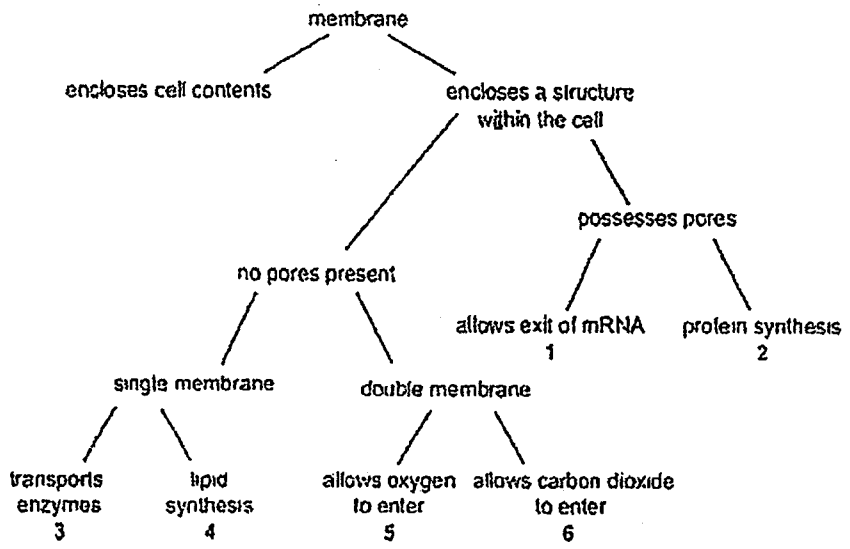
1 Membranes within and at the surface of cells have different roles

The diagram allows the identification of the various organelles within the cell, by describing the membrane structure and function.



Which of the outcomes shown below correctly identifies the organelles that possess the membrane and function concerned?

	1	2	3	4	5	6
A	chloroplast	vesicle	smooth ER	rough ER	nucleolus	mitochondrion
B	nucleus	rough ER	vesicle	smooth ER	nucleolus	mitochondrion
C	nucleus	rough ER	vesicle	smooth ER	mitochondrion	chloroplast
D	nucleus	smooth ER	mitochondrion	rough ER	vesicle	chloroplast

2 The table below shows the chemical elements present in four substances.

Which substance, A, B, C or D could be cellulose?

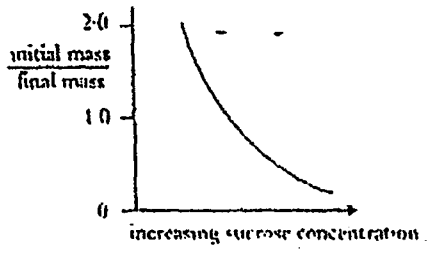
√= present X = absent

substance	carbon	hydrogen	nitrogen	oxygen
A	√	√	√	X
B	√	√	X	√
C	√	√	√	√
D	√	X	√	√

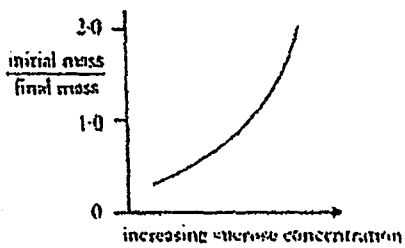
3 Equal sized pieces of potato were weighed then placed in different concentrations of sucrose. After 24 hours the potato pieces were removed and reweighed For each potato piece the initial mass divided by the final mass was calculated.

Which graph correctly represents the change in initial mass divided by final mass which would be expected as the concentration of sucrose increases?

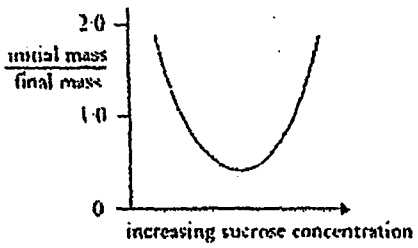
A



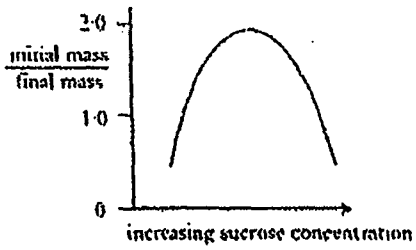
C



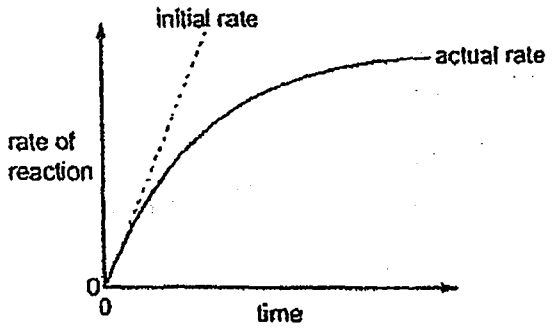
B



D



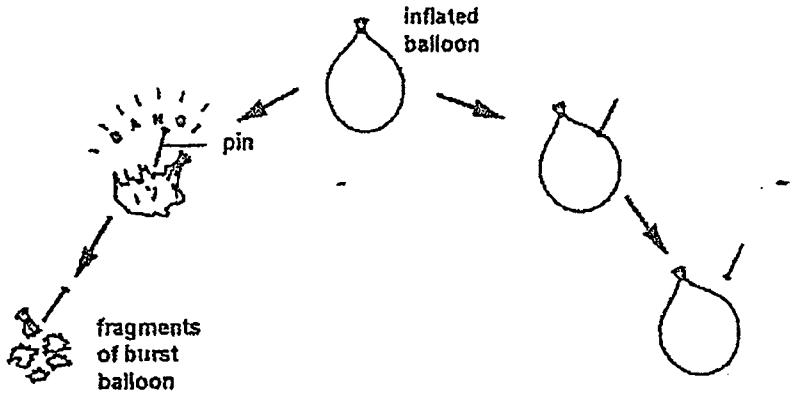
4 A fixed volume of the enzyme catalase was added to a fixed volume of hydrogen peroxide solution. The diagram shows how the rate of the reaction changed over the course of the reaction.



Why did the actual rate of reaction decrease over time?

A The enzyme active sites become saturated.
B The enzymes were denatured.
C The products were all formed
D The substrate molecules were used up.

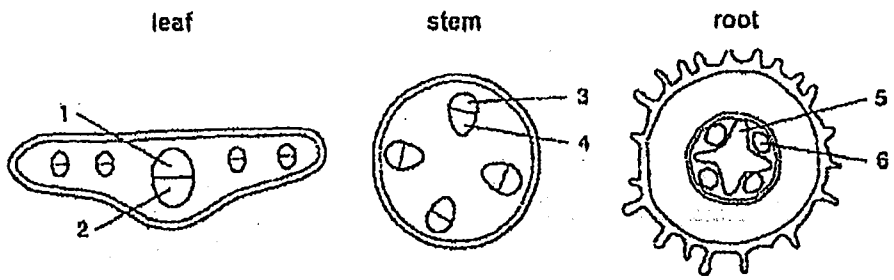
5 The figure below represents the action of an enzyme.



What is represented by the inflated balloon and the fragments of burst balloon?

	inflated balloon	fragments of burst balloon
A	enzyme	product
B	enzyme	substrate
C	substrate	enzyme
D	substrate	product

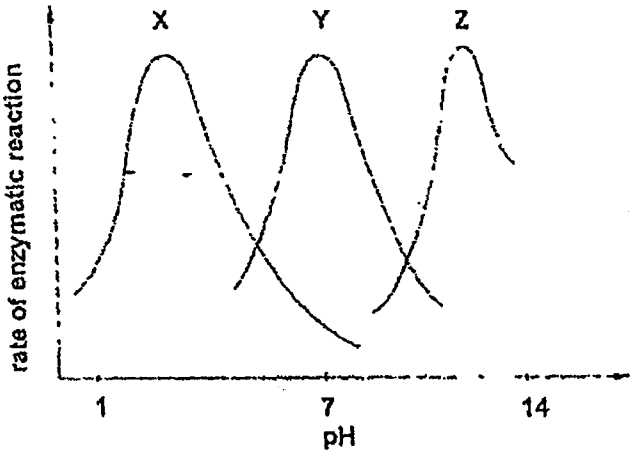
6 The diagram shows sections from a leaf, stem and root of a plant.



The plant is exposed to carbon dioxide containing radioactive carbon-14.
In which tissues would you expect to find radioactive carbon-14 after 2 days?

A 1, 3 and 6
B 1, 4 and 5
C 2, 3 and 6
D 2, 4 and 5

7 The following graph shows the effect of pH on the rate of reaction of three enzymes, X, Y and Z.



Each of these enzymes was extracted from a region of the alimentary canal of a mammal. Which of the following combinations states the correct area where each enzyme was extracted?

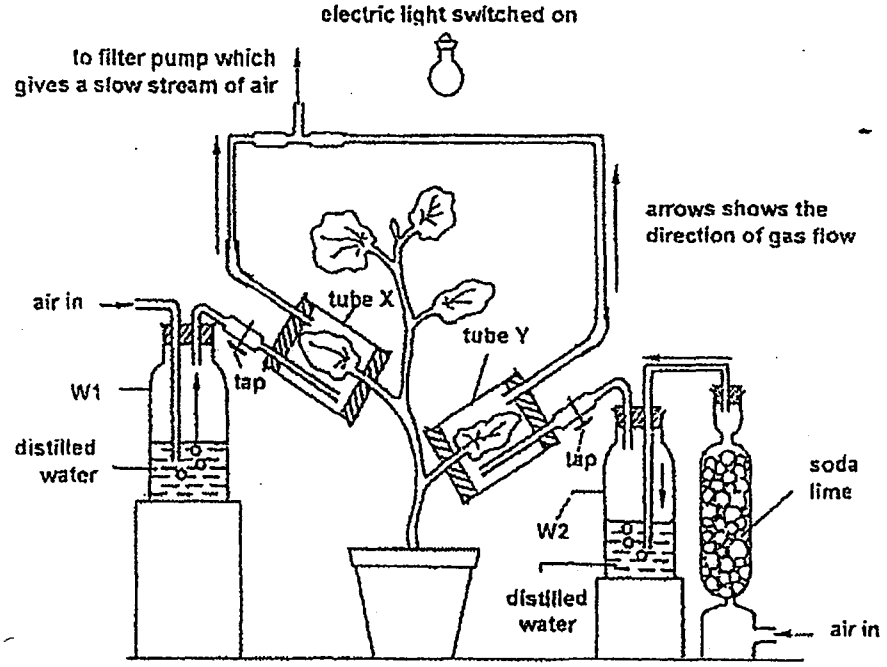
	X	Y	Z
A	small intestine	salivary gland	stomach
B	stomach	salivary gland	small intestine
C	small intestine	stomach	salivary gland
D	liver	stomach	gall bladder

8 Which of the following statements is correct?

A Carbohydrates makes up the main component in cell membranes.
B Fats are the main energy source.
C Proteins are important in the production of antibodies.
D Water is not an essential nutrient.

Refer to the information and diagram below for Questions 9 and 10

An experiment is set up as shown in the diagram below to investigate factors essential for photosynthesis



The taps can be used to regulate the flow of gas through tubes X and Y W1 and W2 both contain distilled water. The plant is continuously illuminated and regularly watered. Prior to setting up the experiment, the plant has been kept in a dark cupboard for three days.

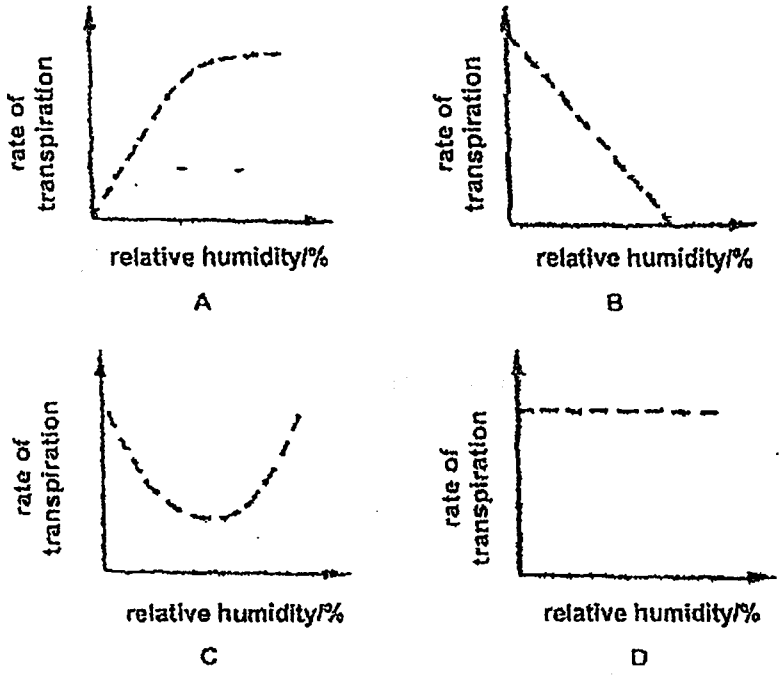
9 Which factor essential for photosynthesis is being investigated in this experiment?

A light only
B carbon dioxide only
C carbon dioxide and light
D carbon dioxide and water

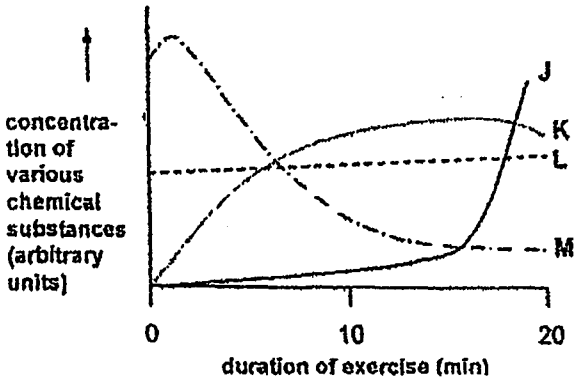
10 What modifications would you make to the experimental set up to investigate the effect of light on the process of photosynthesis?

A black out tube X
B black out tube X and Y
C remove soda lime tower and black out tube X or Y
D remove soda lime tower and black out tube X and Y

11 Which one of the following graphs most closely represents the relationship between the rate of transpiration of a leaf and relative humidity?



12 The graph below shows the changes in concentrations of various chemical substances in the thigh muscles of a person exercising vigorously.



Which of the following statements is correct?

A Line J represents glycogen.
B Line M represents lactic acid.
C Line L represents oxygen.
D Line K represents carbon dioxide.

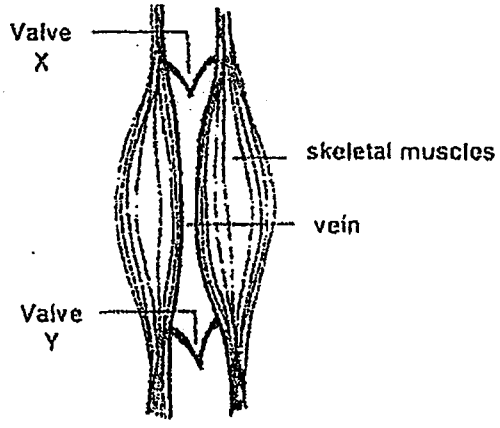
13 Which of the following correctly describes the state of the muscles and the relative pressure when breathing in?

	external intercostal muscles	*diaphragm*	*pressure inside lung compared to atmospheric pressure*
A	contracted	contracted	lower
B	contracted	contracted	higher
C	relaxed	contracted	higher
D	relaxed	relaxed	higher

14 The table shows the blood groups of four people and the type of blood each received in a transfusion.
Which person is at risk from agglutination?

	blood group	*blood type received in transfusion*
A	A	O
B	B	AB
C	AB	B
D	O	O

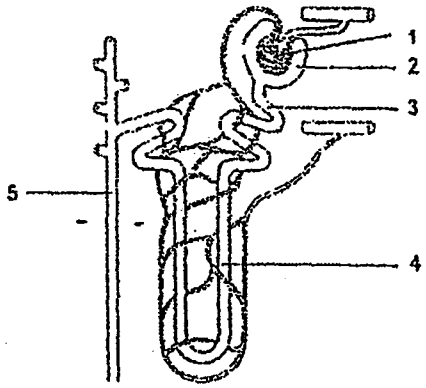
15 The diagram below illustrates a small portion of a vein and its neighbouring skeletal muscles.



Which of the following combinations shows the state of the muscle with the corresponding situations of valves X and Y?

	Skeletal muscle	*Valve X*	*Valve Y*
A	contraction	open	closed
B	contraction	closed	open
C	relaxation	open	closed
D	relaxation	open	open

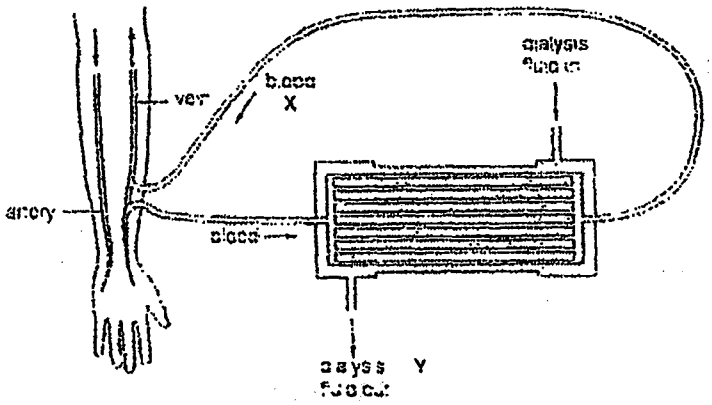
16 The diagram below shows the internal structure of a kidney



Which of the following statements is correct?

A Ultrafiltration takes place at regions 1, 2 and 5.
B The liquid found in region 2 contains water, amino acids, urea, mineral salts and red blood cells.
C Reabsorption of glucose takes place mainly at regions 3 and 4
D Movement of substances in region 4 depends mainly on osmosis.

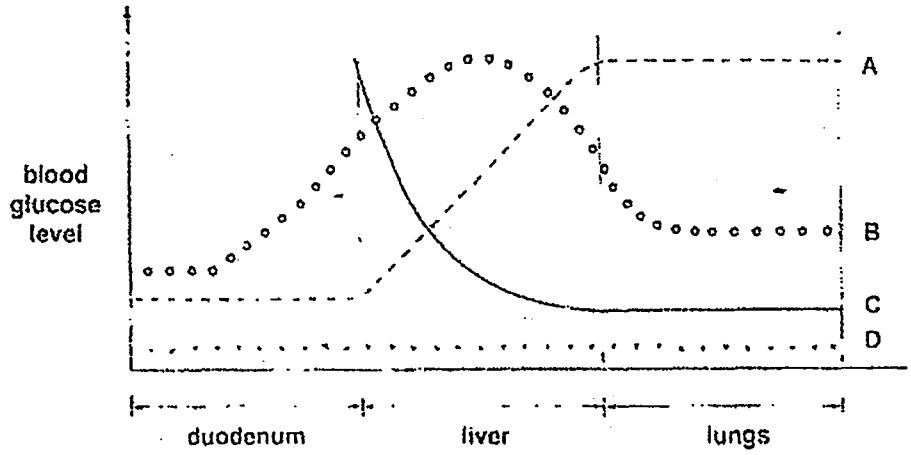
17 The diagram shows the flow of blood and dialysis fluid through a kidney machine.



Which substance will show the greatest difference in concentration between X and Y?

A urea
B glucose
C water
D salts

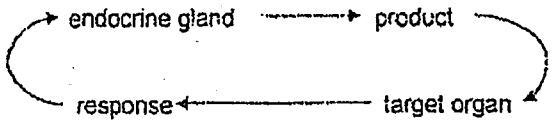
18 Which of the following curves best represents the change in the glucose level of blood flowing through the following organs of a man who has starved for eight hours?



19 Which organ controls the secretion of the hormone insulin and what is the target organ?

	organ that controls secretion	target organ
A	hypothalamus	pancreas
B	pancreas	ileum
C	hypothalamus	skeletal muscles
D	pancreas	liver

20 The diagram below shows the relationship between two organs and the changes/responses they bring about in the body



If the response of the target organ is controlled by negative feedback, then the product (of the endocrine gland)

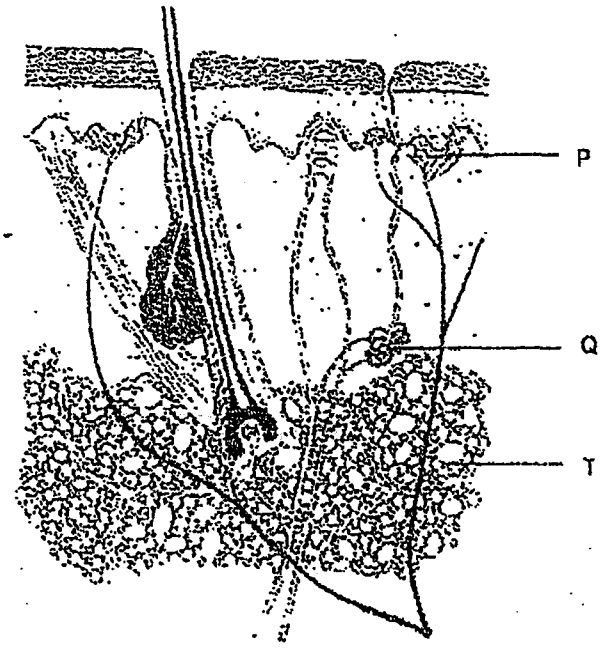
A inhibits the response (of the target organ).

B stimulates a greater response (of the target organ).

C stimulates a greater response (of the target organ) while the response inhibits the secretion of the product

D inhibits the response (of the target organ) while the response (of the target organ) stimulates greater secretion of the product.

21 The diagram below shows a longitudinal section of the skin of a boy



Select the best combination that indicates one function of P, Q and T respectively

	P	Q	T
A	absorbs UV light	reduces evaporation	reduce heat loss
B	detects changes in air temperature	produces sweat	acts as an insulator of heat
C	detects changes in air temperature	reduces evaporation	stores food
D	absorbs UV light	releases water vapour	supplies nutrients to the skin

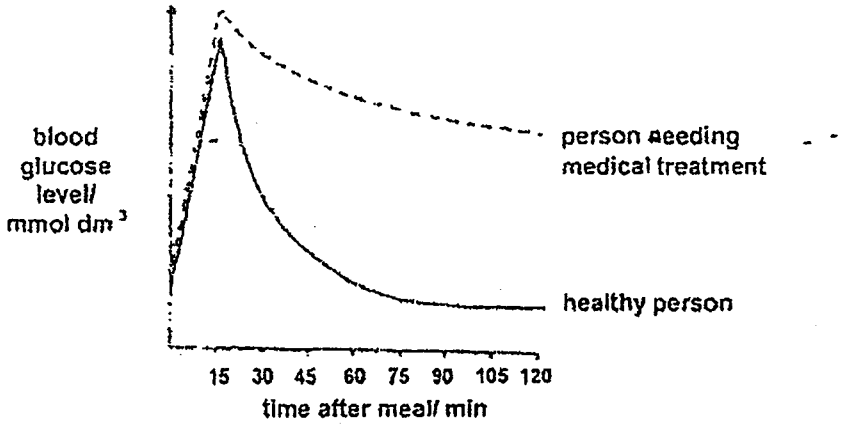
22 Adrenaline is secreted in response to feelings of fear or anger.

Which of the following are effects of the secretion of adrenaline?

i Increased heart rate
ii Constriction of arterioles in the skin.
iii Constriction of arterioles in gut (intestines).
iv Increased conversion of glucose to glycogen

A i and ii only.
B i, ii and iii only
C i, ii and iv only
D i, ii, iii and iv

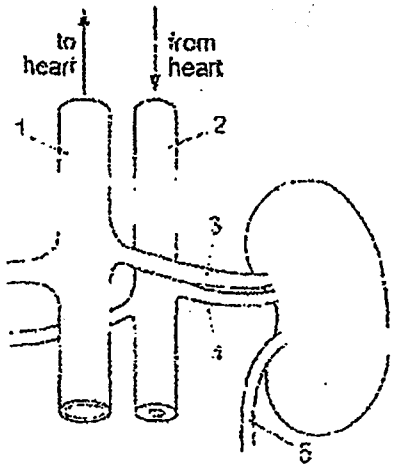
23 The graph shows changes in the blood glucose levels of two people after eating identical meals



What should be the correct medical treatment for person X?

A insulin injections
B blood transfusion
C dialysis by a kidney machine
D increase proteins taken in the diet

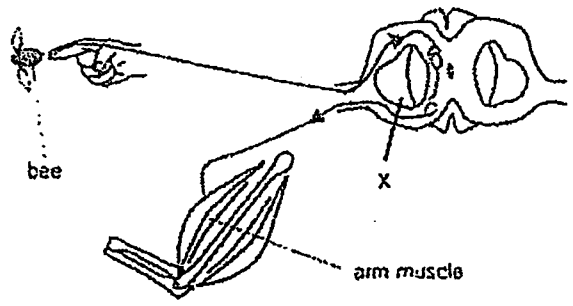
24 The diagram shows a kidney and its associated vessels



Which structures contain liquids with the least and the most concentrations of urea solution?

	least	most
A	1	4
B	2	1
C	3	4
D	3	5

25 The diagram below shows part of the nervous system including a reflex arc. A cut has been made at X.

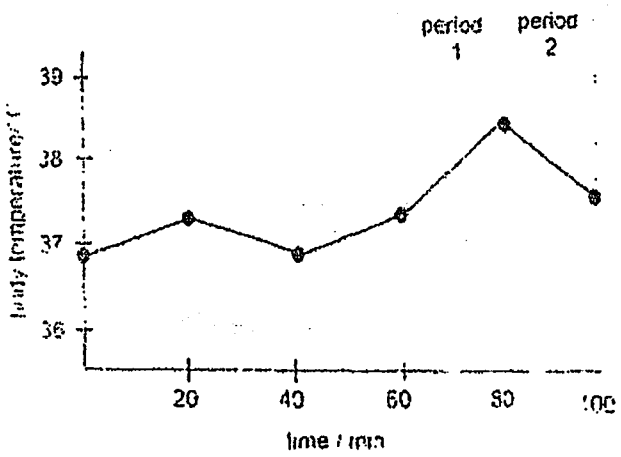


A bee stings the finger as shown.

What are the effects of the sting?

	pain felt	arm moves
A	yes	yes
B	yes	no
C	no	yes
D	no	no

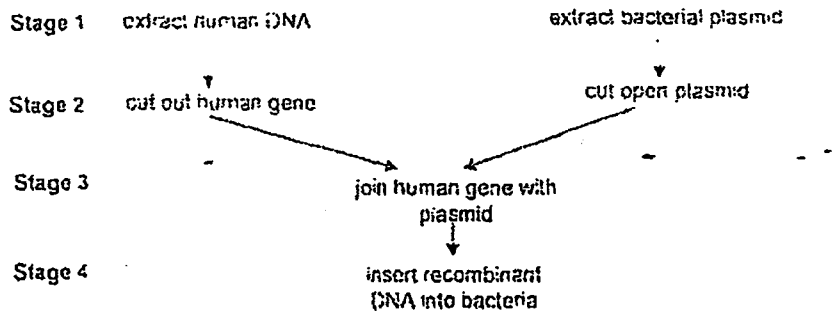
26 The graph below shows the changes in a person's body temperature plotted against time.



What could cause the changes in body temperature in periods 1 and 2?

	period 1	period 2
A	vigorous exercise	increased sweating
B	reduced air temperature	shivering
C	vigorous exercise	increased air temperature
D	reduced air temperature	increased sweating

27 The diagram below outlines part of the process to produce a recombinant DNA containing a human gene



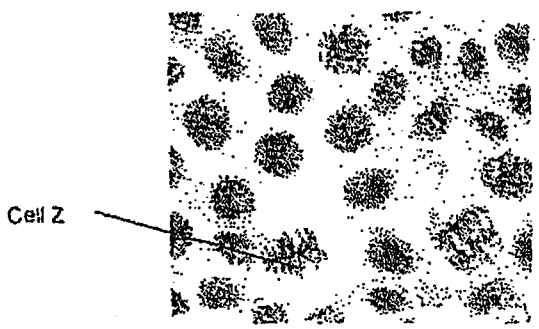
Which of the following correctly identifies the enzymes involved at the different stages?

	restriction enzyme	*ligase*
A	Stage 1 and Stage 2	Stage 3 and Stage 4
B	Stage 2 and Stage 4	Stage 3
C	Stage 1	Stage 4
D	Stage 2	Stage 3

28 A gene

A is a DNA molecule
B is a sequence of nucleotides
C is a chain of amino acids
D consists of a sugar molecule a phosphate group and a base

29 The photomicrograph shows the cells in a onion root tip undergoing cell division



Which of the following statements correctly describes what is occurring in Cell Z?

A DNA is replicating
B Homologous chromosomes are pairing up
C Sister chromatids are separating
D Chromosomes are lining up at the equator

30 Which of the following correctly identifies the type/s of cell division that occur/s in the liver and the testes?

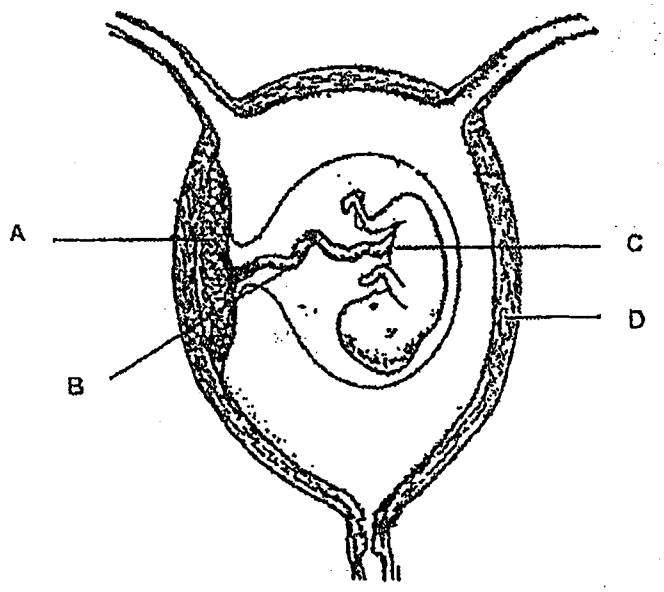
	liver	testes
A	mitosis	mitosis
B	mitosis	mitosis and meiosis
C	meiosis	meiosis
D	meiosis	mitosis and meiosis

31 An experiment was set up using four groups of insect-pollinated flowers in a field. In each group, different parts of the flower were removed as shown below and insects were allowed to visit all the flowers.

Which group would produce most seeds?

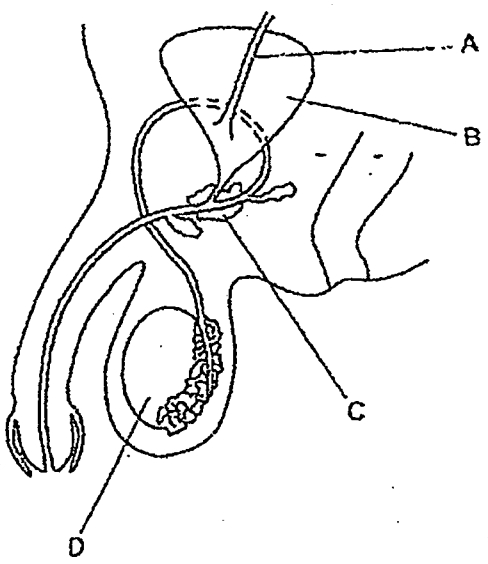
group of flowers	petals	stigmas	anthers
A	left behind	left behind	removed
B	left behind	removed	left behind
C	removed	left behind	left behind
D	removed	removed	left behind

32 The diagram below shows a fetus in a uterus.



Where does exchange of maternal and fetal materials take place?

33 The diagram shows the male reproductive and urinary systems.
Which structure produces the fluid part of semen?



34 Fig. 1 shows the side view of the female reproductive system while Fig. 2 shows the early stages of reproduction in humans.

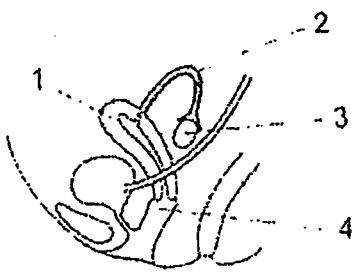


Fig. 1

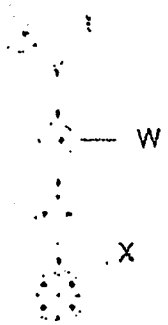


Fig. 2

In which numbered parts of the female reproductive system will the stages W and X be found?

	W	X
A	1	2
B	2	1
C	3	2
D	1	4

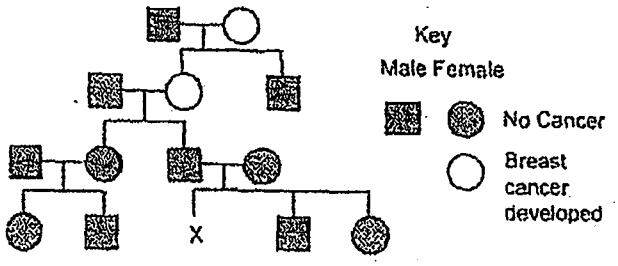
35 A girl has blood group A and her brother has blood group B. Which combination of genotypes cannot belong to their parents?

	mother	father
A	I^AI^O	I^BI^O
B	I^AI^A	I^BI^O
C	I^OI^O	I^AI^B
D	I^AI^B	I^AI^B

36 Which of the following consists of human traits that display discontinuous variation only?

A tongue rolling, ABO blood group, ear lobe (detached)
B height, widow's peak hairline, eye colour
C weight, intelligence, earlobe (detached).
D intelligence, haemophilia (blood unable to clot), ABO blood group

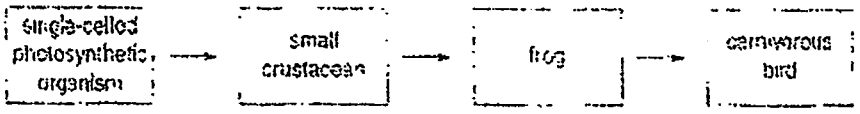
37 The diagram below shows the inheritance of a form of breast cancer associated with the presence of just one allele of the BRCA 1 gene.



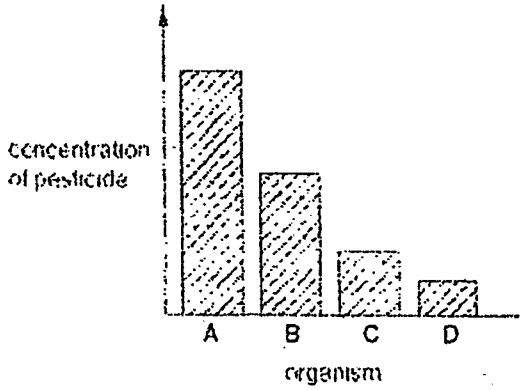
What is the probability that the woman X inherits the BRCA 1 allele that is associated with breast cancer?

A 0.00
B 0.25
C 0.75
D 1.00

38 The diagram shows part of a food chain in a lake

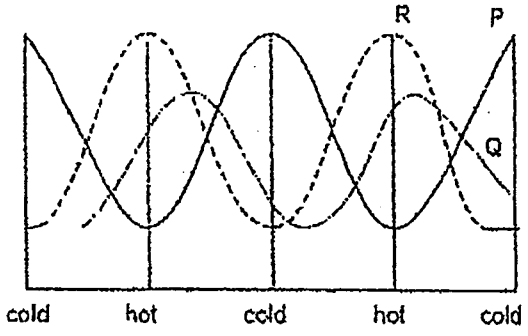


The chart shows the concentration of a pesticide in the bodies of each organism in the chain



Which organism on the chart is the crustacean?

39 In a pond variations in the population of consumers and producers and the amount of mineral salts were measured over a few years The diagram below shows the results



Which statement is not true of the results?

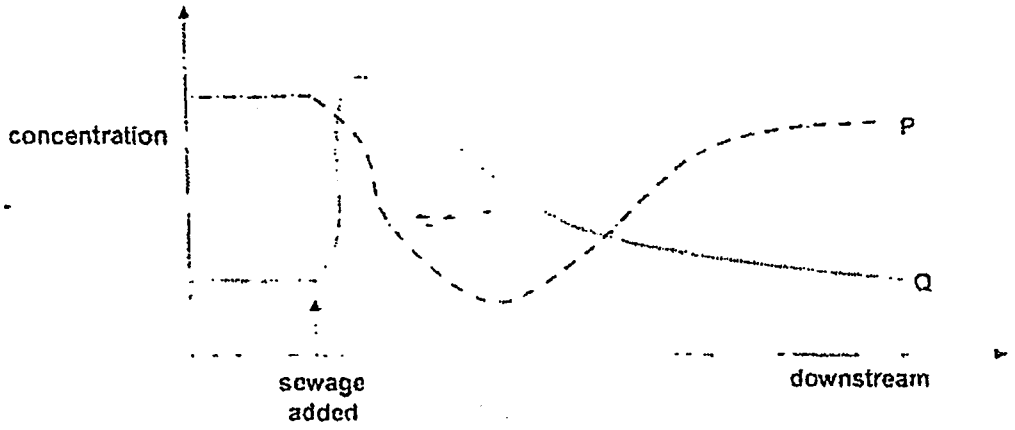
A The amount of mineral salts is represented by graph Q.

B The producer and consumer population show a difference in size

C The producer population increases after mineral salts content increases.

D The consumer graph pattern follows closely behind that of the producer graph pattern.

40 The graph below shows the changes in the concentration of two substances P and Q in the river. Identify P and Q



	P	Q
A	carbon dioxide	nitrogen compound
B	nitrogen compound	carbon dioxide
C	oxygen	nitrogen compound
D	nitrogen compound	oxygen

END OF PAPER

Section A [50 marks]

Answer all the questions in the space provided.

1 Fig. 1.1 is a diagrammatic representation of the small intestine containing three types of food molecule: a fat, a carbohydrate and a protein, before they have been digested. Fig. 1.1 also shows a lacteal and a capillary.

The different features in Fig. 1.1 have not been drawn to the same scale.

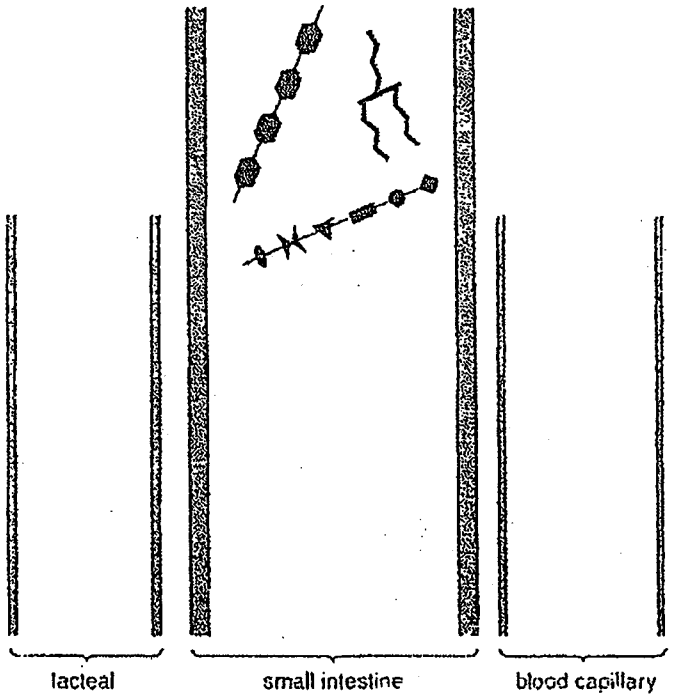


Fig. 1.1

(a) On Fig. 1.1, draw and label the molecules as they would appear after they have been digested and then absorbed by the lacteal and by the capillary. [3]

(b) Explain how these molecules are carried to the liver.

[2]

[Total: 5m]

2 Fig 2.1 shows an experiment to investigate the uptake of ions by a plant.

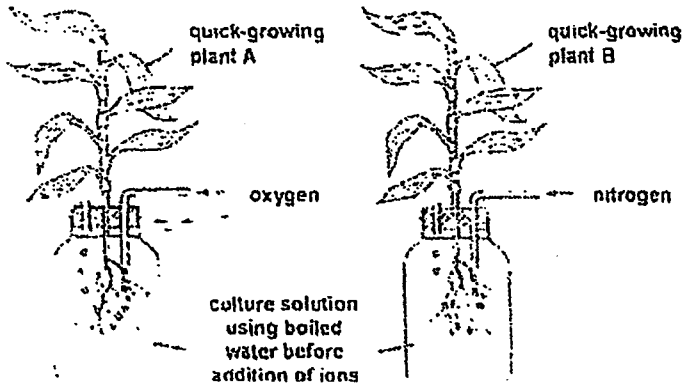


Fig. 2.1

The culture solutions contained measured quantities of all the ions necessary for plant growth which had been boiled to remove dissolved gases.

(a) Identify the process characteristic of all plant cells which the roots of plant B will be unable to carry out.

[1]

Using the radioactive form of an ion, the rate at which it is absorbed from culture solutions can be measured. Fig. 2.2 shows the rate of uptake of one particular ion from the two solutions in Fig. 2.1.

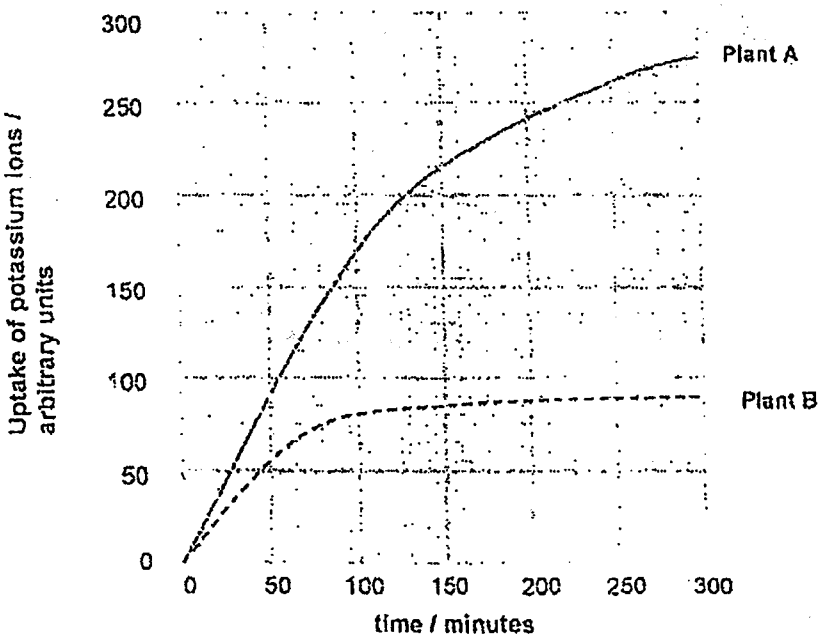


Fig. 2.2

(b) Calculate the difference in uptake of the ion between the two plants after 2.5 hours.

[2]

(c) Describe and explain the difference in the uptake between the two plants.

[3]

[Total: 6m]

3 (a) Fig. 3.1 shows the pressure of the blood as it completes one circulation of the body (excluding the lungs)

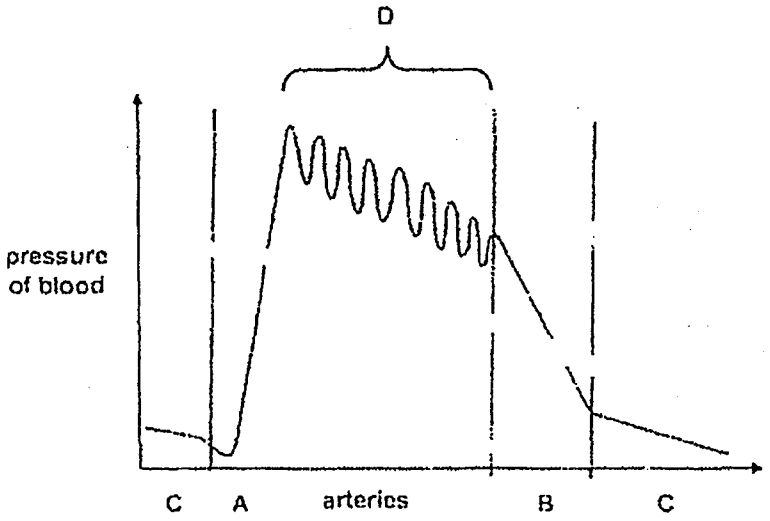


Fig. 3.1

(i) State which labelled section of the above graph shows the pressure of the blood as it passes through

(1) veins: _____ (2) capillaries _____ (3) the heart: _____ [2]

(ii) Suggest a reason to support why section D of graph represents the arteries.

[1]

(b) (i) The blood pressure in the pulmonary circulation is taken. Describe how the blood pressure in the arteries of the pulmonary circulation would differ from that in Fig 3.1.

[1]

(ii) Explain your answer to (c) (i).

[1]

(c) Explain how blood pressure might be affected by eating food rich in animal fats and cholesterol.

[2]

[Total: 7m]

4 (a) Fig. 4.1 shows the changes in the tension of the suspensory ligaments of a girl. She carries out 2 activities during 10 seconds

A: she writes an essay
B: she looks at an aeroplane flying past a window

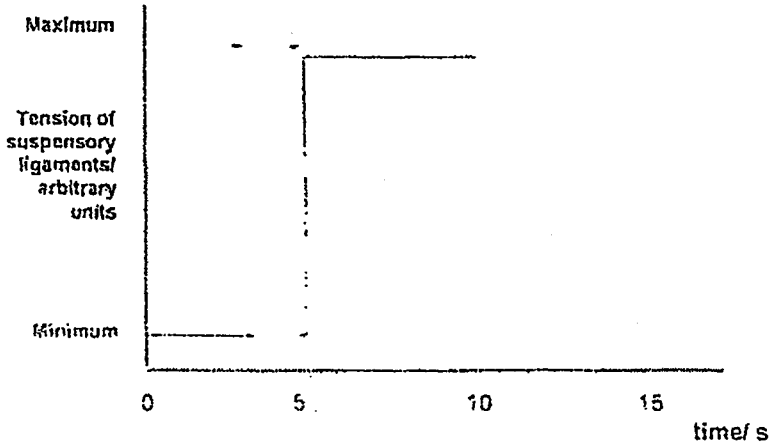


Fig. 4.1

(i) Using the letters A and B, identify which activity is being carried out

From 0 to 5 s: _____ From 5 to 10 s: _____ [1]

(ii) Her pet puppy runs into her room through the door towards her between 10 s and 15 s. On Fig 4.1, show on the same axes the change that occurs to her suspensory ligaments from 10 s to 15 s. [1]

(b) Before an eye test can be conducted to observe the retina, eye drops containing muscle relaxants are often applied to a person's eye. Often after the eye test, a person's eyesight is blurred and it takes a few hours until his eyesight returns to normal

(i) State two groups of muscles that are present in the eye.

[2]

(ii) Suggest why the person's eyesight is blurred after applying the muscle relaxant.

[2]

[Total: 6m]

5 The process of meiosis increases variation in gametes

(a) Describe how meiosis increases variation in gametes.

[2]

(b) Sickle cell anaemia is an example of a condition that can arise when this type of mutation occurs. Fig. 5.1 below illustrates this mutation. In sickle cell anaemia the mutation leads to a different haemoglobin S molecule being formed.

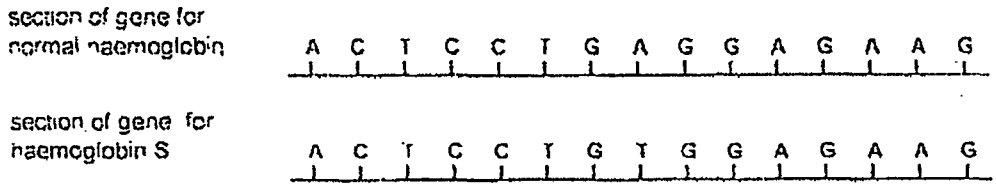


Fig. 5.1

(i) Identify the type of mutation illustrated in Fig. 5.1

[1]

(ii) Explain how a change in the sequence of bases in a gene can lead to a different haemoglobin S being formed

[2]

[Total: 5m]

6 Fig 6.1 shows the longitudinal section of an insect-pollinated flower and Fig. 6.2 shows the transverse section of the flower bud of the same species of insect-pollinated flower

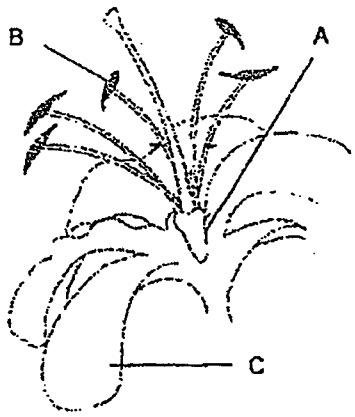


Fig. 6.1

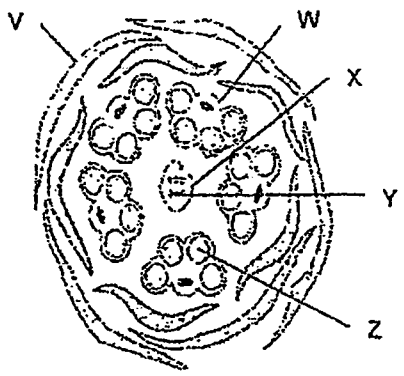


Fig. 6.2

(a) Suggest two possible methods that may be used by this flower to avoid self-pollination.

[2]

(b) With reference to Fig 6.2 only, state two features that indicate that the flower is pollinated by insects.

[2]

(c) Identify the labelled parts in Fig. 6.2 which are equivalent to parts A, B and C in Fig 6.1 respectively

Fig 6.1	Fig 6.2
A	
B	
C	

[3]

(d) Describe how the number of chromosomes in Y and Z differ from the number of chromosomes in cells in structure V

[1]

[Total: 8m]

7 The fur colour of mice is observed to be either yellow or grey. A heterozygous male mouse with grey fur was mated with a female mouse with yellow fur. They had a litter of 8 mice, 5 with grey fur and 3 with yellow fur.

(a) By using suitable symbols and a genetic diagram, show the results of the cross between the grey and yellow mice

[3]

(b) State the reason why the actual percentage of the offspring with different fur colour does not match that predicted in (a)

[1]

(c) A group of equal number of yellow and grey mice were released into a field where yellow grains were grown. After a few years, the number of mice in the field had increased. However, the percentage of yellow furred mice was now more than double the percentage of grey furred mice.

Explain the changes that occurred in the population of mice.

[3]

[Total: 7m]

8 A flow chart representing energy flow through a food web in a pond during one year is shown in Fig. 8.1 below.

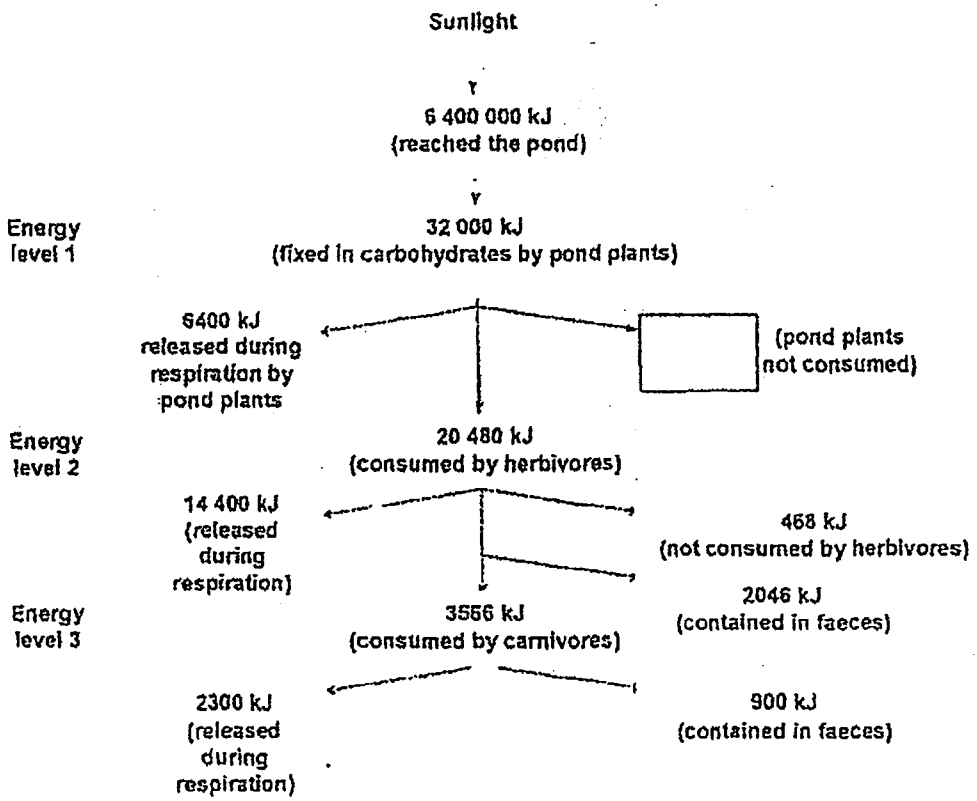


Fig. 8.1

(a) (i) State the process that is responsible for fixing the energy from sunlight into carbohydrates

[1]

(ii) Determine the percentage of the light energy (from the sunlight) that is fixed into carbohydrates by pond plants

[1]

(iii) The remainder of the light energy which reached the pond was not fixed into carbonydrates in the pond plants Suggest a reason why this energy did not enter the food web

[1]

(b) Only 20 480 kJ per year reach the herbivores because the plants release energy from their carbohydrates during respiration and not all the plants are consumed. Calculate the amount of energy still contained in the pond plants which were not consumed.

[2]

(c) Compare the amount of energy released during respiration by pond plants and by herbivore. Suggest one reason for the difference.

[1]

[Total: 6m]

Section B [30 marks]

Answer all the questions in this section on the space provided
Question 11 has a choice of parts to answer.

9 Fig 9.1 below shows the thickness of the uterine lining of a woman for the first 8 days of a 40-day assessment period

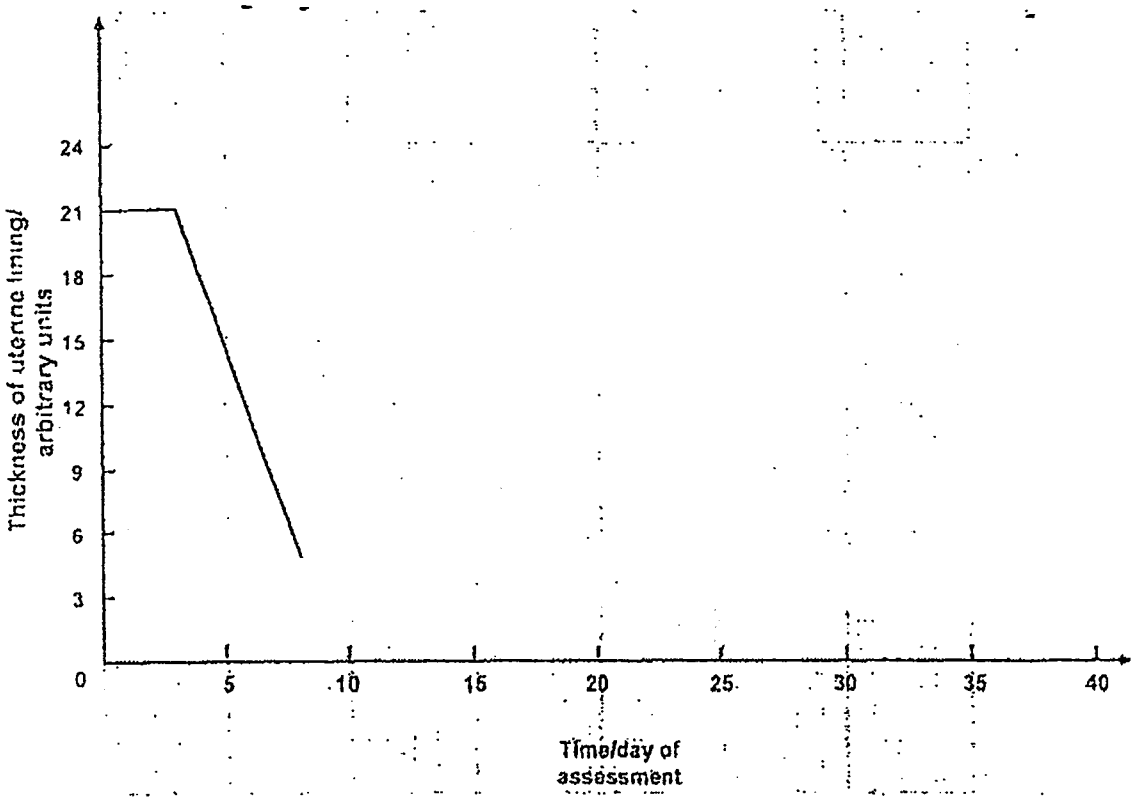


Fig 9.1

(a) Using Table 9.2 below, complete the graph of the thickness of her uterine lining for the remaining period of the assessment. [2]

Time/day of assessment	Thickness of uterine lining/ arbitrary units
10	3
16	9
20	21
24	21
28	21
32	24
36	24
40	24

Table 9.2

(b) The woman's menstrual cycle lasts an average of 28 days

With reference to the graph drawn in Fig 9.1, outline the key biological events that would have taken place in her female reproductive system (including ovaries, fallopian tubes and uterus) for the following period of time:

(i) Day 10 to Day 16 of assessment

[2]

(ii) Day 17 to Day 40 of the assessment

[4]

(c) A foetus in a woman's womb is suspended in amniotic fluid.
Describe the functions of amniotic fluid.

[2]

10 (a) Differentiate between respiration and breathing.

[4]

(b) In 1822, a man, Alexis Bidagan, suffered an injury from a gun fired at close range. The injury was in the form of a hole about 10 cm in diameter, penetrating both his chest and stomach walls, below his diaphragm. Fig. 10.1 shows the position of the opening that remained to Alexis's stomach until he died 58 years later.

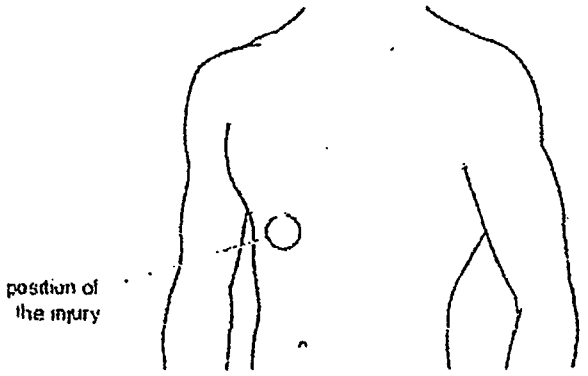


Fig. 10.1

If the wound had extended above his diaphragm, explain why Alexis would have experienced some breathing difficulties until the wound healed

[5]

(c) Explain why smoking leads to emphysema

[1]

Either

11 (a) With reference to named examples describe the differences between hormonal and nervous control in humans

[8]

(b) A patient was admitted to a hospital accident and emergency ward and was diagnosed with Syndrome of Inappropriate Antidiuretic Hormone Secretion or SIADH. She was suffering from hyponatremia, a condition where the water potential of blood remains abnormally high.

Based on your knowledge of Antidiuretic Hormone (ADH) explain how hyponatremia comes about in a patient suffering from SIADH

[2]

Or

11 (a) With a named example of enzyme, substrate and product, explain how the effect of temperature affects the rate of enzymatic reaction.

[6]

(b) (i) Describe the role of enzymes in blood clotting

[2]

(ii) Blood clotting is an important process that prevents excessive bleeding when a blood vessel is injured. However, a blood clot can be a serious medical condition because clots that form in the veins or arteries can cause stroke or heart attack.

Describe how enzyme can be used for the removal of blood clot.

[2]

End of Paper

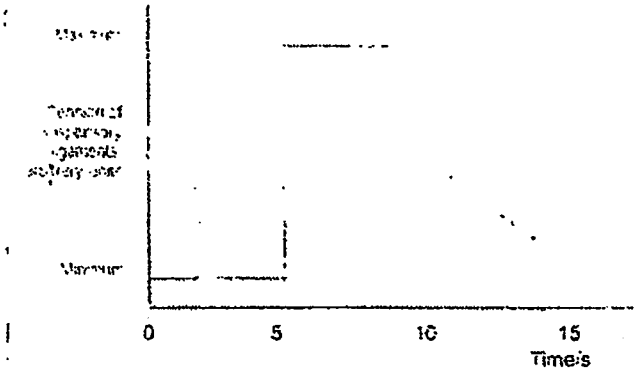
Answer Key

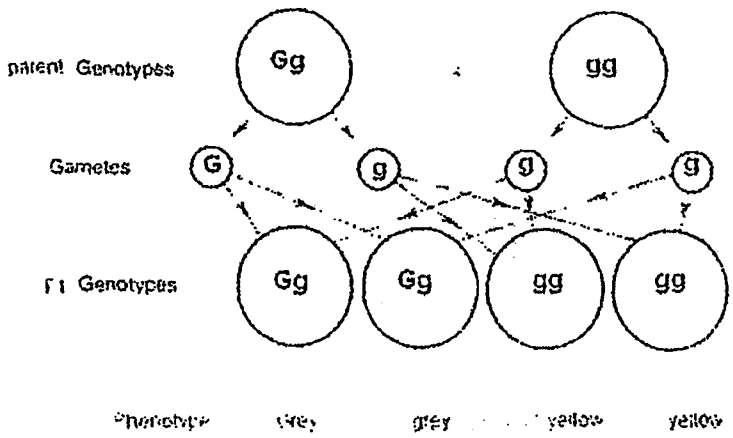
Qn	Ans	Qn	Ans	Qn	Ans	Qn	Ans
1		11		21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Answer Keys for 2014 Biology Preliminary Examinations Papers 2

Paper 2

Qn	Answer keys
1a	In lacteal – draw the same molecule of fat [1] In blood capillary – draw 4 molecules of glucose [1] In blood capillary – draw 6 molecules of amino acids (must follow the shapes given in question) [1] No marks awarded if number or shape of molecules is wrong
1c	Any 2 of the 3 points: • Soluble in (blood) plasma [1] • Transported by plasma [1] • From small intestine to liver via hepatic portal vein [1] Max 2 marks
2a	Aerobic respiration [1] Reject: Respiration/ active transport
2b	215 – 85 = 130 arbitrary units Correct working [1] Correct answer with correct units [1]
2c	Speed of absorption of ions by plant A is twice as fast as that of plant B/ The amount of ions absorbed by plant A is twice that absorbed by plant B [1]. This is because plant A can absorbed ions by both diffusion and active transport.[1] In the presence of oxygen, aerobic respiration can be carried out by the root hair cells to produce energy required to transport ions into the plant against a concentration gradient.[1]
3ai	Veins: C Capillaries: B The heart: A 1 mark for each correct answer. Max: 2 marks
3aii	Any of the following: Pulsating blood pressure because of the contraction and relaxation of artery muscles [1] Arteries being nearer to heart hence highest blood pressure compared to the other blood vessels [1]
3bii	Blood pressure in pulmonary arteries higher than the other arteries [1]
3bi	Pulmonary artery carries (deoxygenated) blood from the heart to the lungs which is

Qn	Answer keys
	very close to the heart [1].
3c	Diet rich in animal fats and cholesterol which are saturated fats results in deposition of fats on the walls of the blood vessels [1]. The fatty deposits narrow blood vessels hence increasing blood pressure [1]
4ai	From 0 – 5 s: A [1] From 5 – 10 s: B [1]
4aii	 1 mark
4bi	muscles of iris [1] ciliary muscles [1]
4bii	• Ciliary muscles remains relaxed/ unable to contract, suspensopry ligaments remain taut [1] • lens remains flat/ unable to bulge, cannot focus on near objects [1] OR • Iris muscles cannot contract/remain relaxed, pupil remains dilated [1] • Allows a lot of light into eye, causing blur image [1]
5a	• Crossing over occurs where sections of homologous chromosomes are exchanged during prophase 1 [1] • Random assortment of homologous pairs of chromosomes occurs during metaphase 1 [1]
5b	• The sequence of bases determines the sequence of amino acids in a protein [1] • Wrong sequence of amino acid leads to different protein formed [1] • folds differently/different physical structure/different 3D structure from normal haemoglobin [1]

Qn	Answer keys
6a	Pollen grains from the same flower landing on stigma do not germinate [1] Anthers and stigma matures at different times. [1]
6b	Any two: Large petals, stigma not feathery, stamen not pendulous/short and compact Max. 2 marks
6c	<table><tr><th>Fig 3.1</th><th>Fig 3.2</th></tr><tr><td>B</td><td>X [1]</td></tr><tr><td>E</td><td>Y [1]</td></tr><tr><td>F</td><td>W [1]</td></tr></table>
6d	They contain half the number of chromosomes of W [1]
7a	 • Legend (symbols used etc) [1] • Correct Genotypes of parents and gametes formed [1] • Correct crosses (lines drawn) and genotypes and phenotypes of F1 generation [1] Deduct 1 mark if did not circle the gametes [1]
7b	The number of offsprings/progeny is too small or sample size of progeny/offsprings is too small. [1]
7c	• yellow fur mice <u>better adapted</u> to survive in environment (<u>reasonable explanation</u>) [1] • <u>survive longer</u>, more likely to mate and <u>pass on the allele for yellow fur</u> to their offspring [1] • <u>over many generations, greater percentage of population has the advantageous</u>

Qn	Answer keys
	allele for them to survive [1]
8ai	Photosynthesis [1]
8aii	Total energy reaching the pond = 6400 00kJ Energy fixed = 32 000 kJ % energy fixed = (32 000/6400 000) x 100 = 0.5% [1]
8aiii	Any one of the following: Reflected off the pond water/ fall on a part of the pond where there are no plants/ wrong wavelength to be absorbed by plant [1]
8b	32 000 kJ fixed by pond plant, of this, 6400 kJ used for respiration 20 8000 kJ consumed by herbivores So amount not consumed = 32 000 – (20 480 + 6400) = 5120 kJ 1m for correct answer+unit, 1 m for correct working
8c	Herbivores released much more energy by respiration (about twice as much) because they use energy to move around [1]
9a	Correct plots [1] Line of best fit [1]
9bi	Repair and thicken of uterus lining + development of follicle/primary follicle develop into Graafian follicle + secretion of oestrogen [1] Ovulation/ release of mature egg cell [1]
9bii	Fertilization [1] Migration of zygote from fallopian tube to uterus, Mitosis of zygote to form embryo/ ball of cells, Implantation of embryo into uterine lining. [2] Corpus luteum stage + continue secretion of progesterone + thickening of uterus lining [1] Day 30/31 to 40 – no shredding of uterine lining/ endometrium continues to thicken [1] Max. 4m
9c	Amniotic fluid never enters lungs because foetus not breathing, the gaseous exchange does not occur via lungs. [1] but occurs via placenta [1]
10a	• Respiration is the oxidation of food substance to release energy [1] • Occurs in all living cells [1] • Breathing is the contraction and relaxation of muscles to bring about the

Qn	Answer keys
	movement of the ribs [1] • In order to cause air to move into and out of lungs.[1]
10b	• chest / thorax no longer airtight;[1] • ref. intercostal muscles (damage or action)/diaphragm (damage or action)/ lungs / alveoli damaged or infected. [1] • air drawn in / out through hole [1] • correct volume / pressure reference. [1] • insufficient / less air or oxygen in lungs / not properly inflated [1]
10c	irritants in tobacco smoke cause <u>prolonged violent coughing</u> leading to <u>breakdown of partition walls between alveoli</u> [1]

11(E) a

	hormonal	Nervous
response time	generally slower	very fast
mode of transmission of signal	by blood circulatory system	by nerves
voluntary/involuntary	involuntary	voluntary or involuntary
length of effect	can last very long	short lived
type of signal	chemical	chemical and electrical
target organ	can affect multiple organs	localised

Every correct comparison- 1m
Every correct description (including named example) – 1m
Max. 8 marks

11(E) b	• <u>High secretion of ADH</u>, <u>increases permeability of collecting ducts</u> in the kidneys to water [1] • <u>Large amount</u> of <u>water reabsorbed</u> into blood stream [1]
11(O) a	<u>Essential marking point</u> Correct match of enzyme substrate and product [1] <u>Any 5 points below</u> Enzyme lowers the activation energy of the reaction [1] Lower temperature, enzymes and substrate has lower kinetic energy, enzymatic activity low/enzyme inactive [1] With every 10°C rise in temperature, enzyme activity doubles [1] Optimum temperature at 37 °C, enzymes works the fastest [1] Temperature above 37 °C, enzymes starts to denature, rate of reaction decreases [1] At 60 °C enzymes completely denatured rate of enzyme reaction is zero [1]

Qn	Answer keys
	Max. 6 marks
11(O) bi	Thrombokinase converts the prothrombin to thrombin (active enzymes) [1] Thrombin converts fibrinogen to fibrin [1]
11(O) bii	Protease [1] breaks down fibrin [1] in blood clot