ANDERSON

Name: _____ ( )

1 The table gives descriptions of four membranous structures in a cell. Which structure is correctly matched with its function?

	Structure	Function
A	An extensive network of tubes and sacs; each tube and sac bounded by a single membrane	Lipid synthesis
B	A spherical sac bounded by a single membrane	Protein synthesis
C	A sac bounded by two membranes, the inner highly folded	Packaging of proteins
D	A stack of elongated, curved sacs; each sac bounded by a single membrane	Photosynthesis

2 What is the adaptation of the xylem vessel that allows it to carry out its function?

A large surface area
B presence of many chloroplasts
C absence of cross walls
D biconcave shape

3 Which of the following is an example of diffusion in plants?

A Water moving from the soil into the root hair cells.
B Ions moving into root hair cells against a concentration gradient.
C Carbon dioxide moving into leaves during photosynthesis.
D Water moving from vascular bundles into mesophyll cells in the leaves.

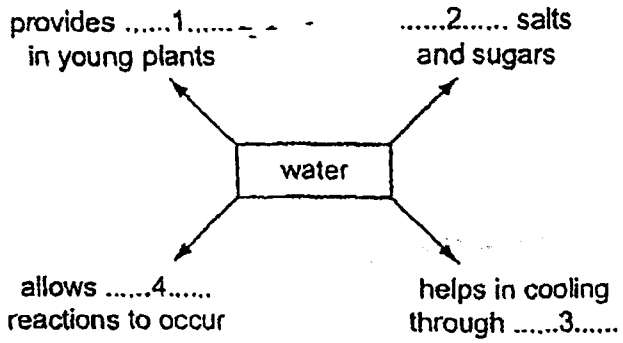
4 Which of the following does not affect the rate of diffusion?

A concentration gradient of diffusing substances
B size of diffusing substances
C temperature
D concentration of adenosine triphosphate (ATP) molecules

5 Which of the following is required for the Biuret test to give a positive result?

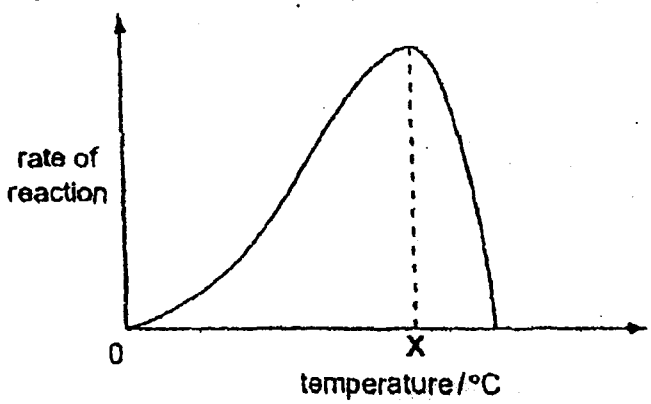
A reducing sugars
B iodine
C copper (II) sulfate
D lipids

6 What is the adaptation of the xylem vessel that allows it to carry out its function?



	1	2	3	4
A	chemical	evaporation	transports	support
B	evaporation	support	chemical	transports
C	support	transports	evaporation	chemical
D	transports	chemical	support	evaporation

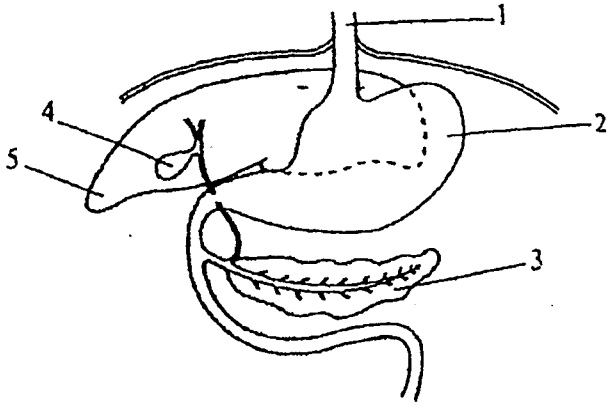
7 The graph shows the effect of temperature on an enzyme-catalyzed reaction.



What is the correct explanation of events at temperature X°C?

A The activation energy of the reaction has been raised to a maximum.
B The kinetic energy of substrate molecules has reached a maximum.
C The number of denatured enzyme molecules is at a minimum.
D The number of enzyme-substrate complexes has reached a maximum.

8 The diagram shows part of the human alimentary canal.



Which two structures produce substances involved in the digestion of fat?

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

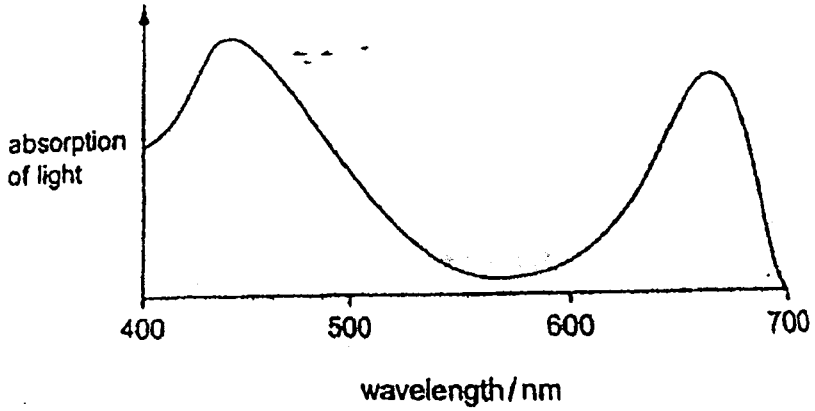
9 Which function of the liver is correctly paired with the chemical involved?

	Function	Chemical
A	Deamination	Glycogen
B	Detoxification	Alcohol
C	Excretion	Urea
D	Storage	Amino acids

10 Some organisms live in the dark at the bottom of the seas and, to synthesize glucose, use energy from chemicals in the very hot water that comes out of volcanoes. What is a distinguishing feature of these organisms?

A Their enzymes are easily denatured by heat.
B They do not need carbon dioxide.
C They do not need to be green.
D They all obtain energy only by being carnivores.

11 The graph shows the absorption of light at different wavelengths by intact chloroplasts from a pond weed.



A sample of the same pond weed was exposed to four different wavelengths of light of the same intensity for the same time. The table shows the number of bubbles produced by the pond weed at each wavelength of light.

Experiment	Number of bubbles			Mean number of bubbles
1	15	14	16	15
2	3	4	2	3
3	1	2	0	1
4	12	11	13	12

Which row shows the number of bubbles produced by the different wavelengths of light investigated?

	Mean number of bubbles			
	440nm	520nm	560nm	650nm
A	1	12	15	3
B	3	1	12	15
C	12	15	3	1
D	15	3	1	12

12 The table shows the characteristics of the blood in one blood vessel in the body.

oxygen concentration	carbon dioxide concentration	pressure
High	- -Low	High

Which blood vessel contains blood with these characteristics?

A Aorta
B Pulmonary vein
C Pulmonary artery
D Vena cava

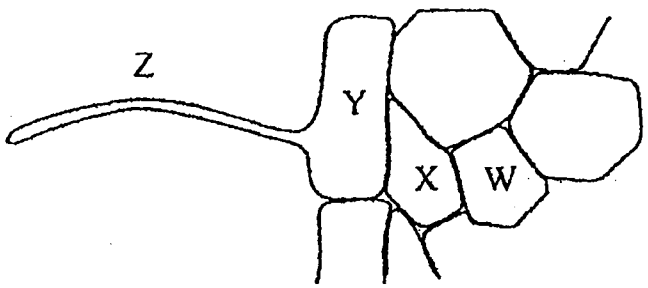
13 Which substance will pass from muscle cells into the capillary via the tissue fluid?

A Adrenaline
B Carbon dioxide
C Glycogen
D Urea

14 Which of the following can cause a heart attack?

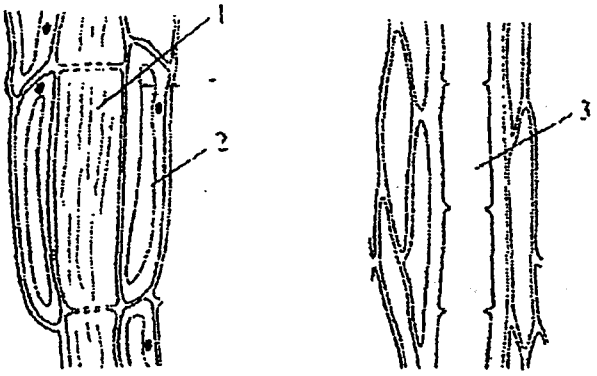
A Hardening of the hepatic portal vein
B Blood clot in the brain
C Rupture of the renal artery
D Blocked coronary artery

15 The diagram shows some plant root cells. Which statement is correct?



A The water potential of the soil water Z is zero.
B The water potential of cell W is the lowest.
C The water potential of cell X is higher than cell Y.
D The water potential of cell W is higher than cell Y.

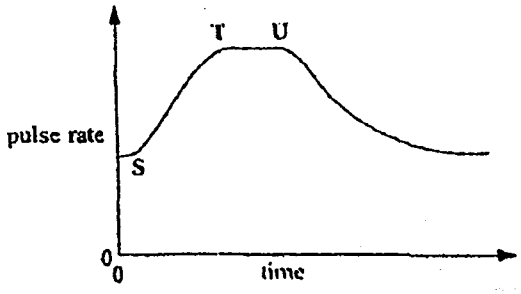
16 The diagrams represent some plant cells seen in a section of a stem.



Which cells have the functions shown?

	1	2	3
A	Support of young stem	Transport of water	Transport of sucrose
B	Transport of amino acids	Supply of energy to surrounding cells	Transport of minerals
C	Transport of sucrose	Transport of water	Transport of amino acids
D	Transport of water	Supply of energy to surrounding cells	Support of young stem

17 The pulse rate of a girl was measured every two minutes and plotted on the graph.



Her exercise started at S and finished at T but her pulse rate did not start to drop until U.
Which process(es) would occur during the T-U interval?

1. accumulation of lactic acid from muscle cells
2. increased supply of oxygen to the muscle cells
3. increased transport of carbon dioxide to the lungs

A 1, 2 and 3
B 1 and 3 only
C 2 only
D 2 and 3 only

18 Some effects of smoking tobacco are listed

1. bronchitis
2. increase in alertness
3. increase in blood pressure
4. increase in heart rate
5. increase in mucus production
6. uncontrolled cell division

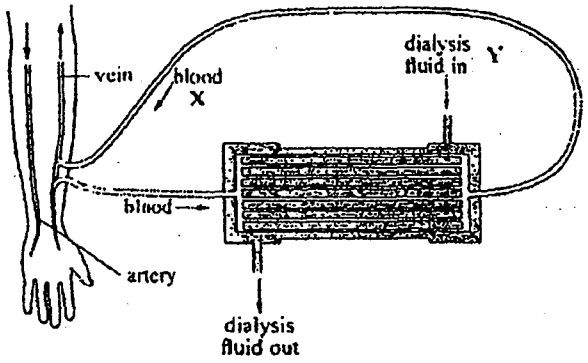
Which effects are caused by tar?

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

19 What is an example of excretion?

A Release of adrenalin from the adrenal glands
B Release of sweat from the sweat glands
C Removal of carbon dioxide from the lungs
D Removal of faeces from the alimentary canal

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



Which substances have the lowest concentration at X and the highest concentration at Y?

	Lowest at X	Highest at Y
A	Glucose	Salts
B	Salts	Glucose
C	Urea	Water
D	Water	Urea

21 On a hot day how would these skin structures respond to help maintain a constant body temperature?

	Sweat gland	Arterioles
A	Decreased sweat production	Contract
B	Decreased sweat production	Dilate (get wider)
C	Increased sweat production	Contract
D	Increased sweat production	Dilate (get wider)

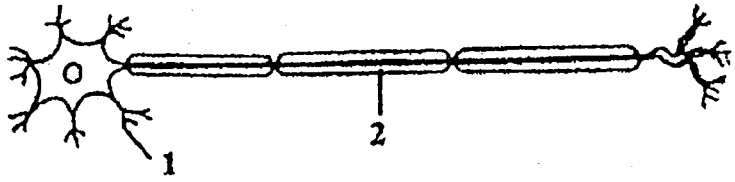
22 Four processes that take place in the human body are listed

1. absorption of amino acids through the villi
2. maintenance of constant body temperature
3. production of lactic acid in muscles
4. regulation of blood glucose concentration

Which two processes are directly controlled by negative feedback?

A 2 and 4
B 1 and 4
C 1 and 3
D 2 and 3

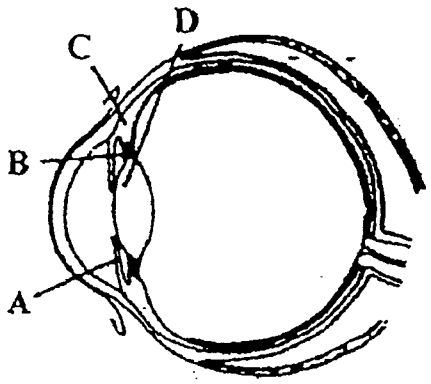
23 The diagram below shows a motor neuron.



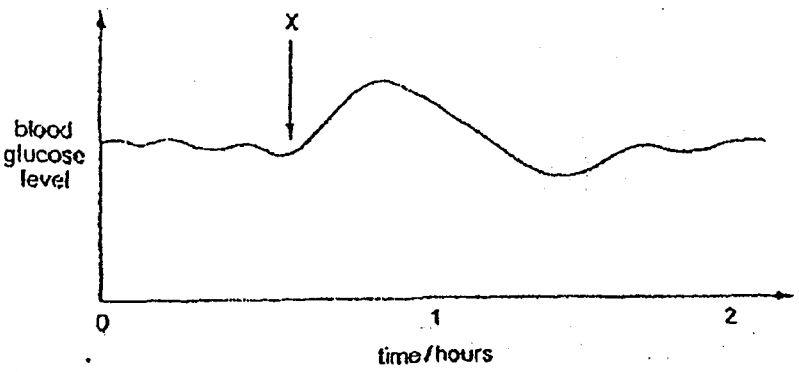
Which one of the lines, A, B, C or D in the table bellows names the labeled parts correctly?

	1	2
A	Dendrite	Myelin shealth
B	Axon	Dendrite
C	Cell body	Axon
D	Synapse	Dendrite

24 The diagram below shows the mammalian eye in section. Which part of the eye, A, B, C or D controls the quantity of light falling on the retina?



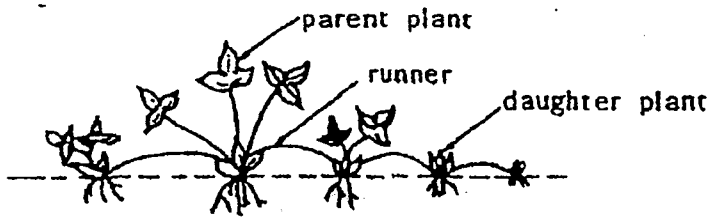
25 The graph shows changes in the glucose concentration in the blood of a person during two hours.



What explains the shape of the graph after X?

A The person has eaten a sugary sweet meal.
B The person has had an insulin injection.
C The person is suffering from diabetes mellitus.
D The person starts some hard physical exercise.

26 Some species of plant reproduce vegetatively by producing slender side-shoots called runners, which grow along the ground surface and which root at the nodes as shown in the diagram below. Eventually, the runner decays, leaving the rooted parts to develop as independent individuals..



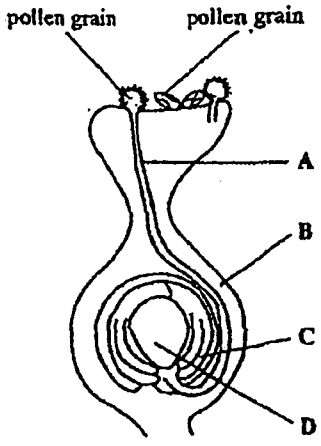
In which one of the following ways may this method of reproduction have an advantage over reproduction by seed?

A The offspring are identical to the parent and are therefore bound to be healthy.
B Faster growth of daughter plants to become mature plants.
C There is no possibility of a mutation occurring to give offspring of a different genotype.
D Those plants, which compete with this species will have less chance of becoming established nearby.

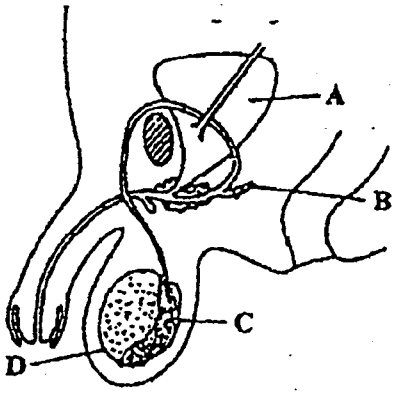
27 Many wind-pollinated flowers have _____ .

A feathery stigmas and light pollen
B short stigmas and sticky pollen
C feathery stigmas and sticky pollen
D short stigmas and light pollen

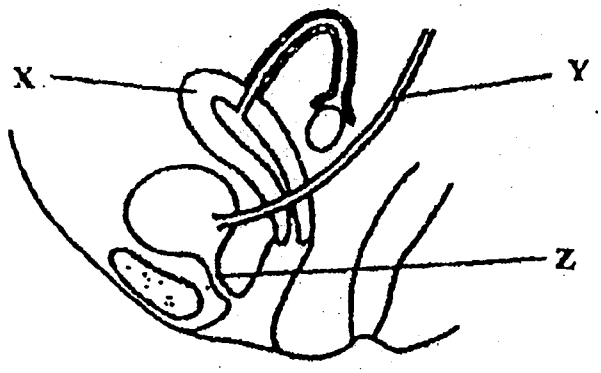
28 The diagram shows the development of a pollen tube and its entry into the ovule. Which part usually develops into the fruit after fertilization?



29 The diagram shows the reproductive system and associated structures of a male mammal. Which labeled structure stores sperm cells in an inactive form?

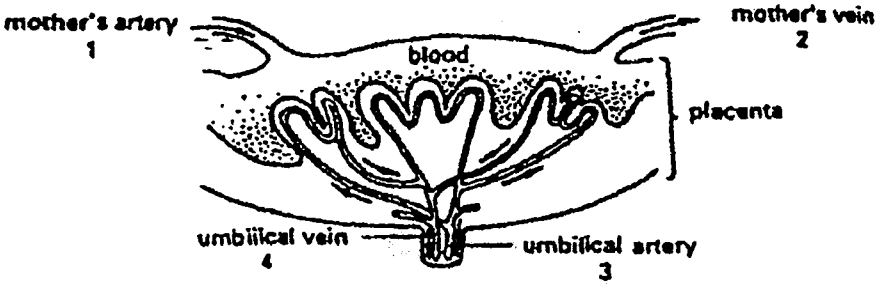


30 The diagram shows some of the structures present in the lower abdomen of a female mammal. What are the structures labeled X, Y and Z?



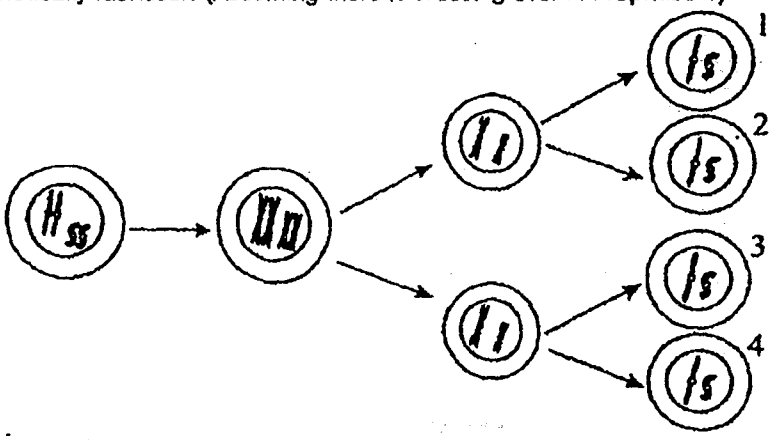
	Uterus	Urethra	Ureter
A	X	Y	Z
B	X	Z	Y
C	Y	X	Z
D	Y	Z	X

31 The diagram shows part of the placenta. In which numbered parts does the blood contain the most oxygen and nutrients?



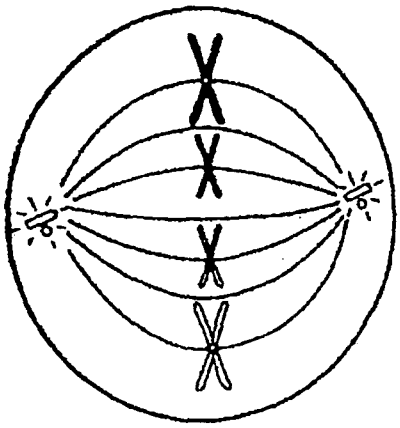
A 1 and 4
B 1 and 3
C 1 and 2
D 2 and 3

32 The diagram shows a cell undergoing meiosis. Which of the labeled daughter cells are genetically identical? (Assuming there is crossing over in Prophase 1)



A 1 and 2
B 3 and 4
C 1 and 3; 2 and 4
D None of the above

33 The diagram shows a cell undergoing cell division. Which phase of the cell division is it at?

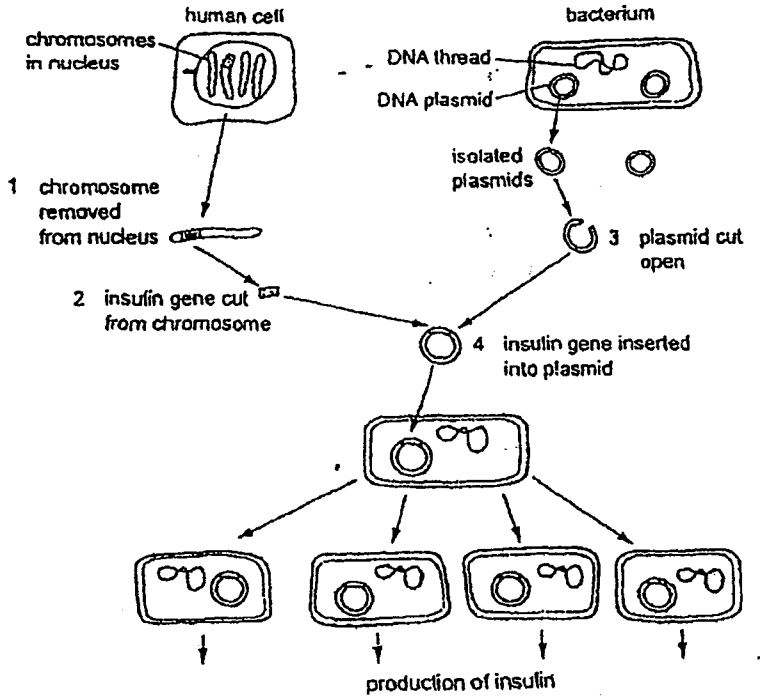


A Prophase
B Metaphase
C Anaphase
D Telophase

34 Which of the following is false?

A Each chromosome contains one gene.
B Each nucleotide consists of a base, a sugar and a phosphate group.
C Genes encode information to make proteins.
D Cytosine pairs with guanine.

35 The diagram shows a process by which a human insulin gene can be inserted into bacterial DNA to produce human insulin.



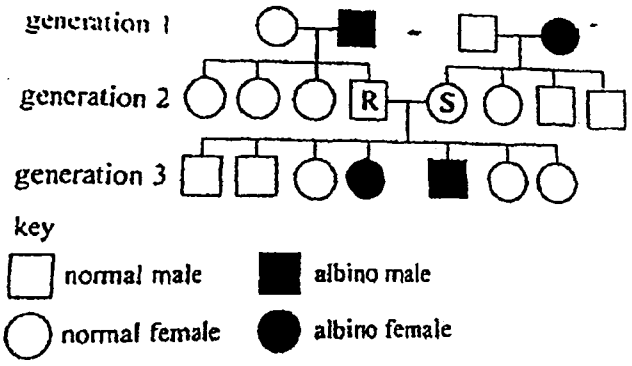
Which stages use a restriction enzyme?

A 1 and 3
B 2 and 3
C 1 and 4
D 2 and 4

36 In goats, the allele for black hair is dominant to the allele for red hair. Two black-haired goats mated and produced twelve offspring. Of the first eleven, eight had black hair and three had red hair. What is the probability of the twelfth offspring having red hair?

A 0.75
B 0.50
C 0.33
D 0.25

37 Albinism is an inherited condition caused by a recessive allele a. A is the dominant allele for the normal condition.



What are the genotypes of individuals R and S?

	R	S
A	AA	AA
B	AA	Aa
C	Aa	Aa
D	aa	aa

38 Which two statements about continuous variation are correct?

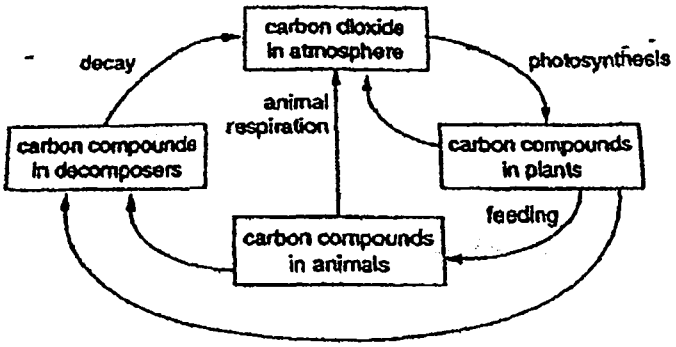
1. The heights of adult humans will partly depend on the quality of their diets when young.
2. The faster period of growth in humans in the embryo.
3. A group of adult males had heights ranging from 155 cm to 220 cm.
4. Humans have stopped growing by the time they are 22 years old.
5. Humans grow taller during babyhood and childhood.

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

39 Only one hundredth of the light energy trapped by green plants is passed to herbivore tissues and only one thousandth reaches primary carnivore tissues. Which one of the following is the main reason for this?

A Energy is lost as heat to the environment.
B Energy is lost as carbon dioxide to the environment.
C Energy is used in photosynthesis of green plants.
D Energy is used in transpiration of green plants.

40 The diagram shows part of the carbon cycle.



Which process converts most carbon from one form to another?

A Animal respiration
B Decay
C Feeding
D Photosynthesis

--- End of paper ---

ANDERSON SECONDARY SCHOOL
SCIENCE DEPARTMENT
PRELIMINARY EXAMINATION 2014

CANDIDATE NAME

CLASS 4 /

INDEX NUMBER

BIOLOGY (SPA) **5158/02**

Paper 2 September 2014
1 hr 45 min

READ THESE INSTRUCTIONS FIRST:

Write your index number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A
Answer all questions.
Write your answers in the spaces provided on the Question Paper.

Section B
Answer questions 9 and 10. Choose Either [E], Or [O] for question 11.

You are advised to spend no longer than 1 hour on Section A and 45 minutes on Section B.
The number of marks is given in brackets [ ] at the end of each question or part question.

Section A	
Section B	
9	
10	
11 [E] [O]	
Total	

This question paper consists of 18 printed pages, inclusive of this cover page.

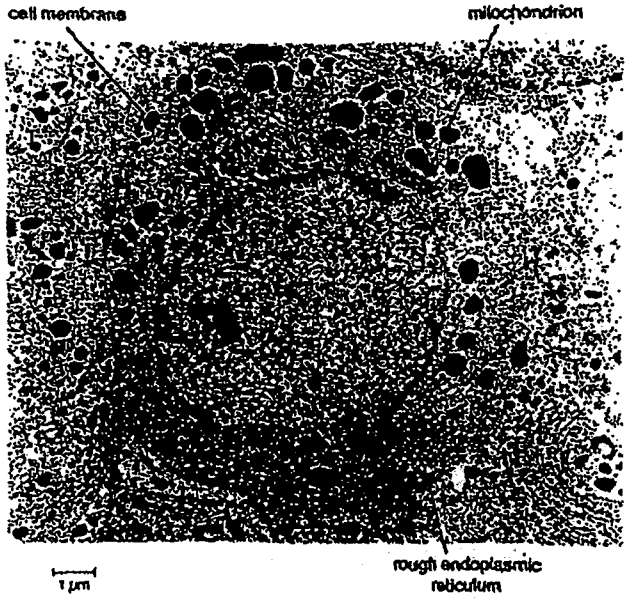
[Turn over

Section A [50 marks]

Answer all the questions in this section.

Write your answers in the spaces provided.

1. The diagram below shows an electron micrograph of a secretory cell from the hypothalamus of the brain. This cell synthesizes and releases ADH. ADH is a peptide made of nine amino acids.



(a) Explain the role of the following structures in the synthesis of ADH.

mitochondrion

nucleolus

chromatin threads

[3]

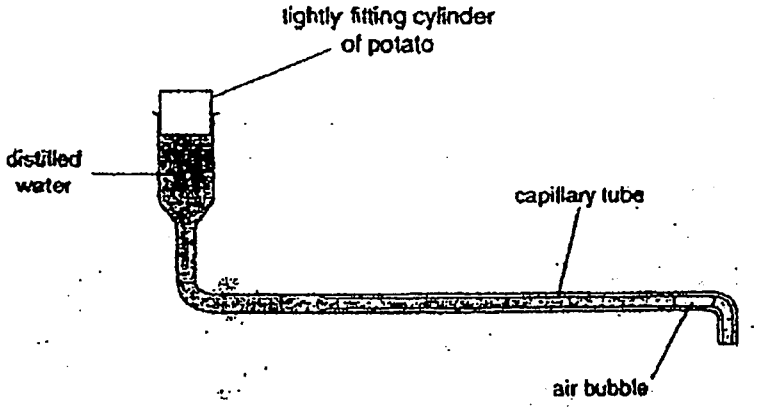
(b) Describe what happens to peptides, such as ADH, before they are secreted out of the cell.

.....

.....

..... [2]

2. An experiement was carried out to investigate the effect of solutions of different concentrations on potato tissue. The apparatus was set up as shown below.



(a) (i) Name the process which will occur where the potato is in contact with the distilled water.

.....

(ii) In which direction will the air bubble move along the capillary tube? Explain your answer.

Direction .....

Explanation .....

.....

.....

..... [4]

(b) Suggest how and why the experimental results would differ (if at all) if a cooked potato is used instead.

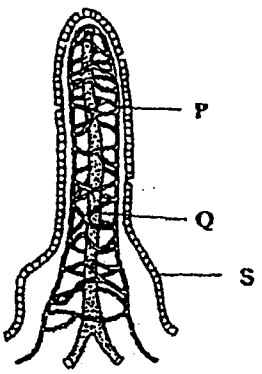
.....

.....

..... [1]

3. The figure shows a villus, in longitudinal section, from the ileum of a mammal.

0·2 mm



(a) What are the names and functions of P and Q.

P .....

.....

.....

Q .....

.....

..... [2]

(b) Explain how S is adapted to carry out its respective specific functions.

.....

.....

.....

..... [2]

Alcohol is a small molecule that is easily absorbed through the small intestine.

(c) State how alcohol travels to the liver

.....

[1]

(d) State what prolonged excessive consumption of alcohol can do to the liver.

.....

.....

..... [2]

4. Fig 1 and 2 below shows two different views of a leaf.

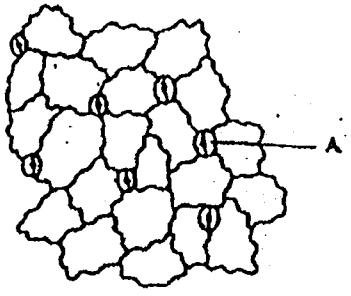


Fig. 1

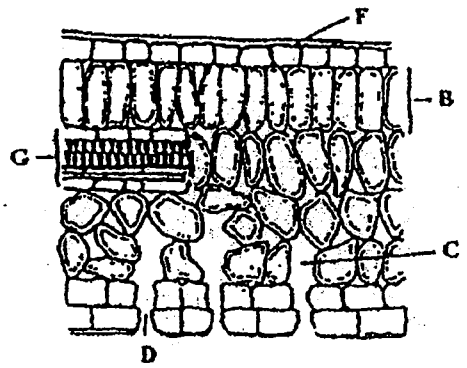


Fig. 2

(a) By means of a line labelled E, indicate the layer of cells in Fig 2 that corresponds to the cells represented in Fig. 1. [1]

(b) Name the parts labelled A and B, and describe their function.

.....

.....

.....

.....

.....

..... [2]

(c) Name two substances carried to the leaf cells by region G.

_____ [1]

(d) Explain how these substances enter the plant and reach the leaf.

_____

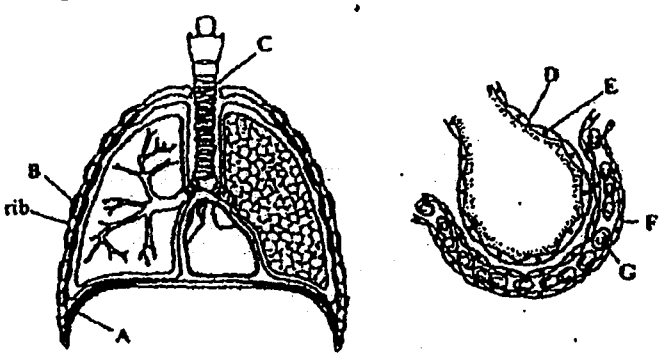
_____

_____

_____

_____ [3]

5. The diagram shows structures associated with breathing and gaseous exchange.



(a) Name the structures A, B, C and E

A: _____ B: _____

C: _____ E: _____ [2]

(b) Describe using the diagram above the characteristics of the alveoli that enables efficient gaseous exchange.

_____

_____

_____

_____

_____ [2]

(c) Describe how blood flows from the lungs to the liver cells.

.....

.....

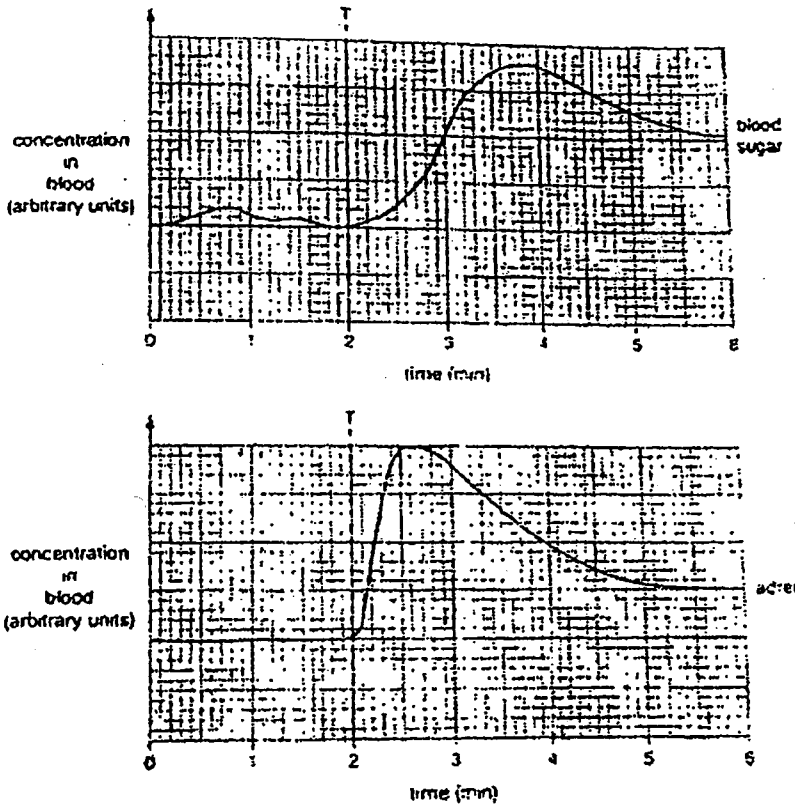
.....

.....

.....

[3]

6. The levels of sugar and adrenaline in a person's blood were measured at the same time over a period of six minutes. The figure below shows these measurements.



(a) Suggest what may have happened at time T.

[1]

(b) Explain why the concentration of blood sugar changed after time T.

[1]

(c) Explain how the concentrations of blood sugar are returned to their original levels.

[3]

(d) Explain how the nephrons in the kidneys also aid in returning the water potential of blood to normal levels.

[2]

7. Fig 2.1 and Fig 2.2 show diagrammatically chromosomes from two cells from the same organism undergoing different types of nuclear division.

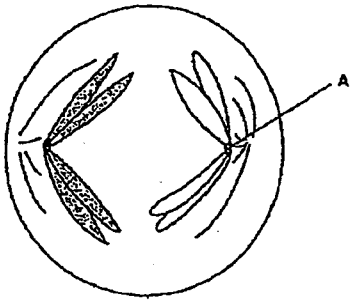


Fig. 2.1

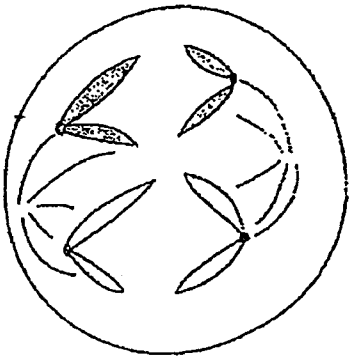


Fig. 2.2

(a) State the type of nuclear division and name the stage shown for:

(i) Fig 2.1

type of nuclear division

stage ..... [1]

(ii) Fig 2.2

type of nuclear division .....

stage ..... [1]

(b) Describe the main difference between the two stages visible in Fig 2.1 and Fig 2.2.

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.....

.....

..... [2]

(c) Explain how meiosis and fertilization can lead to variation.

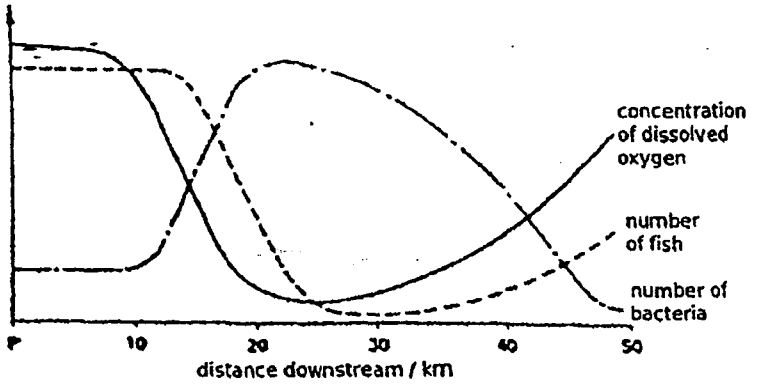
.....

.....

.....

..... [2]

8. The figure below shows the concentration of oxygen, the number of bacteria and the number of fish in a river over a distance of 50 km, measured from point P, which is up-stream from a source of pollution (dumping of sewage).



(a) With reference to the three curves on the graph, describe the effect of pollution downstream 10 to 30 km from Point P.

[3]

(b) Describe how sewage should be treated before it is safe to be released to water bodies.

[3]

SECTION B [30 marks]

Answer questions 9 and 10. Choose Either [E], Or [O] for question 11.

Write your answers in the spaces provided.

9 An experiment was carried out to investigate enzyme catalysis of substrates with time.

Eight test tubes of equal concentrations of a short peptide are incubated with an equal amount of short peptide-protease, extracted from the stomach of a mammal, at 37°C at the same time. At every twenty minutes after the start of the reaction, a test tube was selected and the reaction was stopped with an inhibitor. A Biuret test was carried out using the contents of the test tube and the intensity of the violet solution was measured and recorded below.

Tube	A	B	C	D	E	F	G	H
Time stopped/ min	20	40	60	80	100	120	140	160
Intensity / AU	1170	700	530	502	500	500	500	500

(a) Plot the intensity measured against the time of the reaction. [3]

(b) Describe and explain the graph you have plotted.

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.....

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.....

.....

..... [3]

(c) The same reaction was repeated at an incubation temperature of 27°C.

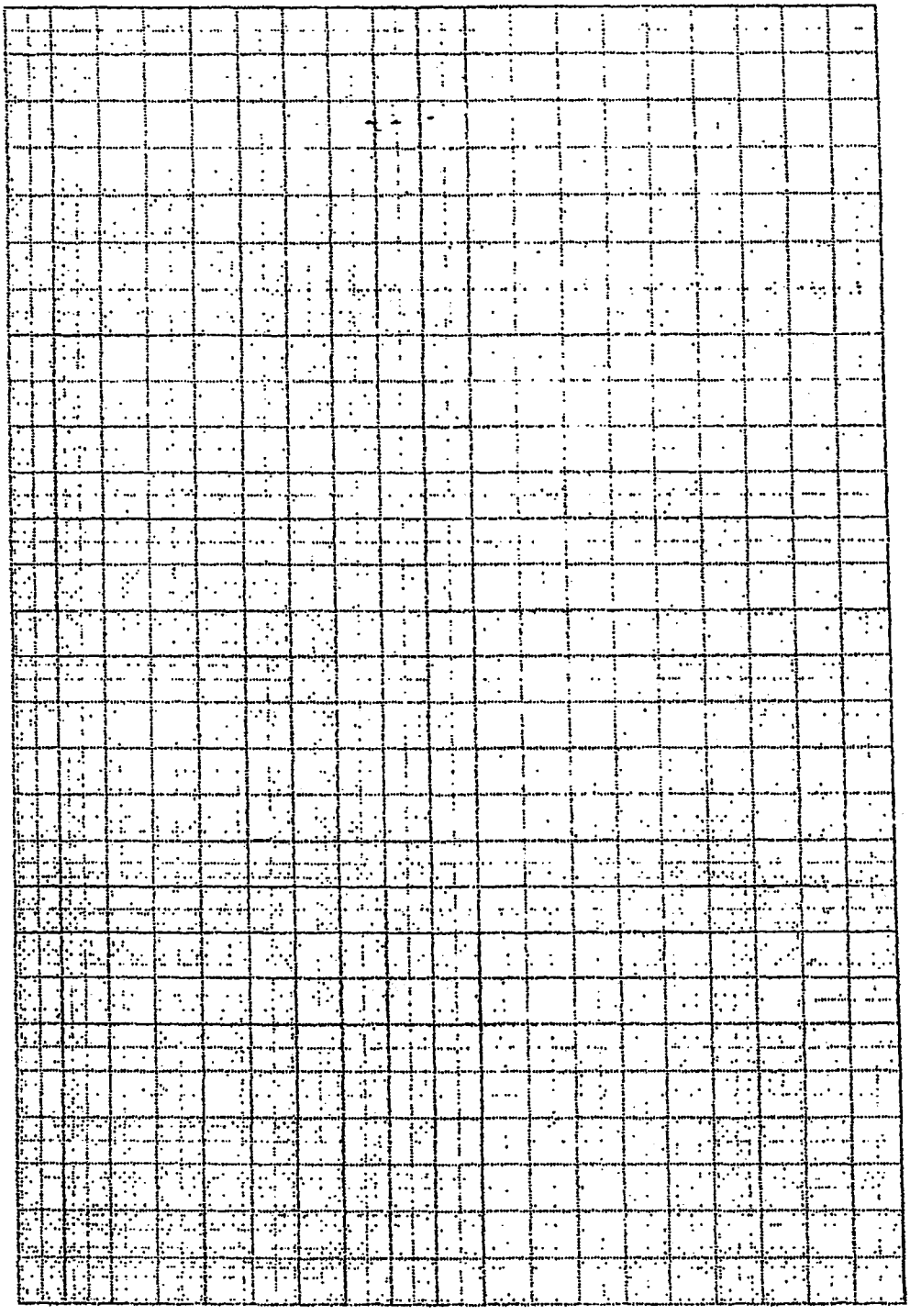
(i) If the data were collected and a graph plotted, sketch this new graph on the same graph paper on the next page and label it "60°C". [2]

(ii) Explain the differences you see in the new graph compared to that from the original graph you plotted.

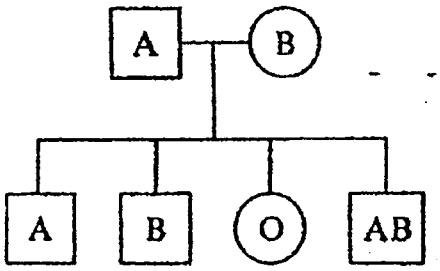
.....

.....

..... [2]



10. The diagram below shows the blood groups of the members in a family.



(a) Draw a genetic diagram to show how it is possible that the parents have children of all four different blood groups.

[3]

A flu epidemic is suddenly upon the population of an Asian country that is caused by a mutated form of the avian flu virus. However, it seems humans with blood group AB are more likely to survive than the rest.

(b) Suggest what factors may have increased the rate of mutation of the avian flu virus.

[1]

(c) Suggest and explain what would happen to the population if there is no cure for the flu epidemic over hundreds of years.

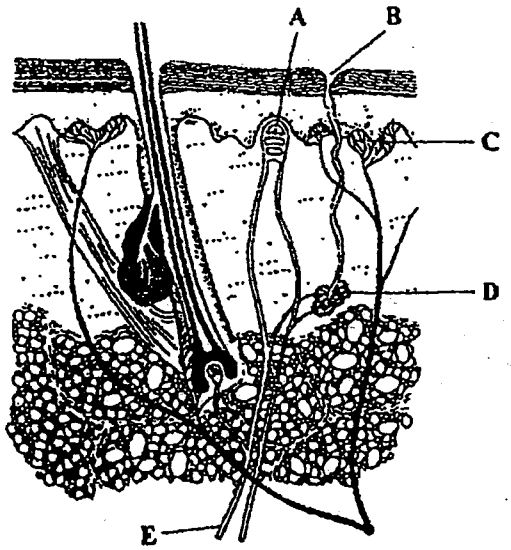
[3]

(d) If scientists discovered the gene that produces a protein that gives people of blood group AB higher resistance to the flu virus. Suggest how bacteria can be used to manufacture this protein in large quantities.

[3]

Either [E]

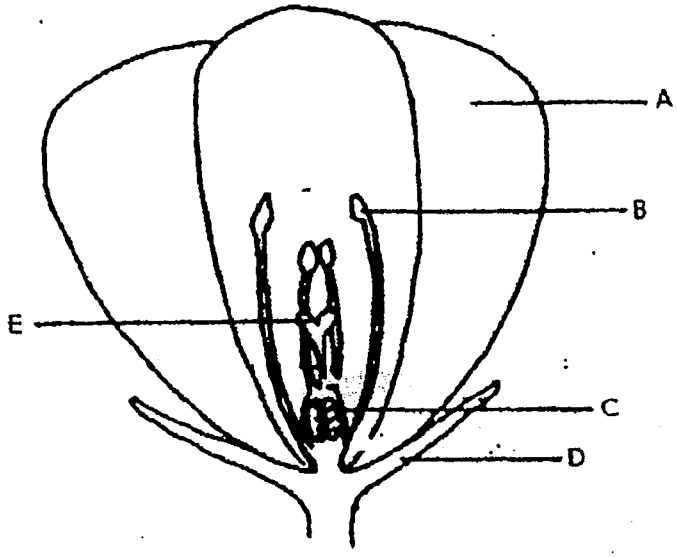
11. The figure below shows a section through human skin.



(a) Explain how the skin is involved in returning the body temperature to normal when the body overheats. In your answer, you should refer to, and identify, structures A to E.

[5]

The diagram below shows the main parts of a flower.



(b) Name the parts A to E and describe their functions.

[5]

Or [O]

11. (a) Outline the role of anti-diuretic hormone (ADH) in osmoregulation when the water potential of the blood increases.

[3]

(b) Briefly describe the menstrual cycle with reference to the fertile and infertile phases of the cycle focusing on the effects of progesterone and estrogen only.

[5]

(c) State the functions of the amniotic sac and amniotic fluid.

.....

.....

.....

..... [2]

End of paper

Paper 1

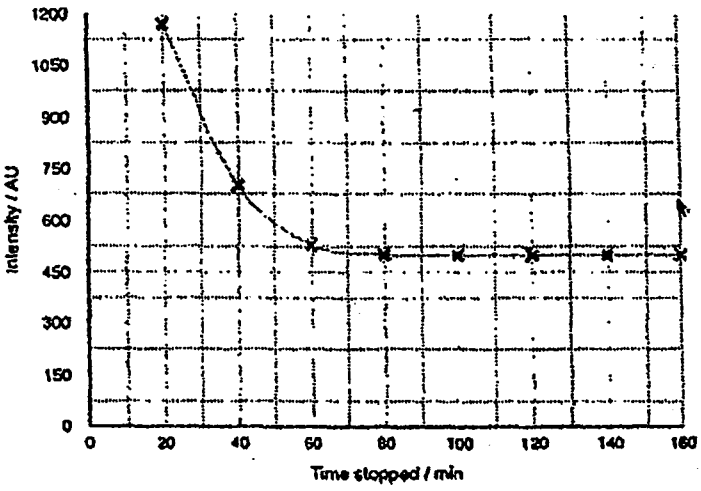
1	2	3	4	5	6	7	8	9	10
A	C	C	D	C	C	D	C	B	C
11	12	13	14	15	16	17	18	19	20
D	A	B	D	B	B	D	B	C	C
21	22	23	24	25	26	27	28	29	30
D	A	A	A	A	B	A	B	C	B
31	32	33	34	35	36	37	38	39	40
A	D	B	A	B	D	C	B	A	D

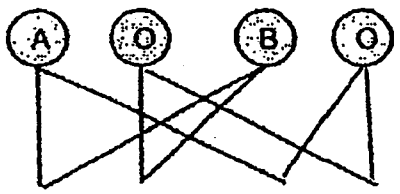
Paper 2 Section A

1a	mitochondrion - provide energy through respiration for synthesis of ADH nucleolus - produce ribosomes for synthesis of proteins chromatin threads - DNA that contains the gene / genetic code that encodes for the protein		
1b	sent to the golgi apparatus for; modification and repackaging before it leaves the cell;		
2ai 2aii	osmosis [1] direction - from right to left [1] explanation - distilled water has a higher water potential and have a net movement into the potato through osmosis.		
2b	there will be no net movement (remained in position) of water as membrane will be destroyed and become fully permeable.		
3a	P - blood capillaries, carry amino acids and monosaccharides Q - lacteal, carry fatty acids and glycerol to the liver		
3b	one cell thick epithelium - faster diffusion of digested nutrients presence of microvilli - increase surface area to volume ratio for faster diffusion		
3c	travels through the hepatic portal vein from the small intestine to the liver		

3d	damage liver, replacement of functional liver tissue with scar tissue; resulting in cirrhosis;		
4a	lower epidermal layer		
4b	A - guard cell - controls the size of the stoma so as to allow gaseous exchange and transpiration B - palisade mesophyll layer - contains the highest concentration of chloroplasts, site of photosynthesis		
4c 4d	water and mineral salts root pressure - root hair cells have lower water potential compared to the soil, water enters through osmosis; mineral salts enter through active transport; capillary action - helps to pull water up the xylem vessels; transpiration pull - water vapour leaves through the stomata creating a force that pulls water up the xylem vessels;	4d - any 3	
5a	A - diaphragm B - external intercostal muscles C - trachea E - alveolar wall		
5b	thin alveolar wall moist layer to dissolve gases numerous alveoli to increase surface area to volume ratio (any 2)		
5c	blood leaves lungs via pulmonary vein and enters the left atrium, past the bicuspid valve then to the left ventricle and out via the aorta to the hepatic artery and into the liver (0.5 mark each)		
6a	any reasonable response - a scare, panic attack		
6b	adrenaline causes the conversion of fat and glycogen to glucose in the liver, increasing the blood sugar concentration		
6c	once stimulus over, adrenaline production will stop, excess adrenaline will be broken in the liver, glycogen no longer convert to glucose; pancreas will detect high levels of glucose; and secrete insulin to convert glucose to glycogen to be stored in the liver;		
6d	ultrafiltration - all small molecules enter the nephron from the glomerulus selective reabsorption - molecules needed by the body like glucose, amino acids and water will be reabsorbed into the capillaries Alternate Answer:		

	Noticed many students interpret the question as a continuation of th scenario where blood glucose level increases. So they answered based on osmoregulation. I will accept this alternate answer: - water potential of blood decreases below normal due to high blood glucose, hypothalamus stimulated and trigger pituitary gland to secrete more ADH [1]; more water reabsorbed by kidney tubules thereby raising water potential of the blood to normal levels [1].		
7ai 7aii	meiosis anaphase 1 mitosis anaphase		
7b	2.1 shows the splitting of homologous chromosomes, while in 2.2 the centromere has divided and the sister chromatids of each chromosome separate from each other		
7c	meiosis produce genetically dissimilar gametes due to formation of chiasma and the independent assortment of alleles. Fertilisation brings together gametes from 2 genetically distinct individuals - both serve to increase variation		
8a	Oxygen decrease due to usage by reproducing bacteria; Bacteria increase due to sewage providing organic matter / food for reproduction; Fish decrease due to lack of oxygen in water; As the amount of bacteria rapidly increased after 10km away from P the amount of dissolved oxygen correspondingly decreased due to increased respiration of bacteria leading to bacteria reproduction. This caused the fish to start dying due to lack of oxygen and their number decreased shortly after 15km away from P.		
8b	- raw sewage is filtered to remove solids and insoluble substances - liquid phase of sewage is treated with microorganisms to break down complex biomolecules - chemically modify toxins and neutralise poisons		

9a		[1] scale [1] correct line and points [1] correct labeling of axis	
9b	from 20min to 80min the intensity dropped exponentially from 1170AU to 502AU as the concentration of short peptide decreases because the protease catalyzed the breaking down of the short peptide to amino acids. from 80min to 160min the intensity did not change because all the short peptides would have been broken down by then thus 500AU is the baseline colour intensity for the absence of short peptides	data used in description [1] correct explanation in part 1 [1] and part 2 [1]	
9ci 9cii	new line should be less steep and reaches 500AU later higher temperature means slower reaction rates because - enzymes denatured - enzyme active site 3D configuration might be slightly changed, thus lower chance of forming enzyme-substrate complex Errata: - The temp corrected to 27C, so the explanation corrected to: Enzyme action at lower temp is less active[1] as the kinetic energy of the enzyme and substrate molecules are lowered thereby decreasing the frequency of collision between enzyme and substrate molecules in forming the enzyme-substrate complex [1].		

10a	parental phenotype A B parental genotype AO BO gametes  F1 genotype AB BO AO OO F1 phenotype AB B A O	[1] parental genotype [1] correct gametes and crossing [1] correct F1 genotype no marks for parental phenotype and F1 phenotype	
10b	radiation from the sun or cosmic rays or chemicals like carcinogens		
10c	1) blood group AB has higher chance of survival so greater chance of mating and reproducing 2) more chance of passing the AB gene to the next generation 3) increase in the number of people having blood group AB		
10d	1) gene is isolated and amplified using PCR technology 2) copies of the gene and antibiotic resistant plasmids are cut using the same restriction enzyme 3) gene and plasmid joined together using ligase 4) plasmid introduced into bacteria using heat or electric shock treatment 5) bacteria grown in broth with antibiotics to select only those bacteria with plasmid 6) transformed bacteria are grown in large fermenters and protein is collected and purified		too little marks
11Ea	A - shunt vessels at the surface constrict to allow more blood to carry heat to the surface and cooled by conduction, convection and radiation D - sweat glands become more active producing more sweat that is secreted through sweat pores B. Sweat evaporates carrying away latent heat of vaporization C - thermoreceptors / nerve ending register the increase in temperature at the surface of the skin triggering other homeostatic processes	0.5 mark for naming A to E, 0.5 mark for explanation	

	E - arterioles also dilate allowing more blood to flow towards the skin to bring away the heat		
11Eb	A - petals - large and coloured for insect pollinated flowers to attract insects B - stamen / anther - produces pollen grains C - ovary or ovules - contains the egg cells D - sepals - protects the flower during the bud stage E - stigma - receives mature pollen grains during pollination	0.5 for name, 0.5 for explanation	
11Oa	hypothalamus detects increase in water potential in blood, pituitary gland releases less ADH; Less ADH means less water reabsorbed in the kidneys tubules / nephrons; Water potential of the blood decreases		
11Ob	- during menstruation lower levels of progesterone and oestrogen causes the uterine wall to break down and expelled through the vagina - estrogen is produced by the ovaries and causes the repair of the uterine wall - high levels of estrogen will eventually cause the ovulation which marks the middle of the fertile periods of the woman. A mature egg is released by a mature follicle cell, this marks the start of the fertile phase - the follicle cell then becomes the graafian follicle and corpus luteum after ovulation which produces progesterone - progesterone thickens the uterine lining in preparation of the implantation of a fertilized egg - if there is no fertilized egg, the graafian follicle eventually degenerates and the concentration of progesterone will drop causing the breaking down of the uterine lining again starting the cycle		
11Oc	amniotic fluid protects the fetus from external impact and allows the fetus to move freely inside the uterus; amniotic sac contains the fetus and the fluid;		