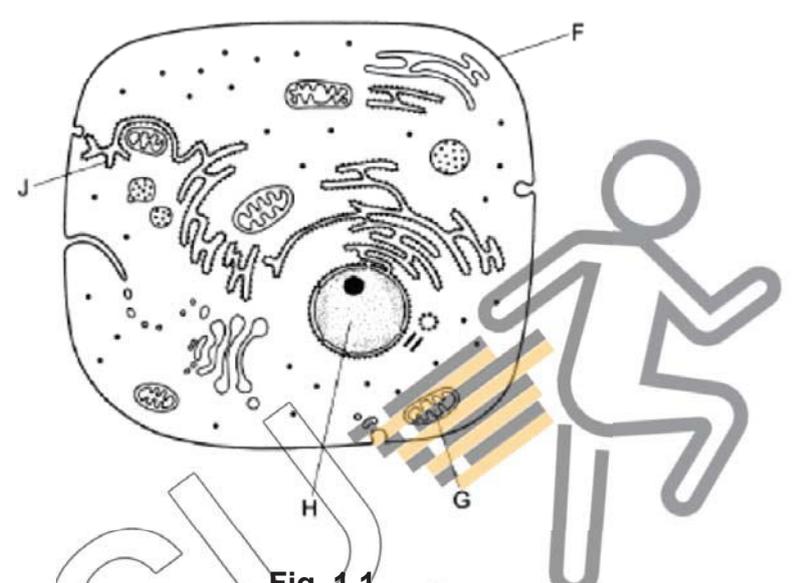
1	(a)	Fig. 1.1 shows an animal cell.		
		Fig. 1.1		
	(a)	Name the following labelled organelles as shown in Fig. 1.1.		[2]
		(i)	**G mitochondrion [1]**	
		(ii)	**H nucleus [1]**	
	(b)	State the function of the organelles labelled		[2]
		(i)	**F controls movement of substances in and out of cell [1]**	
		(ii)	**G site where energy is released / site of aerobic respiration [1]**	
			Reject: 'produce energy'	

2

	(c)	Table 1.1 shows the number of organelle **G** in different types of cells.			

cell type	red blood cell	muscle cell	skin cell
number of mitochondria / arbitrary units	0	1400	200

Table 1.1

		(i)	Suggest why the red blood cell contains no organelle **G**. [1]

Red blood cell has no cytoplasm and organelles in order to contain more haemoglobin. [1]
or
Red blood cells exchange substances with its surroundings through <u>passive transport</u> and hence do not carry out aerobic respiration. [1]

		(ii)	Suggest why the number of organelle **G** between muscle cells and skin cells differ in great numbers. [1]

Muscle cells has many more organelle G than skin cells as they carry out more aerobic respiration to meet the cells' energy needs. [1]
or
Muscle cells require more energy for movement. [1]

2	(a)	Fig. 2.1 shows an experimental set-up. The height of the liquid level in the capillary tube was measured at regular time intervals and recorded in Table 2.1.

capillary tube
liquid level

Visking tubing
sugar solution **X**
sugar solution

Fig. 2.1

3

Time /minutes	Height of liquid level in capillary tube /mm
0	20
30	22
60	25
90	29
120	34

Table 2.1

(i) On the grid provided on the next page, plot a graph of height of liquid in capillary tube against time using the results in Table 2.1.

On your graph, use appropriate scales, label the axes and draw a curve of best fit. [4]

Mark points:
Correct scaling - at least ¾ of graph paper [1]
Correct axes with labels and units [1]
All points plotted correctly [1]
All points joined with a smooth curve, with no extension past points [1]

(ii) With reference to the shape of the graph you have drawn in part **(i)**, suggest an appropriate sugar concentration for sugar solutions **X** and **Y**: [2]

sugar solution **X**: __40__ % sugar [1]

sugar solution **Y**: __10__ % sugar [1]

accept any answer that shows sugar solution Y has higher water potential, provided difference is not too narrow (less than 5%)

(iii) Explain your answer for part **(ii)** above. [3]

The height of the liquid level in the capillary tube increased, suggesting that water molecules moved from sugar solution Y to sugar solution X by osmosis [1].
During osmosis, water molecules move from a region of higher water potential to that of a lower water potential [1].
Hence the concentration of sugar solution X is higher than that of Y [1]

Mark points:
Suggests osmosis has occurred [1]

		Suggests movement of water molecules from higher water potential to lower [1] Compares sugar concentration/water potential of X and Y [1]

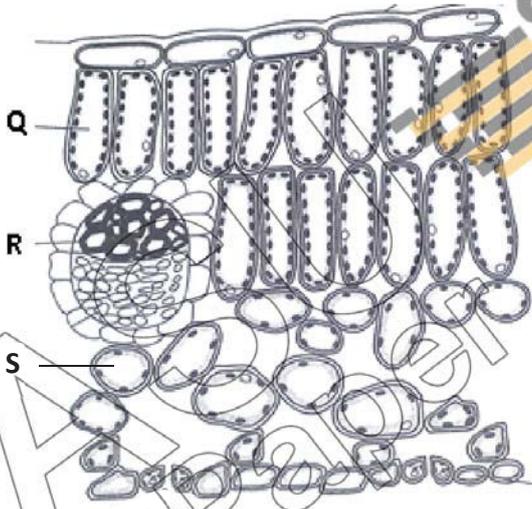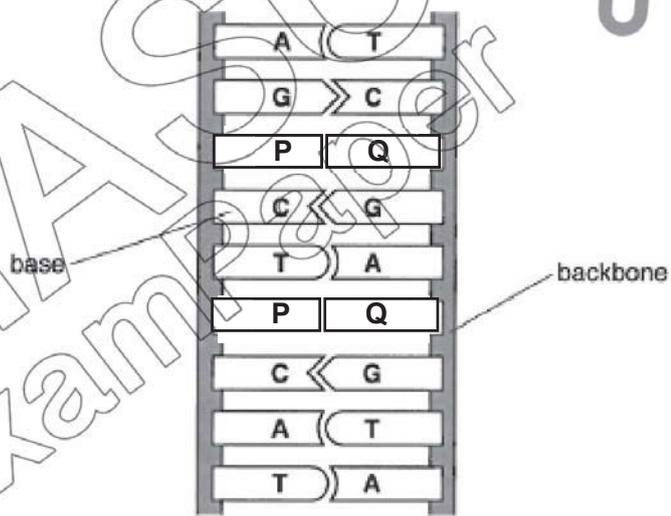| **3**		The enzyme lipase digests fat molecules. During this process acids are formed which decrease the pH of the mixture. Four different tubes, **A**, **B**, **C**, **D** and **E** were set up to investigate the effect of lipase on fat in different conditions. The initial pH of each mixture was pH 8.0. Table 3.1 shows the results obtained.

tube	condition				pH of mixture after 10 min
	amount of lipase added /mg	amount of fat added /mg	amount of substance **P** added /mg	temperature /°C	
A	0	4	0	37	8.0
B	0	4	5	37	8.0
C	10	4	5	37	5.5
D	10	4	0	37	7.0
E	10	4	5	75	**8.0 [1]**

Table 3.1

(a)	Based on the results in Table 3.1, list the conditions necessary for most fat digestion. [3] **lipase [1], substance P/bile [1], temperature of 37°C [1]** omits value for temperature – deduct ½ m

(b)	Identify substance **P**. [1] **bile [1]**

(c)	Name and describe the process involved when substance **P** is added to fats. [2] **Emulsification [1]** **Big fat globules are broken up into smaller fat droplets [1]** Omits name but states 'emulsifies' – award 0.5m

5

	(d)	Complete Table 3.1 by filling in an appropriate pH value for test tube **E**. [1]
	(e)	Explain your answer for part **(d)** above. [2]
		Lipase was denatured at 75°C, losing its active sites [1]
		No enzyme-substrate complex formed as shape of enzyme active site changed and is no longer complementary with that of the substrate. [1]
	(f)	State the end-product(s) of fat digestion. [1]
		fatty acids [0.5] and glycerol [0.5]
4		Fig. 4.1 shows the internal structure of a dicotyledonous green leaf.

Fig. 4.1

	(a)	Name the parts labelled **Q** and **R**. [2]
		Q palisade mesophyll cell [1]
		R xylem [1]
	(b)	Describe and explain how chloroplast distribution differs between cell **Q** and cell **S**. [3]
		There are more chloroplasts in cell Q than S [1]
		Cell Q is nearer to the upper epidermis [0.5] and hence gain more sunlight than cell S [0.5]

			This leads to increased rate of photosynthesis as more light is trapped by chlorophyll for conversion of light energy into chemical energy. [1]	
	(c)		State the process by which carbon dioxide gas from the surroundings reaches cell **Q**. [1]	
			diffusion [1]	
	(d)		Describe and explain two ways in which cell **R** is adapted to its function. [4]	
			Long and hollow (with no protoplasm and 'end-walls') [1] **This reduces resistance to water flowing through the xylem vessel / ensure there is no obstruction to water flow[1]** **Walls are thickened with lignin [1]** **To prevent collapse of the vessel / provide mechanical support [1]**	
5	**(a)**		A group of scientists created 2 artificial nitrogenous bases, named **P** and **Q**. Fig. 5.1 shows a segment of DNA containing the artificial nitrogenous bases. **Fig. 5.1**	
		(i)	State what the letters **A**, **T**, **G** and **C** represents. [2] **A** <u>adenine [0.5]</u> **T** <u>thymine [0.5]</u> **G** <u>guanine [0.5]</u> **C** <u>cytosine [0.5]</u>	

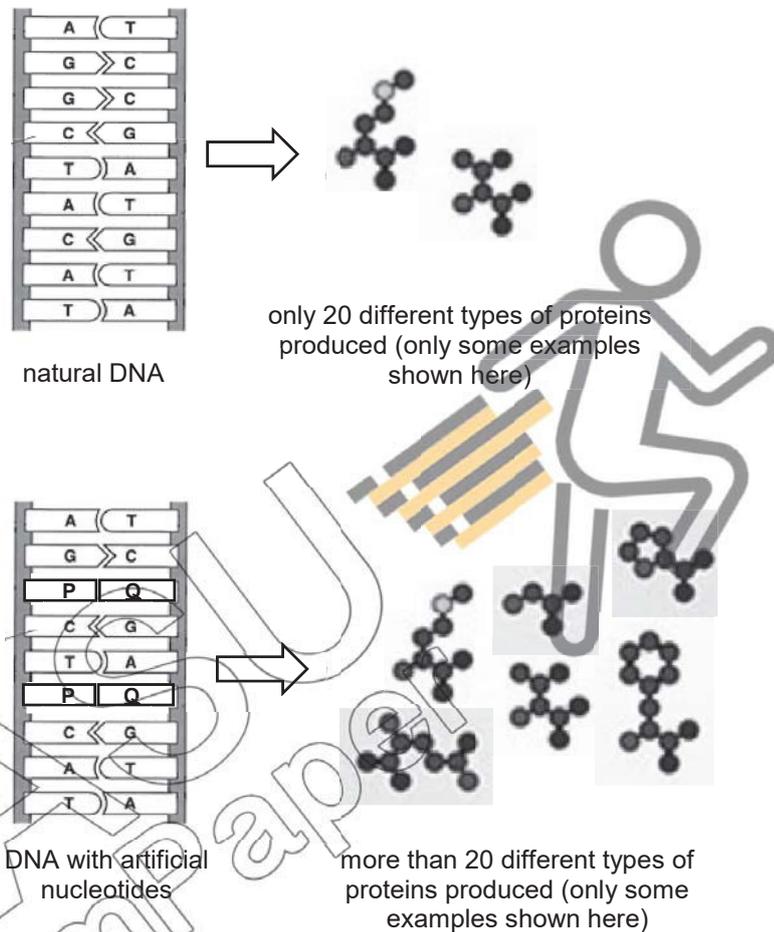| | | **(ii)** | Use the information given in Fig. 5.2 to explain how creating the two artificial nucleotides, **P** and **Q**, leads to more different types of proteins produced. [2] |

Fig. 5.2

Nitrogenous bases form part of a nucleotide molecule [0.5], where many are joined together to form a gene [0.5]
Since each gene codes for a specific protein [0.5], creating two new nitrogenous bases will lead to more diversity of genes with different nucleotide sequence and hence more diverse selection of proteins. [0.5]

mark points:
mentions gene codes for protein [1]
mentions more variety of nucleotides leads to increased variety of genes [1]

	(b)	Niemann-Pick disease is a rare genetic disorder that causes the nervous system and the muscular system to degenerate from birth. Children born with this disease inherited defective genes from their parents. Fig. 5.3 describes how the defective genes of the parents are passed on to the children.	
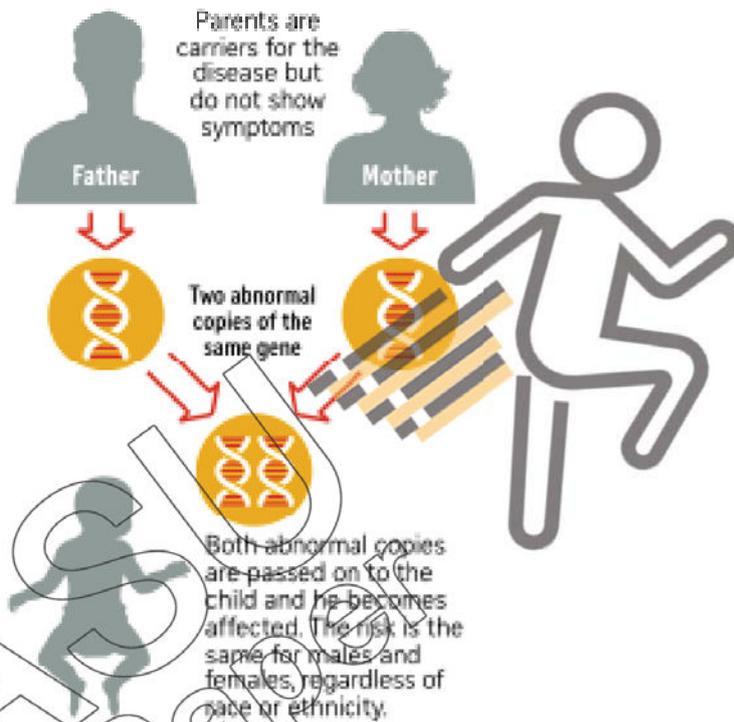
Fig. 5.3

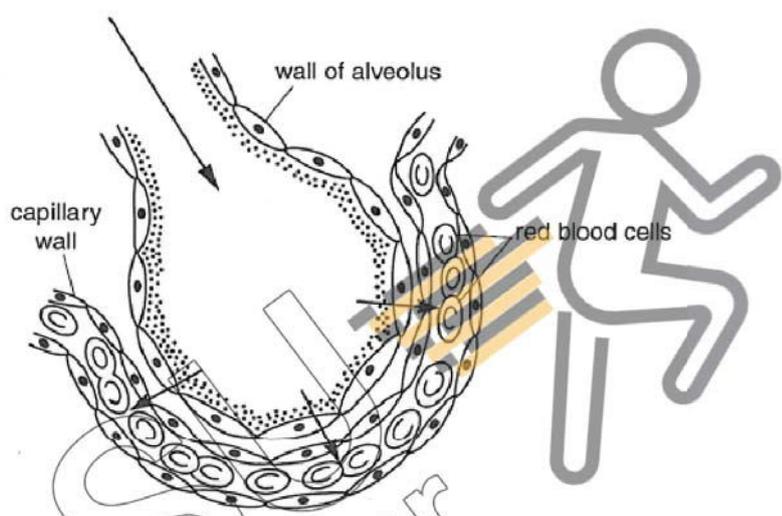|				
		(i)	Using suitable letters, suggest the genotype of the	[2]
			father **Nn [1]**	
			child **nn [1]**	
		(ii)	Explain why the parents are not affected by the disease.	[1]
			Both parents are heterozygous for the trait [1] and hence disease is not expressed.	

9

		(iii)	Use a genetic diagram to work out the chance of the child having Niemann-Pick disease. [3]

Phenotype of parents   healthy   X   healthy
Genotype of parents   Nn   X   Nn   ⎤ **1m**
Gametes   Ⓝ   ⓝ   Ⓝ ⓝ

Genotype of offspring   NN   Nn   Nn   nn
Phenotype of offspring   healthy healthy   healthy   diseased
Phenotypic ratio   3 healthy : 1 diseased

   1m

∴ **The child has a 25% chance of having Niemann-Pick disease.** [1]

Replaced genetic cross diagram with Punnet square – max 2 m

Answer **any 2** of the 3 questions.
Write your answers in the spaces provided.

6	(a)	Fig. 6.1 shows a section through an alveolus and an adjacent blood capillary in a human lung.
		The arrows shows the passage of oxygen.
		 Fig. 6.1
		Using Fig. 6.1, describe and explain how oxygen is rapidly absorbed into the blood. Suggest how the absorption and transport of oxygen will be affected by cigarette smoke. [6] Any 2 of: **Wall of alveolus is one cell thick [1] to provide a short diffusion distance for gases, hence ensuring a faster rate of diffusion. [1]** **A thin film of moisture covers the inner surface of the alveolus [1] to allow gases to dissolve in it. [1]** **Walls of alveoli are richly supplied with blood capillaries [1] so that the flow of blood in the capillaries maintains the concentration gradient of gases. [1]** Max 4m for above **Tar [0.5] in cigarette smoke increases the risk of emphysema, reducing gaseous exchange in the alveoli [0.5]** **Carbon monoxide [0.5] in cigarette smoke binds irreversibly with haemoglobin to form carboxyhaemoglobin, reducing ability of red blood cells to carry oxygen. [0.5]**

11

(b) Oxyhaemoglobin is formed when oxygen binds to haemoglobin.

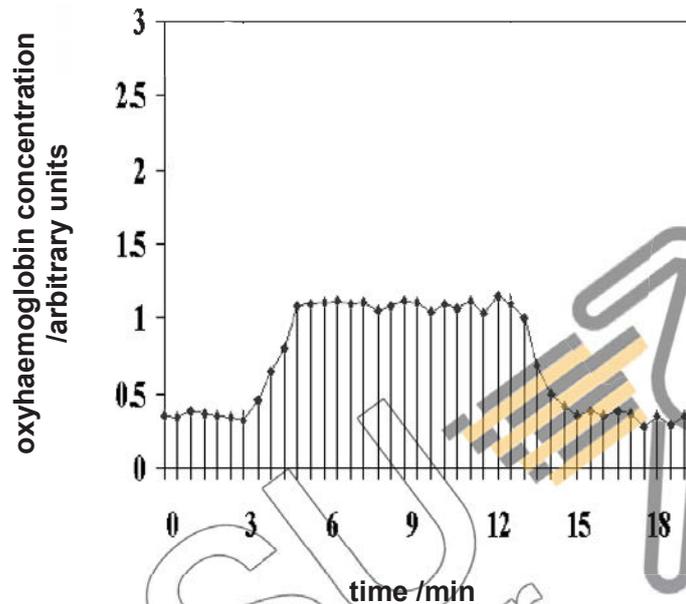Fig. 6.2 shows how the concentration of oxyhaemoglobin changes during exercise.
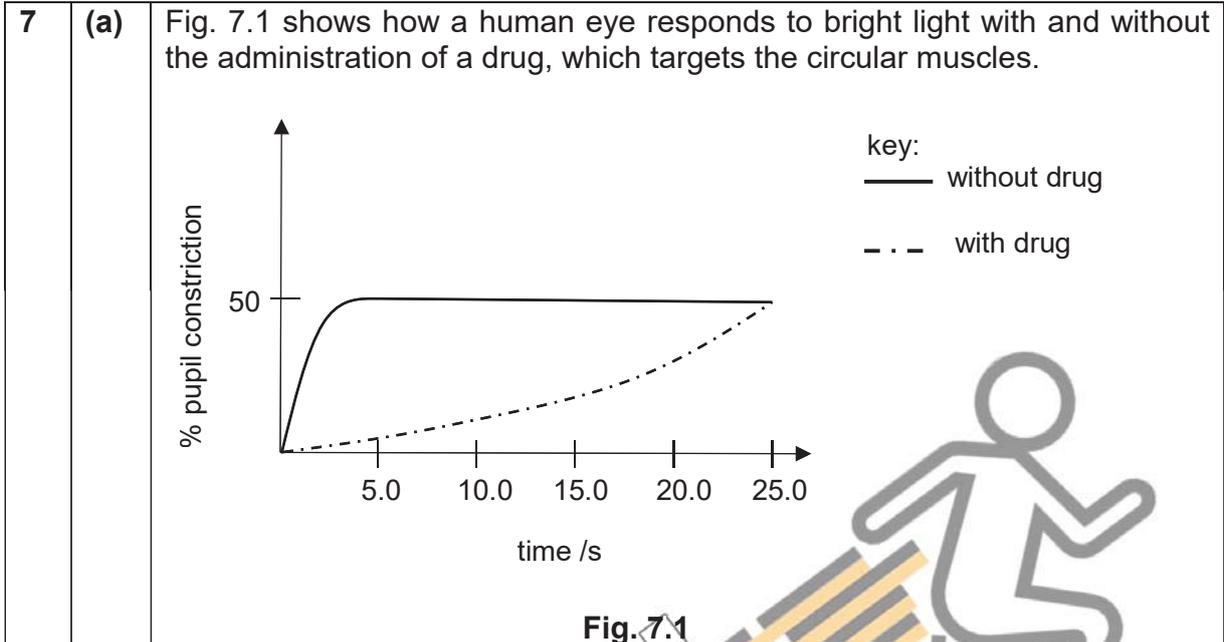

Fig. 6.2

Explain why the concentration of oxyhaemoglobin in blood rises and falls as shown in Fig 6.2. [4]

During exercise, more energy is needed due to increased muscle contractions [1]
Hence more oxygen is taken in to increase aerobic respiration (so as to meet the increased demand for energy) [1],
leading to a rise in oxyhaemoglobin concentration.
After exercise, oxyhaemoglobin concentration remains high as oxygen is taken in to repay oxygen debt incurred during exercise [1].
It slowly decreases to original levels when oxygen debt is fully repaid [1].

Other mark points for consideration:
Explains how oxyhaemoglobin increases due to more oxygen binding to haemoglobin – 1m
Mentions 'stopped exercising/body resting/recovering from exercise' – award 0.5 m

12

7	(a)	Fig. 7.1 shows how a human eye responds to bright light with and without the administration of a drug, which targets the circular muscles.
		Fig. 7.1
		Using Fig. 7.1 and your knowledge of the eye and the nervous system, describe how the eye's response to bright light differs with and without the drug. [6]

key:
——— without drug
– · – with drug

Fig. 7.1

Using Fig. 7.1 and your knowledge of the eye and the nervous system, describe how the eye's response to bright light differs with and without the drug. [6]

When the drug was administered, the pupil took a longer time, 25s to constrict 50% of its size, compared to without drug, 2.5s. [1]
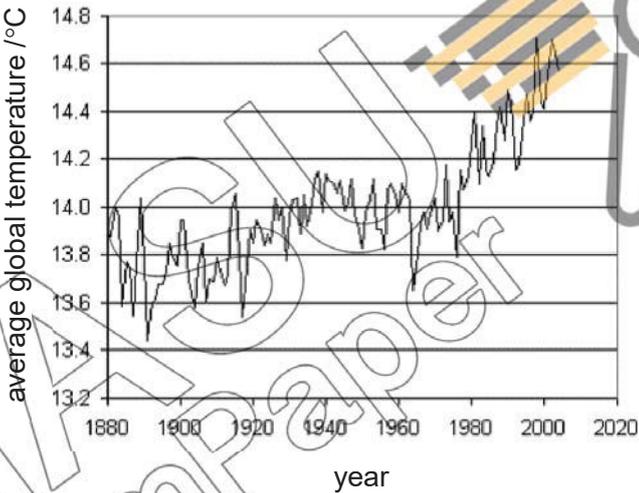
In bright light, an increase in light intensity stimulates the photoreceptors in the retina, which then produce nerve impulses. [1]
The optic nerve transmits the nerve impulses to the relay neurone in the brain [0.5], which then transmits the nerve impulses to the motor neurone. [0.5]
The motor neurone transmits the nerve impulses from the brain to the effector, muscles of iris. [1]
The circular muscles contract and the radial muscles relax [0.5]. The pupil constricts, reducing the amount of light entering the eye. [0.5]

In the presence of the drug, the nerve impulses are transmitted to the muscles of the iris, but the circular muscles are slower to react/impaired, causing pupil to take a longer time to constrict. [1]

13

	(b)	The change in pupil size is an example of a reflex action. Describe, using an example, how this differs from an action controlled by conscious thought. [4] **An example of an action controlled by conscious thought is the raising of a hand to switch on of the lights in a room. [1]** **The pupil reflex is involuntary in nature, while the raising of the hand is voluntary in nature. [1]** **The raising of the hand is not as fast in response as the pupil reflex. [1]** **In the pupil reflex, the same stimulus always result in same response, while in the raising of the hand, same stimulus may produce different responses. [1]**
8	**(a)**	Fig. 8.1 shows the change in average global temperature from 1880 to 2004. **Fig. 8.1**
		One of the main cause of the current global warming trend is the increase in carbon dioxide emission caused by human activities. Suggest possible reasons for the trend in average global temperature shown in Fig. 8.1 and explain the effect increasing carbon dioxide emission will have on the carbon cycle. [6] **An increase in combustion of fossil fuels leads to an increase in carbon dioxide levels in the atmosphere, causing an increase in global temperature [1]** **An increase in deforestation results in less trees available for photosynthesis [1], hence more carbon dioxide accumulates in the atmosphere, causing an increase in global temperature [1].**

14

		The increasing carbon dioxide emission causes an imbalance in the carbon cycle [1] as the amount of carbon dioxide released into the atmosphere by combustion, respiration and decomposition [1] exceeds that absorbed by photosynthesis [1].
	(b)	Scientists are carrying out trials of 'carbon farming', where large masses of the jatropha plant, which absorbs and stores large amounts of carbon dioxide are grown. Using your knowledge of carbon sinks, suggest how this may reduce global warming. [4] **Carbon sinks are areas that store more carbon compounds than it releases, for an indefinite period [1].** **Plants absorb carbon dioxide for photosynthesis, through which carbon compounds are formed [1].** **When the plants die, their remains may be buried deep in the ground and form fossil fuels after millions of years [1].** **As such, since the jatropha plant absorbs and stores large amounts of carbon dioxide, large masses of it may function as a carbon sink and help reduce global warming [1].**

- End of Paper -

310