CCEA GCSE BIOLOGY (2003 SPECIFICATION)

BIOLOGY



EXAM QUESTION PACK

PAPER 1 HIGHER TIER G0903 PAPERS

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Rewarding Learning

General Certificate of Secondary Education
2012

Science: Biology

Paper 1
Higher Tier

[G0903]

WEDNESDAY 30 MAY, AFTERNOON

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	A – Cytoplasm; B – Chloroplast; C – Nucleus;	[3]	
	(b)	Cell wall; Vacuole;	[2]	5
2	**(a)**	90 ÷ 100 000/0.0009 (or 0.001 3dp); 1 742 000 × 0.0009; (1568 = [2]) Accept 1567.8 or 1567 or 1568	[2]	
	(b)	**(i)** Blockage; In **coronary** blood vessel;	[2]	
		(ii) No oxygen/sugar reaches heart **muscle/cells/tissue/organ**;	[1]	
	(c)	Exercise (regularly);	[1]	6
3	**(a)**	Purple; Red; Respiration;	[3]	
	(b)	Control;	[1]	
	(c)	Size of leaf; Volume of indicator; Temperature; Time;	[2]	6
4	**(a)**	Mechanical – Condom/Cap/IDU/coil; Chemical – Pill/Spermicide;	[2]	
	(b)	Any **one** from: Permanent; Don't have to remember to take it/use before intercourse;	[1]	
	(c)	Have to remember to take/side effects;	[1]	
	(d)	Abstain from intercourse; During 2–3 days **before and after** ovulation (/day 14 of cycle);	[2]	6

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				AVAILABLE MARKS
5	**(a)**	A – Uterus; B – Amnion; C – Cervix;	[3]	
	(b)	B – (Amnion) ruptures/bursts; C – (Cervix) dilates/widens;	[2]	
	(c)	Contracts; Pushing baby out;	[2]	7
6	**(a)**	45; 15;	[2]	
	(b)	Energy/heat lost to – atmosphere/air/apparatus; boiling tube;	[1]	
	(c)	Any **three** from: Gender/males require more energy than females; Age/younger people require more energy than older; Activity/people who are sporty require more energy; Pregnancy/woman needs extra energy for the growth of the foetus;	[3]	
		Quality of written communication	[2]	8
7	**(a)**	Dilates/widens; **More** blood to the surface/**more** heat lost/**more** heat radiated through surface;	[2]	
	(b)	**Evaporation** of sweat requires/takes heat from the body; Muscle contraction **produces**/**generates**/**releases** heat;	[2]	
	(c)	Trap a layer of air for insulation;	[1]	5
8	**(a)**	A – Retina; B – Optic nerve; C – Iris;	[3]	
	(b)	Protection against infection/entry of microorganisms;	[1]	
	(c)	C (*NCM*) /Iris closed in/pupil small; Prevents too much light entering/damaging retinal cells;	[2]	6
9	**(a)**	**(i)** Breaks down/digests/decomposes **dead** organic material;	[1]	
		(ii) Fungi;	[1]	
	(b)	(Greater) aeration/(more) oxygen/(more) respiration; Bacteria/saprophytes more evenly spread;	[2]	
	(c)	Warmer/doesn't dry out;	[1]	5

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				AVAILABLE MARKS
10	**(a)**	1900; thousand tonnes;	[2]	
	(b)	Allows time to reproduce;	[1]	
	(c)	Any **three** from: Quotas; Smaller nets; Larger mesh size; Decommissioning of boats/licence; Seasonal ban/limit time at sea;	[3]	6
11	**(a)**	Potometer;	[1]	
	(b)	Arrow ←;	[1]	
	(c)	To move (air) **bubble** to right/zero/to reset bubble;	[1]	
	(d)	Any **three** from: Fan, then no fan; Measure **distance** moved by (air) bubble; In certain **time**/stated **time**; Repeat a number of times/average;	[3]	
	(e)	Humidity/temperature/light/leaf area;	[1]	7
12	**(a)**	Decreases/thinner;	[1]	
	(b)	CFCs;	[1]	
	(c)	Aerosols/refrigerator (air conditioning) coolants;	[1]	
	(d)	**UV**;	[1]	
	(e)	Increased skin cancer; Increased cataracts/eye cancer;	[2]	6
13	**(a)**	Inherited on the sex chromosomes;	[1]	
	(b)	(male/Y chromosome) is shorter/smaller/carries fewer or different genes (/alleles);	[1]	
	(c)	Carrier/heterozygous;	[1]	
	(d)	Women require **two h/recessive haemophiliac/alleles/genes**; Men require only **one h/recessive/haemophiliac alleles/genes**;	[2]	
	(e)	Colour-blindness/any correct answer (see *http://en.wikipedia.org/wiki/List_of_genetic_disorders*)	[1]	6

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				AVAILABLE MARKS
14	**(a)**	Concentration of minerals is higher in root/plant/cell;	[1]	
	(b)	Plants use oxygen/sugar for respiration; To produce energy/uses energy; To move mineral against/up concentration gradient;	[3]	
	(c)	[Hair/finger-like extension gives] large surface area;	[1]	
	(d)	Calcium – (New) cell walls; Magnesium – Chlorophyll;	[2]	7
15	**(a)**	Carbon, hydrogen, oxygen, nitrogen;	[1]	
	(b)	Liver; Glycogen;	[2]	
	(c)	Kidney; **Ultra**filtration;	[2]	
	(d)	Down **ureters to bladder**; Out through **urethra**;	[2]	
	(e)	Urine is toxic/poisonous;	[1]	8
16	**(a)**	Chromosomes replicate/duplicate/copied; Separate into **two** (daughter) cells;	[2]	
	(b)	Any **two** from: Mitosis one division, meiosis two divisions; Mitosis produces two cells, meiosis four cells; Mitosis produces (genetically) identical cells, meiosis (genetically) different cells; Mitosis produces diploid cells, meiosis haploid cells;	[2]	
	(c)	Any **two** from: Gametes (sperm and eggs) contain different **alleles**/**chromosomes**/**genes**/**DNA**/independent assortment; During fertilisation random; Different children have different **combinations** of alleles/chromosomes;	[2]	
	(d)	23; 46;	[2]	8

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			AVAILABLE MARKS
17	**(a)**	Artery wall is thick/muscular/has elastic (fibres) **and** capillary wall is one cell thick; [1]	
		Artery wall is thick/muscular/has elastic (fibres) **and** vein wall is thin/has valves; [1]	
	(b)	Tissue fluid; [1]	
	(c)	High pressure in artery/fluid forced; Through capillary walls; [2]	
	(d)	**(i)** Any **two** from: Oxygen; Glucose/sugar/amino acids/fatty acids/glycerol; Hormones; [2]	
		(ii) Carbon dioxide/nitrogen wastes; [1]	
	(e)	Returned to blood system; [1]	9
18	**(a)**	A – Denitrification; B – Consumption/feeding; C – Decomposition; [3]	
	(b)	Nitrate/nitrite/ammonium compounds; [1]	
	(c)	Any **two** from: Minerals (nitrates/nitrogen compounds) absorbed/used by plants for growth; Minerals (nitrates/nitrogen compounds) removed when plants are harvested; Fertilizers replace minerals (nitrates/nitrogen compounds); [2]	
	(d)	Change nitrogen gas into ammonium compounds/amino acids/nitrates; More in soil/more absorbed; Used to make proteins (for growth); **or** Improved soil texture/crumb structure; More aeration/O_2; For active uptake; [3]	9
		Total	**120**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2011

Science: Biology

Paper 1
Higher Tier

[G0903]

G0903

THURSDAY 19 MAY, AFTERNOON

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
Total Marks	

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

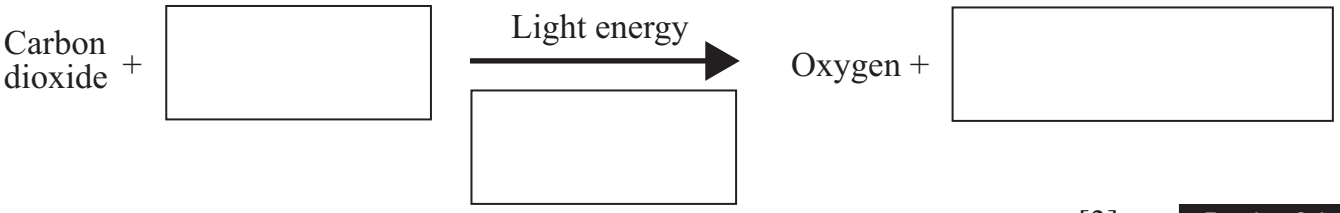
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all eighteen** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 120.
Quality of written communication will be assessed in question **6(c)**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

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1 **(a)** Complete the word equation for photosynthesis.



[3]

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Marks	Remark

(b) Name **one** mineral required by plants and give its use.

_____

_____

_____ [2]

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Examiner Only	
Marks	Remark

2 Breast milk contains all the nutrients a baby needs in the correct proportions.

(a) Name the **food group** needed

to provide energy. _____ [1]

for growth. _____ [1]

Breast milk also contains antibodies.

(b) Explain the advantage of these to the baby.

_____

_____ [1]

(c) Suggest **two other** advantages of breast feeding.

_____

_____

_____ [2]

(d) Explain why HIV positive mothers are advised not to breast feed.

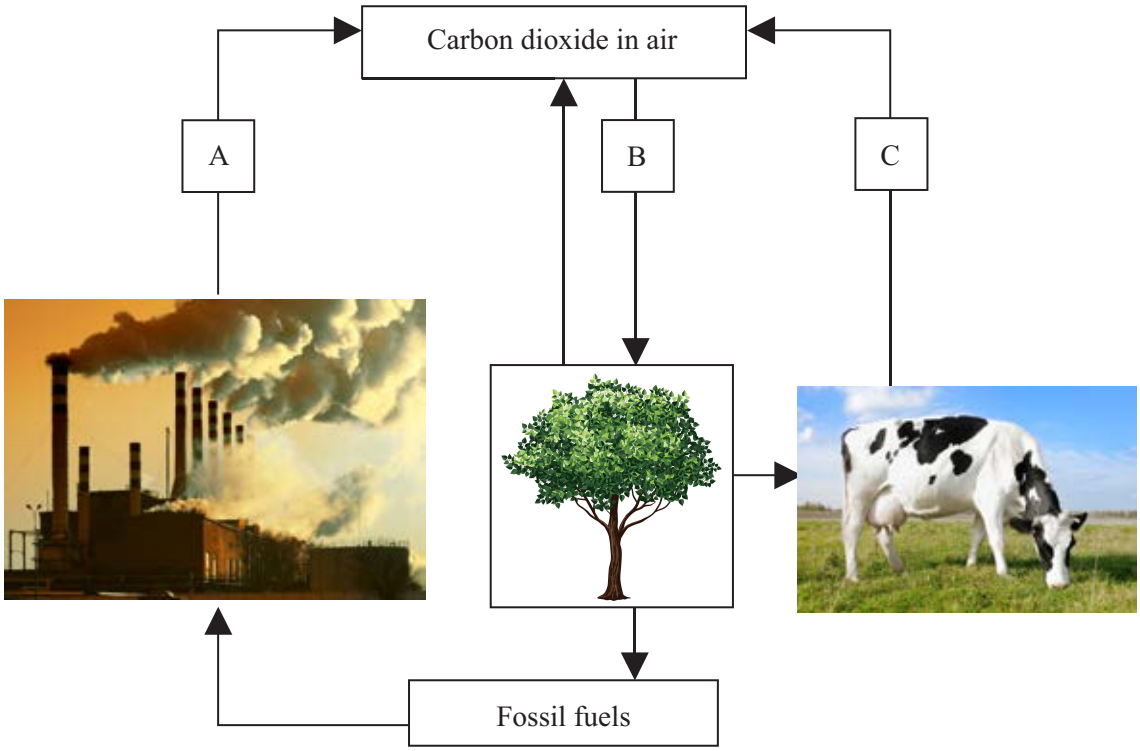
_____

_____ [1]

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3 The diagram shows part of the carbon cycle.

Examiner Only	
Marks	Remark



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(a) Name processes A, B and C.

A _____ [1]

B _____ [1]

C _____ [1]

(b) Describe how carbon, present in plant tissue, becomes a named carbon compound in an animal.

_____

_____

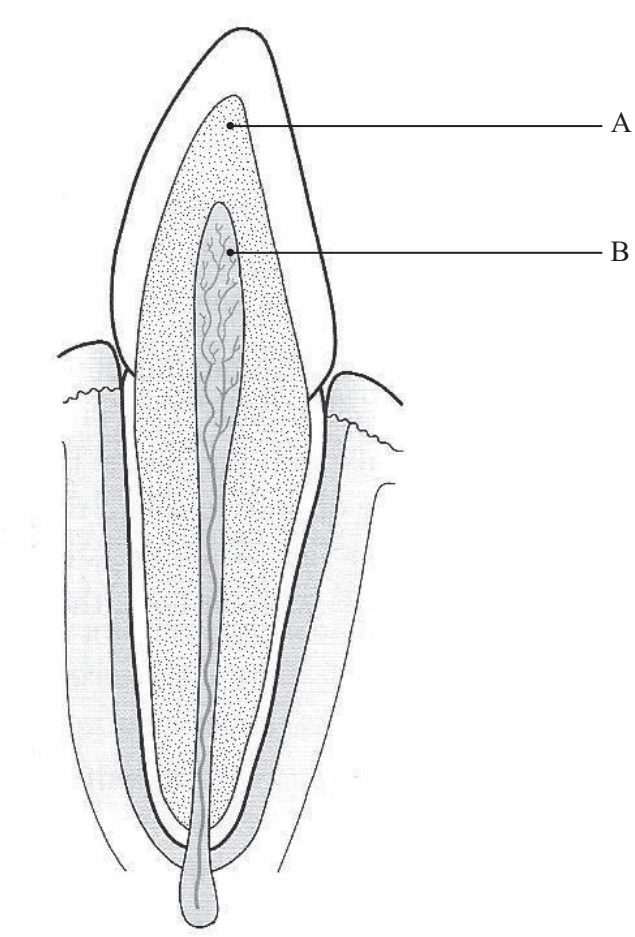
_____ [2]

(c) Name a fossil fuel.

_____ [1]

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4 The diagram shows the structure of a tooth.



© Adapted from Biology Lives by Morton Jenkins, published by Hodder & Stoughton, 2001. ISBN 0340790512.

(a) Name part A.

_____ [1]

(b) Name **one** type of tissue found in cavity B.

_____ [1]

(c) Describe the role of bacteria and sugar in tooth decay.

_____

_____

_____

_____ [2]

Examiner Only

Marks	Remark

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(d) Name the part of the tooth which is strengthened by regular use of fluoride toothpaste.

_____ [1]

One way of ensuring that people get enough fluoride is to add it to the public drinking water.

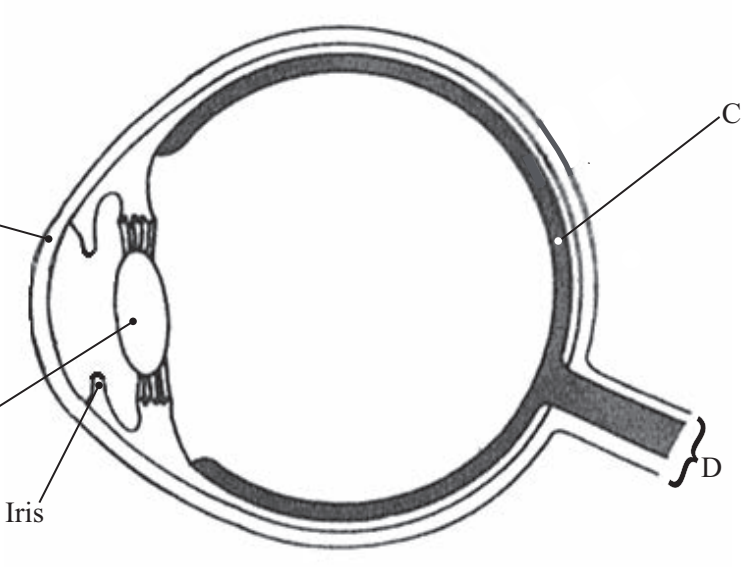
(e) Suggest **one** reason why some people may object to this.

_____

_____ [1]

Examiner Only	
Marks	Remark

5 The diagram shows a simplified cross section of the eye.



(a) Name parts A, B and C.

A _____ [1]

B _____ [1]

C _____ [1]

(b) Name and give the function of part D.

_____

_____

_____ [2]

(c) Give **one** piece of evidence from the diagram, which suggests this eye is in low light conditions.

_____

_____ [1]

(d) Name **one** structure which protects the eye from damage.

_____ [1]

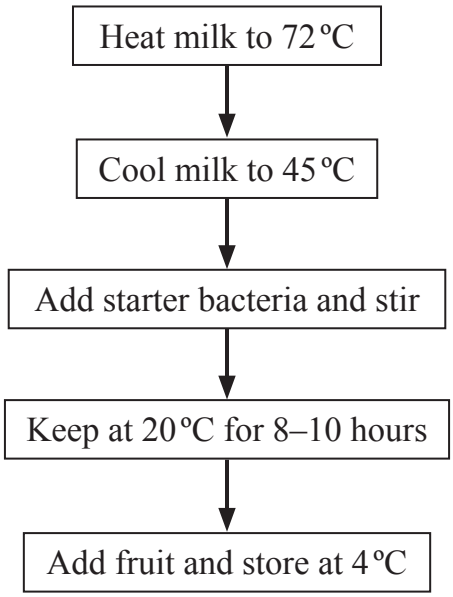
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Marks	Remark

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Examiner Only	
Marks	Remark

6 The flow diagram shows a method used to make yoghurt.



(a) Suggest why the milk is heated to 72 °C at the start.

_____ [1]

(b) Explain why starter bacteria are not added until after the milk has been cooled to 45 °C.

_____

_____ [1]

(c) Describe how the bacteria change the milk into yoghurt at 20 °C.
The quality of written communication will be assessed in this question.

_____

_____

_____

_____

_____ [3]

Quality of written communication [2]

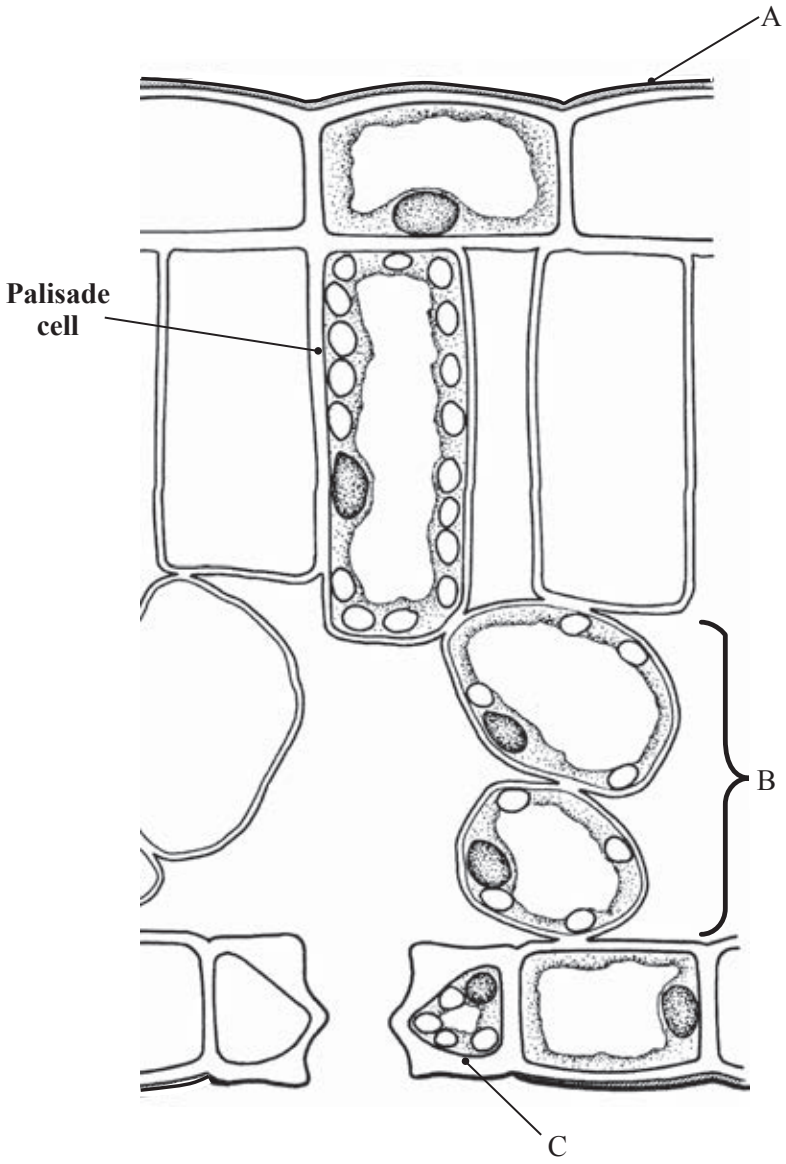
(d) Explain why the yoghurt is stored at 4 °C.

_____

_____ [1]

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7 The diagram shows a section through a leaf.



© Biology GCSE by G & M Jones, published by Cambridge University Press, 1984. ISBN 0521285321

(a) Name parts A, B and C.

A _____ [1]

B _____ [1]

C _____ [1]

(b) Describe how the palisade cell is adapted for its function.

_____

_____

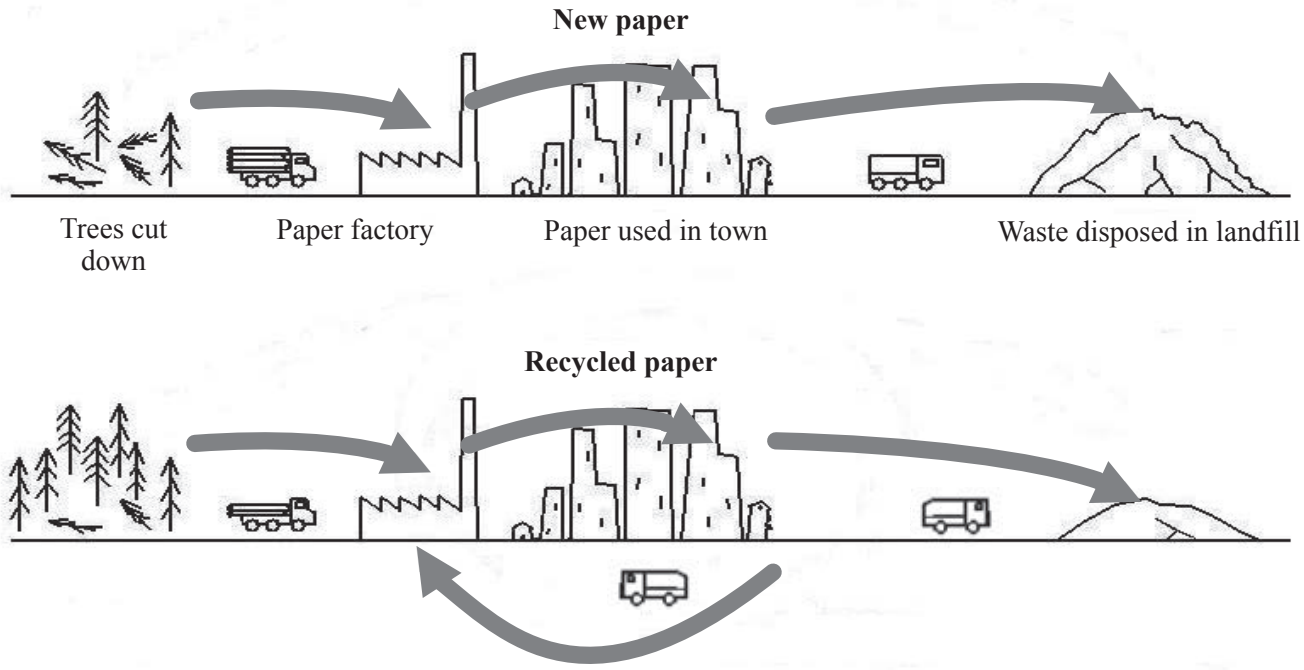
_____ [2]

Examiner Only

Marks	Remark

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8 The diagram compares the production and use of new and recycled paper.



© Giorgio Carboni/Fun Science Gallery http://www.funsci.com/fun3_en/paper/paper.htm#5

Examiner Only	
Marks	Remark

(a) Use the information in the diagram to suggest **two** environmental advantages of using recycled paper.

1. _____

_____ [1]

2. _____

_____ [1]

(b) Explain how the increased transport required to recycle paper may affect the environment.

_____

_____

_____ [2]

(c) Give **one other** disadvantage of using recycled paper instead of new paper.

_____ [1]

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Examiner Only	
Marks	Remark

9 The diagram shows some solvents.



© *The Bridge Project*

(a) What is solvent abuse?

_____

_____

_____ [2]

(b) Give **two** harmful effects of solvent abuse on the human body.

_____

_____

_____ [2]

(c) Describe **two** ways solvent abuse can be damaging to society.

1. _____

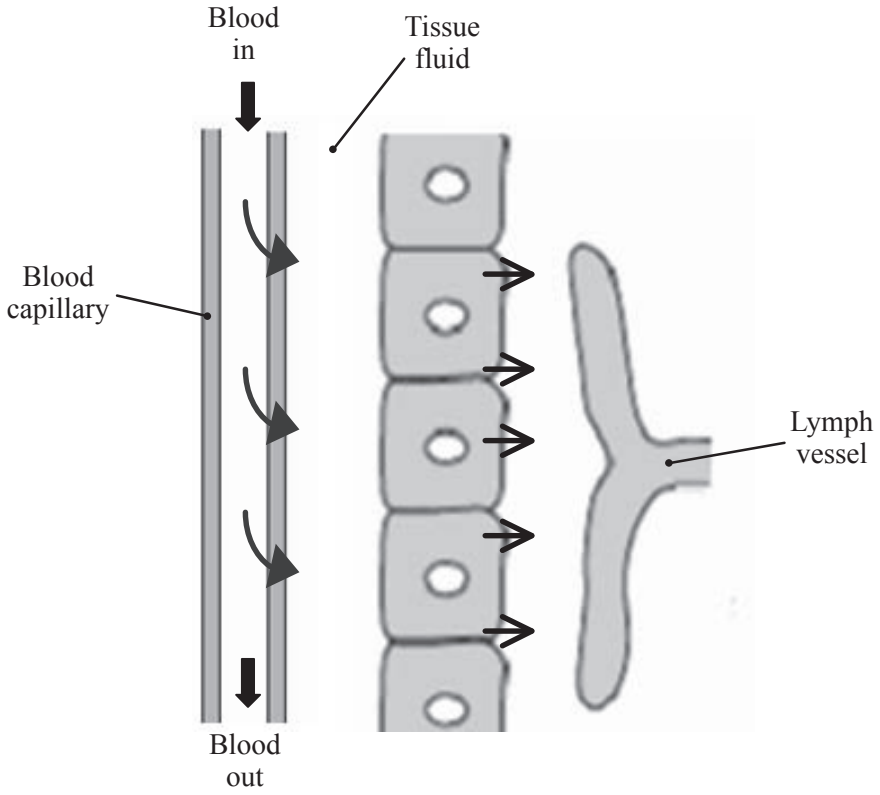
_____ [1]

2. _____

_____ [1]

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10 The diagram shows the formation of tissue fluid.



(a) Describe how tissue fluid forms.

_____

_____

_____

_____

_____ [3]

(b) Name **two** components of the blood which are not found in tissue fluid.

1. _____ [1]

2. _____ [1]

(c) Describe the role of the lymph vessel.

_____

_____ [1]

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Marks	Remark

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11 The photograph shows the effect of light on cress seedlings.



© *Science Photo Library*

(a) Explain how light has affected the cress seedlings.

_____

_____

_____ [2]

(b) Name the process shown and explain why it is beneficial to the seedlings.

_____

_____

_____ [2]

The process was caused by a plant hormone.

(c) Give **two other** uses of plant hormones.

1. _____ [1]

2. _____ [1]

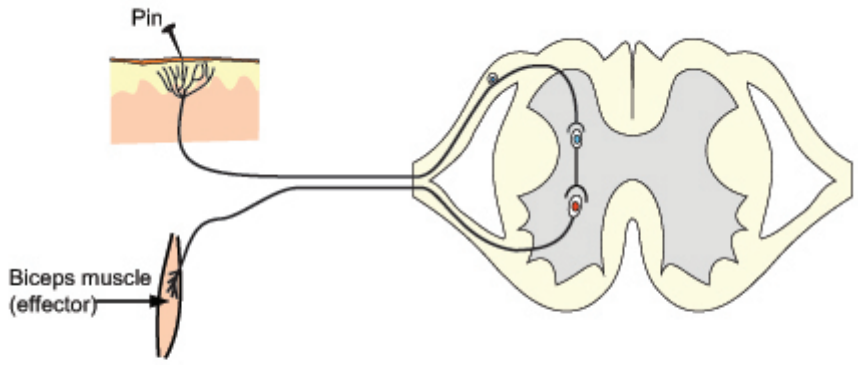
Examiner Only

Marks	Remark

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12 The diagram shows a reflex arc.

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Marks	Remark



© Focus Educational Software Ltd

(a) **Draw a line labelled R** to show the receptor. [1]

(b) Describe the pathway taken as the nerve impulse passes from the receptor to the effector.

_____

_____

_____

_____

_____ [3]

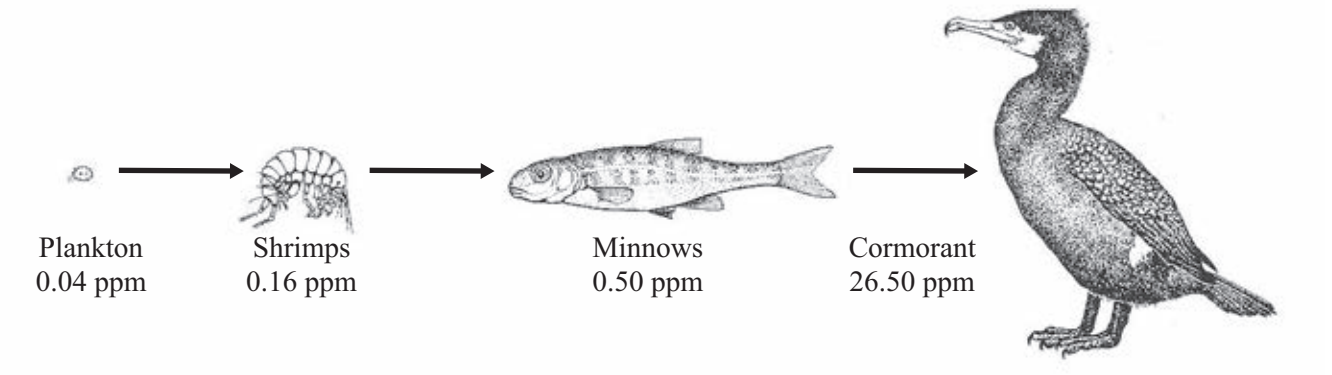
(c) Describe the response when the impulse reaches the effector.

_____

_____

_____ [2]

13 The diagram shows the concentration of DDT in each type of organism in a food chain.



© Biology: GCSE Edition by Geoff & Mary Jones, published by Cambridge University Press, 1987. ISBN 978 0521338691

DDT is a pesticide.

(a) What is a pesticide?

_____ [1]

(b) Calculate the percentage **increase** of the concentration of DDT from the plankton to the shrimps.
Show your working.

_____% [2]

(c) Explain why the concentration of DDT changes along the food chain.

_____

_____

_____ [2]

(d) Give **two** reasons why, although it is banned in many countries, DDT is still used in some underdeveloped countries.

1. _____

_____ [1]

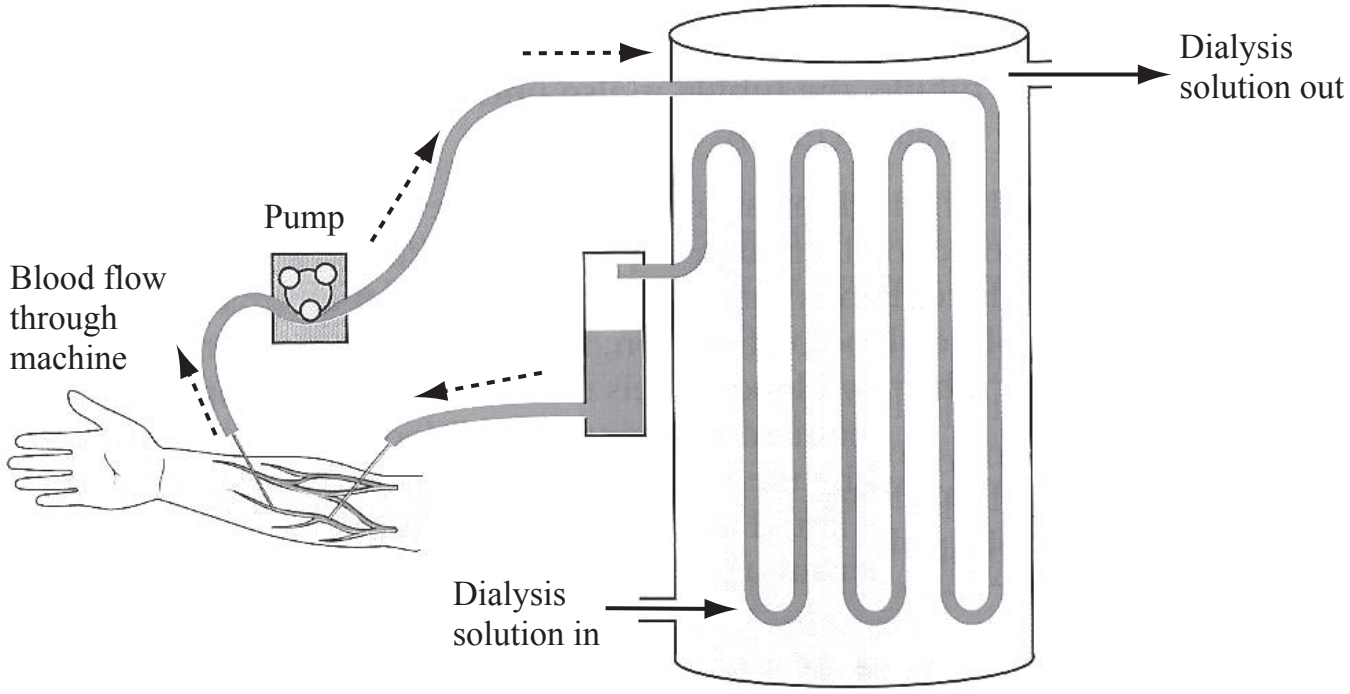
2. _____

_____ [1]

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Marks	Remark

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14 The diagram shows a kidney dialysis machine.



© AQA GCSE Science by V Pruden & K Hirst, published by Hodder & Stoughton, 2001. ISBN 0340802472.
Reproduced by permission of Hodder Education

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Marks	Remark

(a) Name the process which causes urea to pass from the blood into the dialysis solution.

_____ [1]

(b) Explain why the dialysis solution has to be changed at regular intervals.

_____

_____

_____ [2]

(c) Explain why patients have to eat a low salt diet when not on the dialysis machine.

_____

_____ [1]

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(d) Suggest **one** disadvantage and **two** advantages of a kidney transplant compared to dialysis.

Disadvantage _____

_____

Advantages _____

_____

_____

_____ [3]

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Marks	Remark

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Examiner Only	
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15 (a) The diagram shows a radiotherapy machine. This produces X-ray radiation which damages DNA, reducing the growth of a malignant cancerous tumour.



© Reproduced with permission from Macmillan Cancer Support

(i) Explain what is meant by a malignant cancerous tumour.

_____

_____ [2]

(ii) Suggest how X-ray radiation may reduce the growth of a cancerous tumour.

_____

_____ [1]

(iii) Give **one** advantage of having this treatment before surgery is carried out.

_____

_____ [1]

(iv) Suggest why this machine directs the X-ray radiation on to the tumour from several different angles.

_____

_____ [1]

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(b) Some of the radiation in sunlight can cause cancer.

(i) Name the type of radiation in sunlight which causes cancer.

_____ [1]

(ii) Explain how skin cancer is linked to atmospheric pollution.

_____

_____

_____

_____ [2]

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Examiner Only	
Marks	Remark

16 Some women who are sterile may undergo *in vitro* fertilization (IVF).

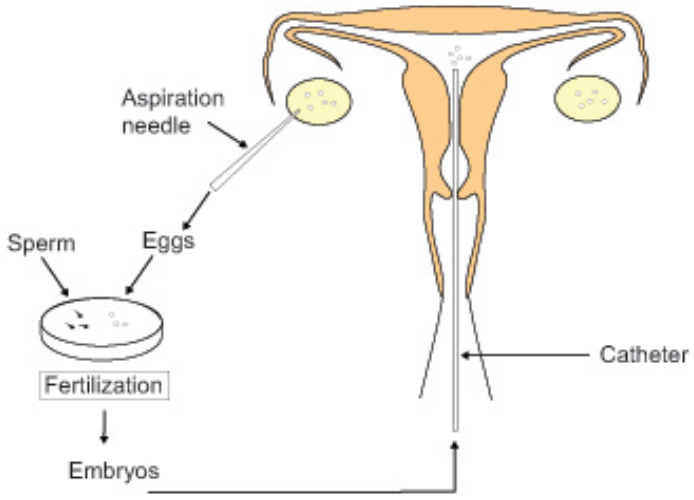
(a) Describe the effect of the hormones on the ovaries at the start of *in vitro* fertilization.

_____

_____

_____ [2]

The diagram shows the process of *in vitro* fertilization.



© *Focus Educational Software Ltd*

Use the diagram to help answer the following questions.

(b) Describe how the eggs are obtained.

_____

_____ [1]

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(c) Explain why eggs are examined after sperm are added to the dish.

_____

_____

_____ [2]

(d) What happens to the embryos after they are inserted into the uterus using the catheter?

_____

_____ [1]

(e) Give **two** reasons why females may be sterile.

1. _____ [1]

2. _____ [1]

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Marks	Remark

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17 The pictures show hornless and horned Hereford bulls owned by a farmer.

Examiner Only	
Marks	Remark



© iStockphoto / Thinkstock



Source: http://en.wikipedia.org/wiki/Hereford_(cattle)

The presence of horns in this breed is controlled by two alleles.
The allele (**H**) for the hornless condition is dominant to the allele (**h**) for horned.

(a) What is an allele?

_____

_____ [1]

(b) Explain the term phenotype.

_____

_____ [1]

(c) Explain which of the bulls could have a heterozygous genotype.

_____

_____

_____ [2]

The farmer bought a hornless cow.

Examiner Only	
Marks	Remark

(d) Explain how mating this cow to one of his bulls could determine the cow's genotype.

_____

_____

_____

_____

_____ [3]

(e) Give the term used to describe this type of mating.

_____ [1]

(f) Explain why the cow may have to produce several calves before the genotype can be determined.

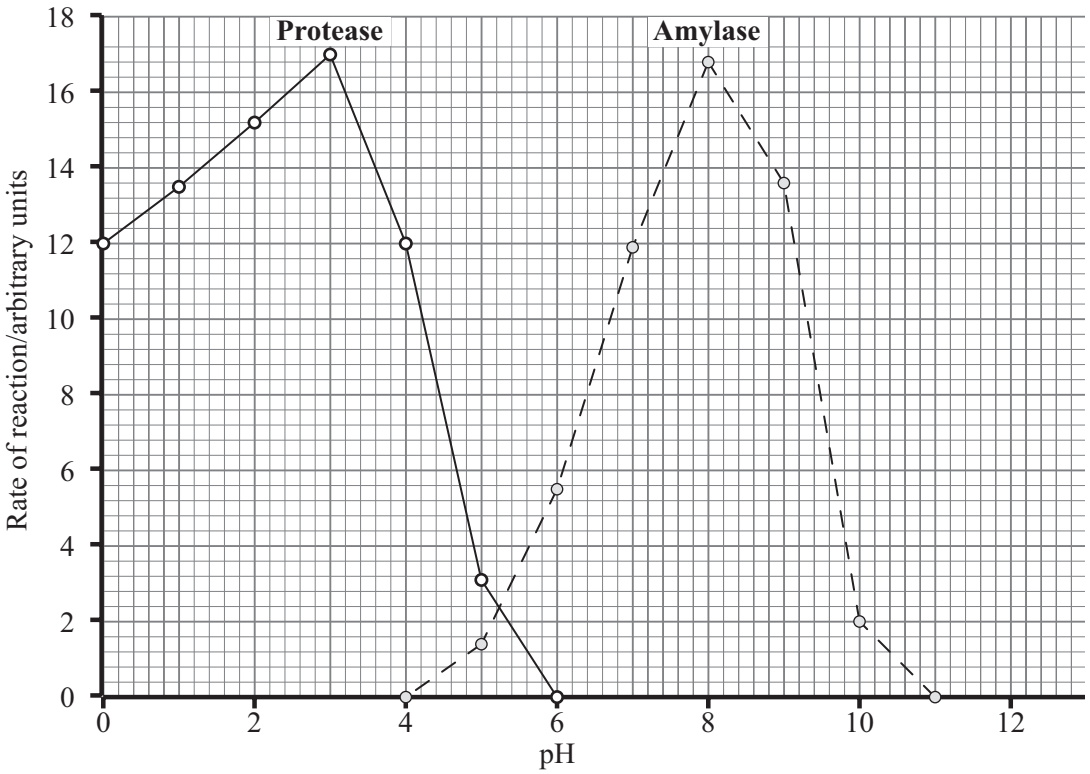
_____

_____ [1]

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18 The graph shows how pH affects the activity of two human enzymes.

Examiner Only	
Marks	Remark



(a) Describe and explain the change in the rate of reaction of the amylase above pH 8.

_____

_____

_____ [2]

(b) Where is amylase found in the digestive system?

_____ [1]

(c) What is a protease enzyme?

_____

_____

_____

_____

_____ [3]

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(d) Use information from the graph to help suggest where the protease enzyme is found in the body.

_____

_____

_____ [2]

(e) Give **one other** factor which affects the activity of an enzyme.

_____ [1]

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Marks	Remark

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General Certificate of Secondary Education
2011

Science: Biology

Paper 1
Higher Tier

[G0903]

THURSDAY 19 MAY, AFTERNOON

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	Water; Chlorophyll; Sugar/glucose/starch;	[1] [1] [1]	
	(b)	Any PAIR [***mineral*** + ***appropriate use***] from: Calcium; Cell walls; Magnesium; Chlorophyll; Nitrate; Growth/protein production/amino acid production;	[2]	5
2	**(a)**	Carbohydrates; Proteins;	[1] [1]	
	(b)	Protects baby from infection/confers immunity;	[1]	
	(c)	Any two from: Convenience (correct temp/no sterilising bottles); Maternal bond/security/love; Easier absorbed/digested; Easier to wean; Helps prevent childhood diabetes; Less cost; Help prevent breast/ovarian cancer in mother;	[2]	
	(d)	May pass virus on to baby/would be in milk;	[1]	6
3	**(a)**	A – combustion/burning; B – photosynthesis; C – respiration;	[1] [1] [1]	
	(b)	animal eats plant; made into animal carbohydrates/fats/proteins;	[2]	
	(c)	Coal/natural gas/oil/peat;	[1]	6

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				AVAILABLE MARKS
4	**(a)**	Dentine;	[1]	
	(b)	Blood (named example)/nerve (neurone);	[1]	
	(c)	(Bacteria) use/respire/break down sugars from food; Produce acid which corrodes the enamel;	[2]	
	(d)	Enamel;	[1]	
	(e)	Lack of freedom of choice/excess can cause fluorosis;	[1]	6
5	**(a)**	A – Lens; B – cornea; C – retina;	[1] [1] [1]	
	(b)	Optic nerve; carries impulses **to brain**;	[2]	
	(c)	Pupil dilated;	[1]	
	(d)	Eyelid/conjunctiva eye socket;	[1]	7
6	**(a)**	To kill any **harmful** bacteria/microorganisms;	[1]	
	(b)	(Starter) bacteria killed by heating;	[1]	
	(c)	Any three from: respiration; fermentation/anaerobic; feed on sugar; produces acid; multiply/grow;	[3]	
		Quality of written communication	[2]	
	(d)	slows microorganism growth/decay of yoghurt;	[1]	8
7	**(a)**	A – (waxy) cuticle; B – Spongy (mesophyll); C – Guard cell;	[1] [1] [1]	
	(b)	Large number of chloroplasts/neatly aligned/near top of leaf; to trap light/for photosynthesis;	[2]	5

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				AVAILABLE MARKS
8	**(a)**	Fewer trees cut down/more trees left standing/more trees to absorb CO_2;	[1]	
		Less (waste paper) to landfill/less space used for landfill;	[1]	
	(b)	*Any **TWO** from:* Increased use of (fossil) fuel/named example; Increased production of CO_2/SO_2/NO_x; Increased greenhouse effect/global/warming/acid rain;	[2]	
	(c)	Poor quality/more expensive;	[1]	5
9	**(a)**	Inhaling; chemicals eg. glue;	[2]	
	(b)	*Any **TWO** from:* Heart damage; Damage to liver/bone marrow/kidneys; Damage to respiratory system/swelling of throat or air passages; Poisonous/toxic; Death; Damage to brain/blurred vision;	[2]	
	(c)	*Any **TWO** from:* increased medical costs; family problems/violence; vandalism; absenteeism;	[2]	6
10	**(a)**	Plasma; forced out/under pressure; through capillary wall;	[3]	
	(b)	Blood cells; (plasma) proteins;	[1] [1]	
	(c)	Absorb/drain away (excess) tissue fluid;	[1]	6
11	**(a)**	plant **grows**; towards light/window;	[2]	
	(b)	phototropism; **more** photosynthesis/**more** light;	[2]	
	(c)	*Any **TWO** from:* selective weedkiller; rooting powder; Stimulate flowering; fruit formation/seedless fruit; fruit ripening;	[2]	6

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				AVAILABLE MARKS
12	**(a)**	skin labelled R;	[1]	
	(b)	pathway – sensory neurone; association neurone; motor neurone; synapse; (Any three)	[3]	
	(c)	muscle **contracts**; moves **arm** (away);	[2]	6
13	**(a)**	A chemical that kills pest;	[1]	
	(b)	(0.16 − 0.04/0.12);	[1]	
		300%/correct method ÷ 0.04 then × 100 or × 100 then ÷ 0.04;	[1]	
	(c)	*Any **TWO** from:* Not broken down/digested/excreted, Remains/persists in body; Each consumer eats several plants/animals in the level below;	[2]	
	(d)	Effective at killing pests;	[1]	
		Economic/cheap compared to modern non-polluting insecticides;	[1]	7
14	**(a)**	Diffusion;	[1]	
	(b)	Concentration gradient/described;	[1]	
		Maintain the diffusion/movement of substances (named example) out of the blood/into the dialysis solution;	[1]	
	(c)	Salt level normally regulated by kidneys/kidneys not able to remove salt; OR High salt level in blood causes osmotic effects/described;	[1]	
	(d)	Disadvantage – lack of donor/surgery/risk of infection/risk of rejection; Advantages – *Any **TWO** from:* Permanent cure/reduced chance of infection; Can eat a normal diet; No visits to hospital 2/3 times per week/better quality of life;	[3]	7

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				AVAILABLE MARKS
15	**(a)**	**(i)** Abnormal cell division; capable of spreading;	[2]	
		(ii) Prevents cell division/DNA replication;	[1]	
		(iii) Smaller tumour easier to remove/causes less pain;	[1]	
		(iv) Radiation more concentrated on tumour/ less damage to healthy tissue;	[1]	
	(b)	**(i)** Ultra violet/UV;	[1]	
		(ii) *Any **TWO** from:* CFCs; from aerosols/refrigerators/air conditioning; depletes ozone; so **more** UV enters;	[2]	8
16	**(a)**	increase the number of eggs; maturing at once;	[2]	
	(b)	via a needle from the ovary;	[1]	
	(c)	to check for fertilization; cells dividing/developing/growing/alive;	[2]	
	(d)	implantation;	[1]	
	(e)	*Any **TWO** from:* blocked oviducts; not ovulating; Uterus removed;	[2]	8
17	**(a)**	Different forms of the same gene;	[1]	
	(b)	The appearance of the organism;	[1]	
	(c)	Hornless;	[1]	
		Hornless allele is dominant/heterozygous genotype has one dominant and one recessive allele/Hh;	[1]	
	(d)	Mate with **horned bull**/homozygous recessive;	[1]	
		If any **horned** calves then cow is heterozygous/Hh;	[1]	
		If **no horned calves/all hornless** then cow is homozygous hornless/HH;	[1]	
	(e)	Backcross/testcross;	[1]	
	(f)	Fertilization is random/only 50% chance of Hh;	[1]	9

				AVAILABLE MARKS
18	**(a)**	Reduced activity; Enzyme <u>denatured</u>;	[1] [1]	
	(b)	Mouth/pancreas/duodenum/small intestine;	[1]	
	(c)	A protein; Catalyses/speeds up reactions; Breaking down proteins (to amino acids);	[1] [1] [1]	
	(d)	Stomach; Highest activity/optimum at pH 3;	[1] [1]	
	(e)	Temperature/substrate concentration/substrate surface area;	[1]	9
		Total		**120**

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Rewarding Learning

General Certificate of Secondary Education
2010

Science: Biology

Paper 1
Higher Tier

[G0903]

FRIDAY 21 MAY, MORNING

G0903

Centre Number

71	

Candidate Number

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
Total Marks	

TIME

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all eighteen** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 120.
Quality of written communication will be assessed in question **6(b)**
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

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Examiner Only	
Marks	Remark

1 **(a)** Complete the table of changes which happen during puberty.

Change during puberty	Boys	Girls	
Growth spurt			[1]
	Yes	No	[1]
Menstruation			[1]

(b) Name the hormone which causes these changes in girls and describe where it is produced.

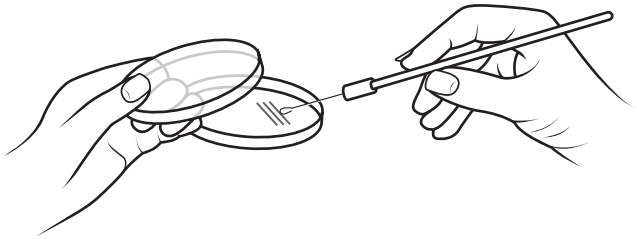
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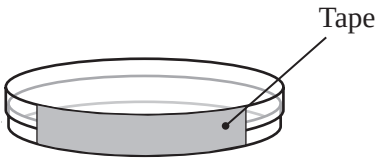
_____[2]

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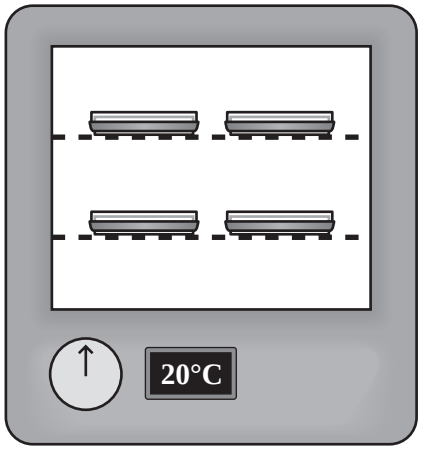
2 The diagram shows a method used to investigate microorganisms.



Streak the sample of microorganism on to a sterile agar plate



Seal the plate with tape



Incubate at 20 °C

Adapted from © Microbes in Action by Dr C J Clegg, published by John Murray, 2002, ISBN 0719575540

(a) Name **two** groups of microorganisms.

1. _____ [1]

2. _____ [1]

(b) Use the diagram and your knowledge to describe **two** ways unwanted microorganisms can be prevented from entering the agar plate while streaking the sample.

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

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(c) Explain why the agar plate is sealed with tape.

_____

_____[1]

(d) Why is the agar plate incubated at 20 °C and not at 37 °C?

_____[1]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

3 Carbohydrates contain the element carbon.

(a) (i) Name the **other two** elements found in carbohydrates.

_____ and _____ [2]

(ii) Name the carbohydrate

found in fibre. _____ [1]

used in respiration. _____ [1]

A 50 g serving of pasta contains 756 kJ of energy.

(b) (i) Calculate the energy content of 100 g of pasta.

_____ kJ [1]

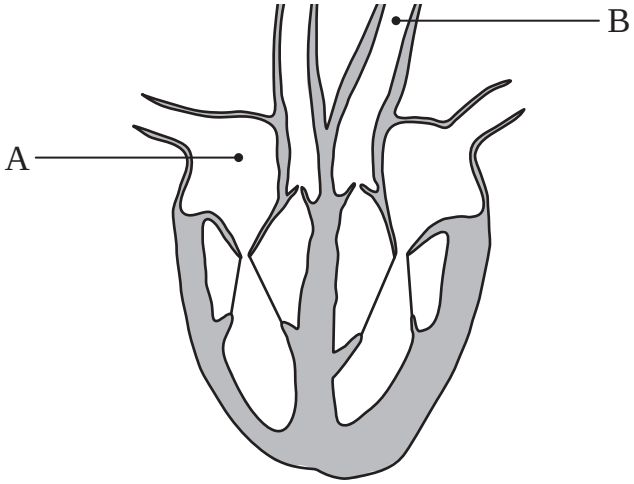
(ii) Suggest which of the foods below would provide most energy.

Potatoes **Butter** **Cabbage**

_____ [1]

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4 The diagram shows a human heart.



(a) Name parts A and B.

A _____ [1]

B _____ [1]

(b) Explain why the wall of the left ventricle is thicker than the right.

_____

_____

_____ [2]

(c) Describe **two** factors which can contribute to heart disease.

_____

_____

_____ [2]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

5 **(a)** Name **one** substance, produced by burning fossil fuels,

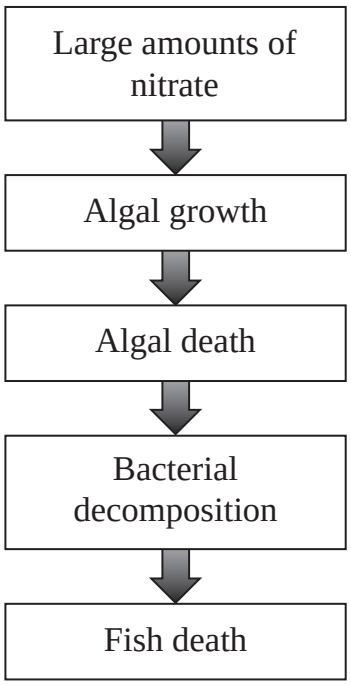
which causes acid rain.

_____ [1]

which blackens leaves and reduces photosynthesis.

_____ [1]

The flowchart summarises what happens when large amounts of nitrates pass into a lake.



(b) **(i)** Give **two** sources of nitrates which pass into lakes.

1. _____ [1]

2. _____ [1]

(ii) Explain how bacterial decomposition causes the death of fish.

_____

_____

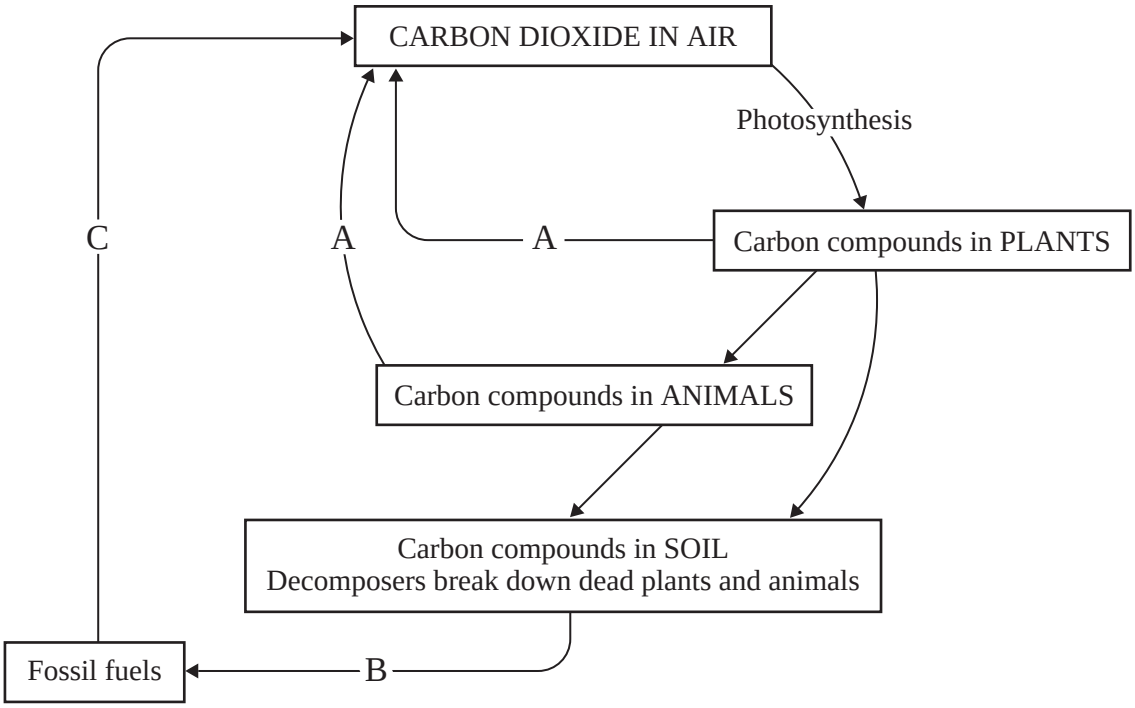
_____ [2]

(iii) Name the process summarised in the flowchart.

_____ [1]

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6 The diagram shows part of the carbon cycle.



(a) Name the processes A, B and C.

A _____ [1]

B _____ [1]

C _____ [1]

(b) Use the diagram to describe how carbon, from the air, is passed through a food chain and back into the air by decomposers.
Quality of written communication will be assessed in this question.

_____

_____

_____

_____

_____

_____ [3]

Quality of written communication [2]

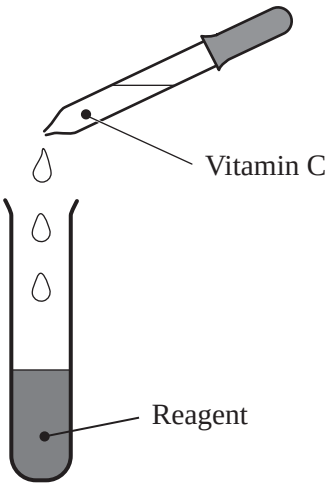
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

7 The diagram shows the apparatus used to test fruit juice for vitamin C content.



(a) Name the reagent used to test for vitamin C.

_____ [1]

(b) Describe the colour change if vitamin C is present.

_____

_____ [1]

The table shows the results for three different juices.

Type of juice	Number of drops of fruit juice required to change colour of reagent
Blackcurrant	3
Orange	5
Boiled orange	18

(c) Which juice contained the most vitamin C?

_____ [1]

(d) Suggest **two** reasons why boiling fruit and vegetables reduces their vitamin C content.

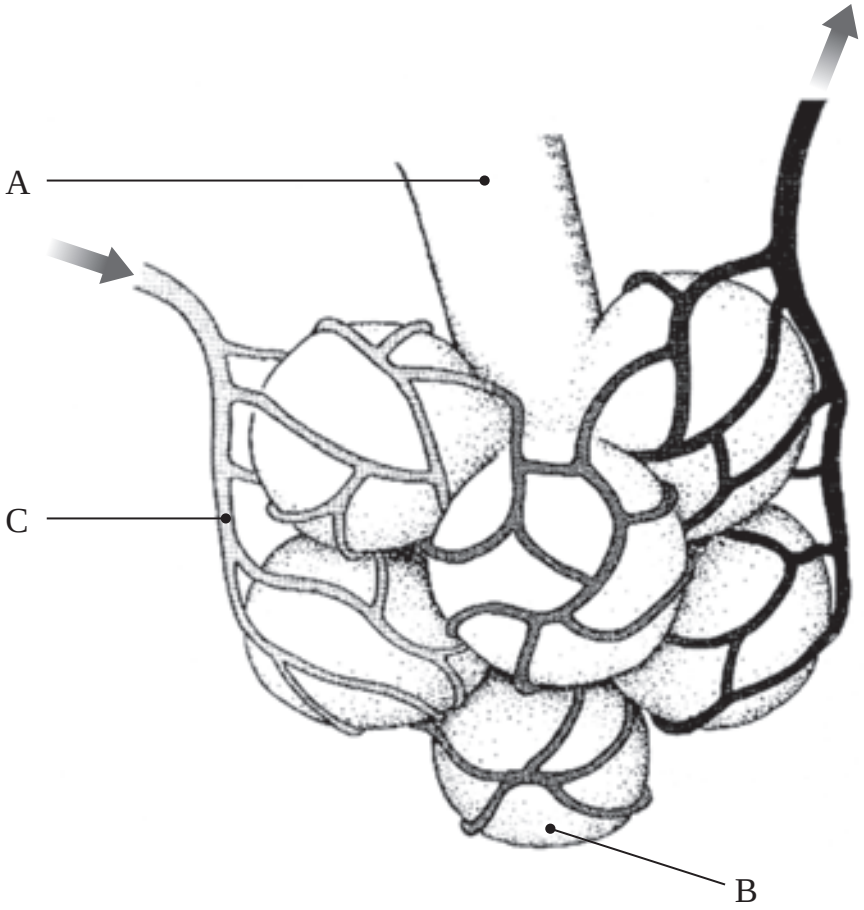
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_____

_____ [2]

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8 The diagram shows part of the respiratory system.



© Biology: GCSE Edition by G & M Jones, published by Cambridge University Press, 1987, ISBN 0521338697

(a) Name parts A, B and C

A _____ [1]

B _____ [1]

C _____ [1]

(b) Describe **two** ways this part of the respiratory system is adapted for gas exchange.

_____

_____

_____

_____ [2]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

9 AIDS is a sexually transmissible disease which may be prevented by using a condom.

(a) Explain what is meant by a sexually transmissible disease.

_____

_____

_____ [1]

(b) Name **one other** sexually transmissible disease.

_____ [1]

(c) Name the type of organism which causes AIDS.

_____ [1]

(d) Describe how a condom can prevent the spread of AIDS.

_____

_____

_____ [1]

(e) Describe **two other** ways AIDS may be transmitted.

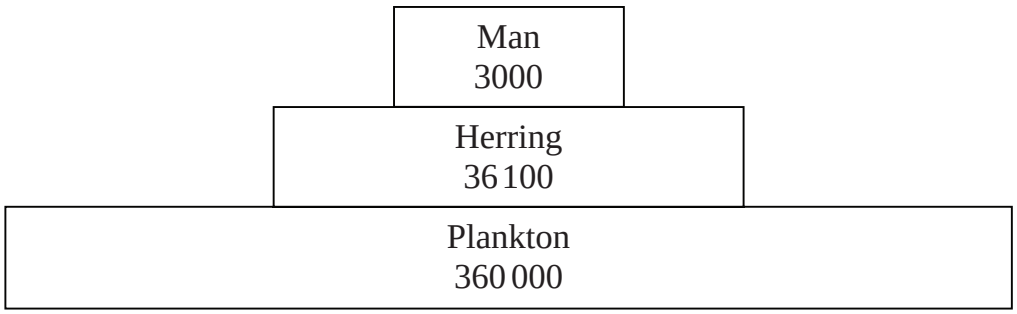
_____

_____

_____ [2]

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10 The pyramid shows the transfer of energy, in arbitrary units, from plankton to man.



(a) Calculate the ratio of energy in the plankton to energy transferred to man.
Show your working.

[2]

(b) Give **two** reasons for the decrease in energy between herring and man.

1. _____[1]

2. _____[1]

(c) Give **two** ways over-fishing of the herring population, in the North Sea, could be reduced.

1. _____[1]

2. _____[1]

Examiner Only

Marks	Remark

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11 **(a)** Complete the table to compare aerobic and anaerobic respiration of yeast.

Write **Yes** or **No** in **each** of the empty boxes.

	Respiration in yeast	
	Aerobic respiration	**Anaerobic respiration**
Uses oxygen		
Releases energy		
Produces ethanol		
Produces carbon dioxide		

[1]

[1]

[1]

[1]

(b) Where does aerobic respiration take place in the human body? Describe what happens to the substances produced.

_____

_____

_____ [2]

Examiner Only

Marks	Remark

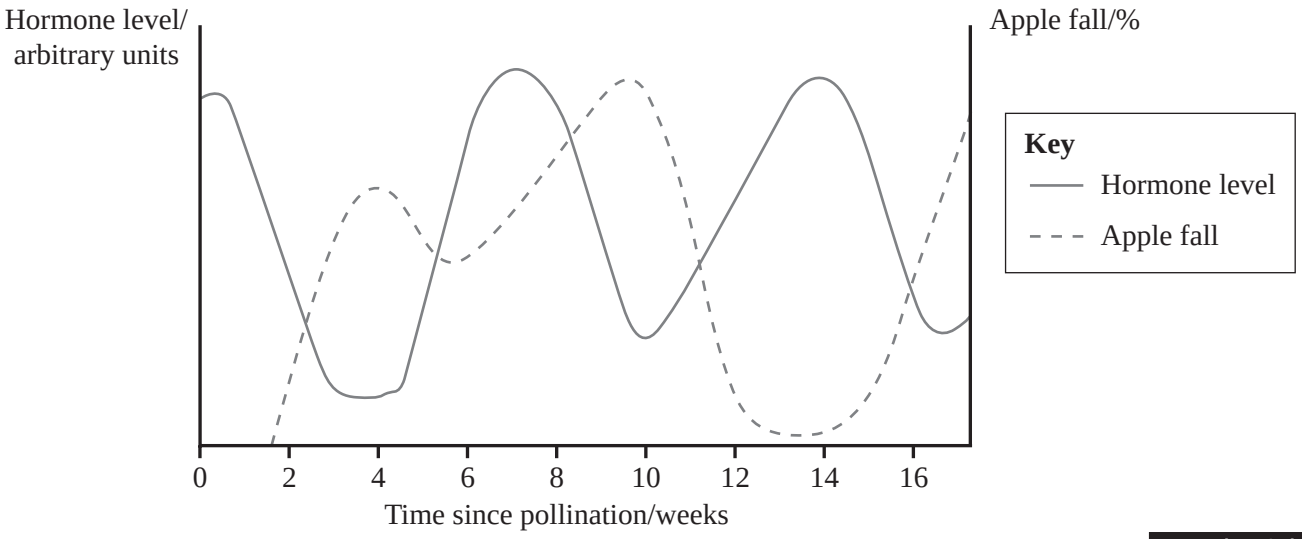
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12 The graph shows the relationship between plant hormone level and the percentage of apples to fall off the trees before harvesting.



Examiner Only	
Marks	Remark

(a) Describe the relationship between hormone level and the percentage of apples that fall.

_____

_____

_____[1]

(b) Suggest **one** reason why farmers spray apple trees with artificial plant hormone.

_____

_____[1]

(c) Give **two other** commercial applications of plant hormones.

1. _____[1]

2. _____[1]

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When flowers are pollinated and fertilized, the developing seed produces hormones that stimulate fruit production.

(d) Explain how poor weather, which kills insects, could affect fruit yield.

_____

_____

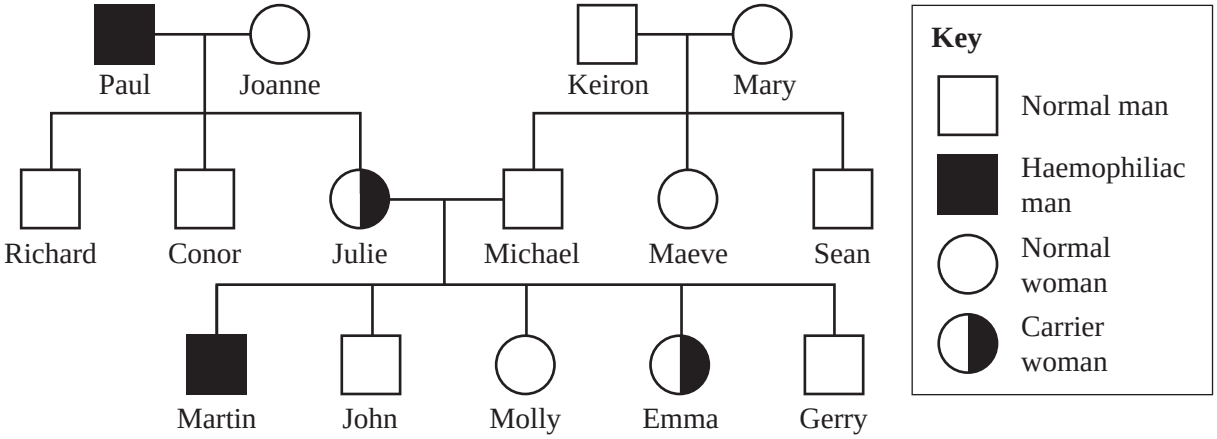
_____[2]

Examiner Only

Marks	Remark

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13 The diagram shows the inheritance of haemophilia, a sex-linked condition found in humans.



Let $\mathbf{X^H}$ be the allele for normal haemoglobin
Let $\mathbf{X^h}$ be the allele for haemophiliac haemoglobin

(a) Give the

phenotype of Paul. _____ [1]

genotype of Emma. _____ [1]

(b) Complete the Punnett square to show the offspring of Julie and Michael.

		Michael	
		$\mathbf{X^H}$	**Y**
Julie			

[3]

(c) Explain why Martin is a haemophiliac yet neither of his sisters suffer from the condition.

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

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14 The eye is a receptor.

Examiner Only	
Marks	Remark

(a) Describe the role of a receptor.

_____

_____[1]

(b) Name the layer which contains rods and cones.

_____ [1]

(c) Suggest why nocturnal mammals have a high density of rods.

_____

_____[1]

(d) Give **two** features of the cones.

1. _____

_____[1]

2. _____

_____[1]

(e) Describe how the image reaches the brain.

_____

_____

_____[2]

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Examiner Only	
Marks	Remark

15 **(a)** Give **two** causes of infertility in women.

1. _____[1]

2. _____[1]

In vitro fertilization is one development which helps infertile women.

(b) Explain how a woman is made to produce a large number of ova at the start of *in vitro* fertilization.

_____

_____[1]

(c) Describe how the ova produced are fertilized during *in vitro* fertilization.

_____

_____

_____[2]

(d) How are the fertilized ova checked for healthy development?

_____

_____[1]

(e) Describe what must happen to the fertilized ovum, if the woman is to become pregnant.

_____

_____

_____[2]

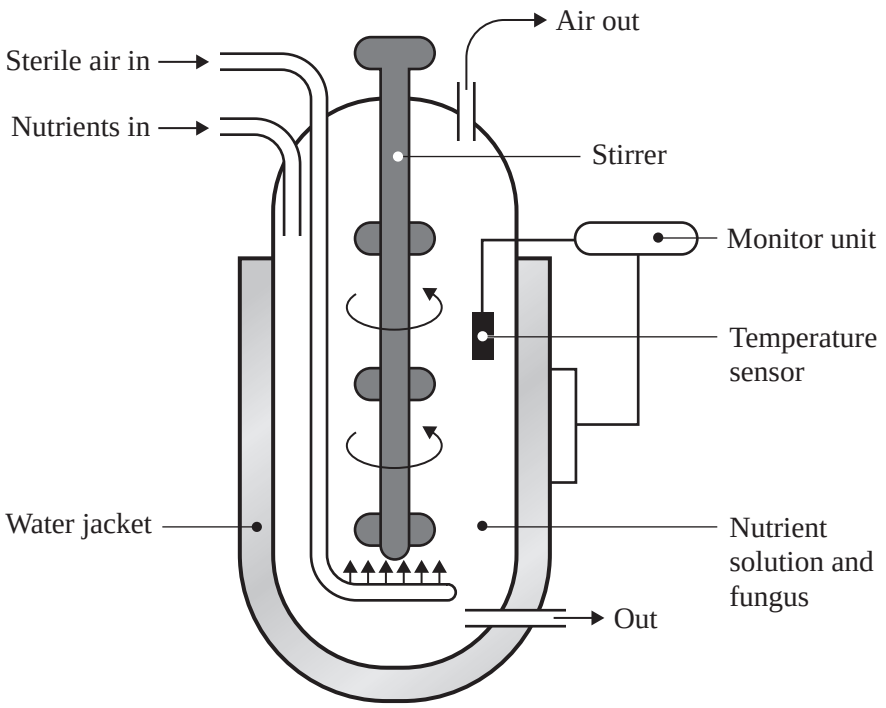
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(Questions continue overleaf)

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16 The diagram shows a simple biodigester used to produce penicillin.



(a) What is the function of the stirrer?

_____

_____ [1]

(b) Explain how the biodigester prevents the temperature rising too high.

_____

_____

_____ [2]

(c) Explain why the temperature of the biodigester should not be allowed to rise too high.

_____

_____ [1]

Examiner Only

Marks	Remark

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(d) Explain why the air entering the biodigester must be sterile.

_____

_____[1]

(e) Describe what must happen to the contents of the biodigester before the penicillin can be used.

_____

_____

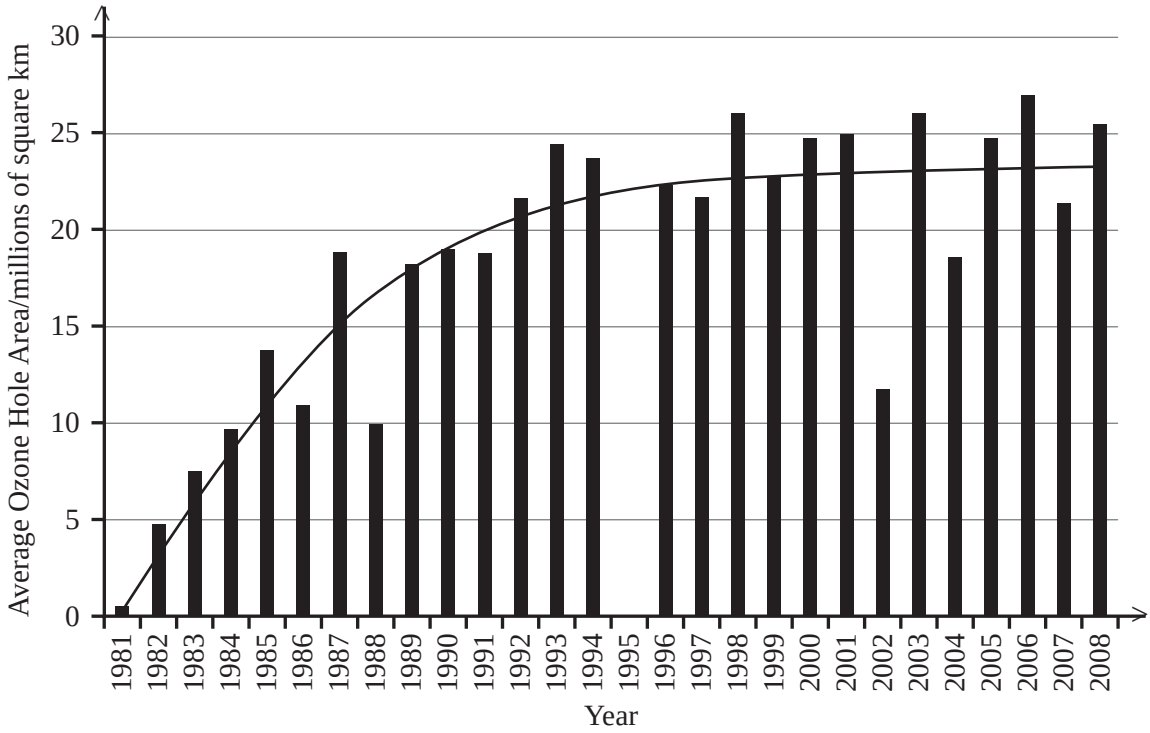
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_____

_____[3]

Examiner Only	
Marks	Remark

17 The graph shows the area of the hole in the ozone layer above the Antarctic between 1981 and 2008.



© NASA http://ozonewatch.gsfc.nasa.gov

(a) Describe the trend in the area of the ozone hole between 1981 and 2008.

_____

_____

_____[2]

The changes in the ozone layer have been linked with chemicals called chlorofluorocarbons.

(b) Give **two** sources of chlorofluorocarbons.

1. _____[1]

2. _____[1]

Examiner Only

Marks	Remark

(c) Explain how the hole in the ozone layer results in increased skin cancers.

_____

_____

_____[2]

(d) Give **three** ways humans can protect themselves against skin cancer.

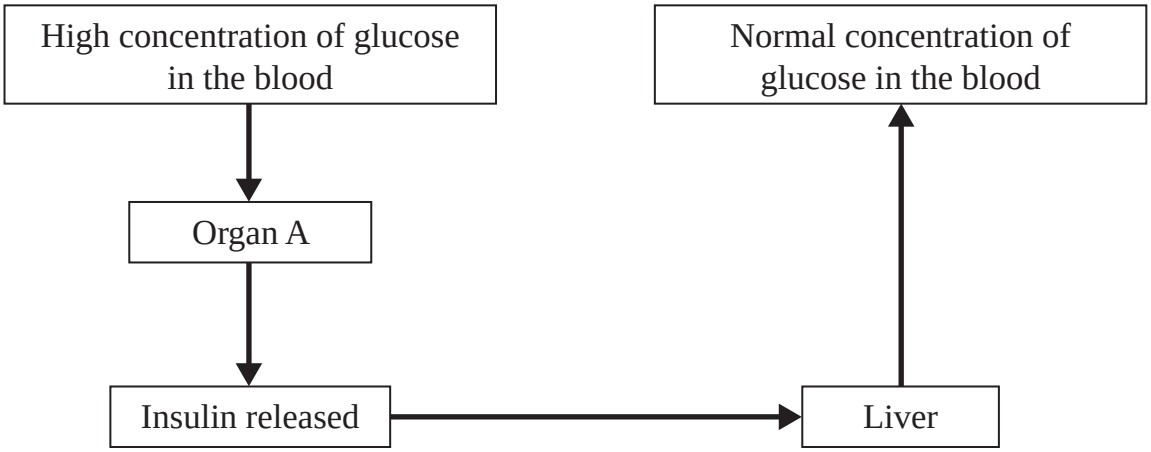
1. _____[1]

2. _____[1]

3. _____[1]

Examiner Only	
Marks	Remark

18 The diagram shows part of the mechanism that controls blood glucose concentration.



Examiner Only	
Marks	Remark

(a) Name organ A.

_____ [1]

(b) Explain why the blood glucose concentration becomes high after eating a meal.

_____

_____ [1]

(c) Describe how insulin reaches the liver.

_____

_____ [1]

(d) Explain how insulin causes the liver to reduce the blood glucose concentration.

_____

_____

_____

_____

_____

_____ [3]

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(e) Use the information in the diagram to help explain how the control of blood glucose concentration involves a feedback mechanism.

_____

_____

_____

_____ [2]

Some people are unable to control their blood glucose concentration.

(f) Name this condition.

_____ [1]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only	
Marks	Remark

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1847-075-1

GCSE

Science: Biology

Summer 2010

Mark Schemes

Issued: October 2010

Rewarding Learning

General Certificate of Secondary Education
2010

Science: Biology

Paper 1
Higher Tier

[G0903]

FRIDAY 21 MAY, MORNING

MARK SCHEME

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					AVAILABLE MARKS
1	**(a)**				

Change during puberty	**Boys**	**Girls**	
Growth spurt	**Yes**	**Yes**	[1]
Voice deepens/Growth of facial hair/ growth of testes/growth of penis/ broadening of shoulders	Yes	No	[1]
Menstruation	**No**	**Yes**	[1]

(b) Oestrogen; [1]
Produced in the ovary; [1] 5

2 **(a)** Any **two** from:
Bacteria;
Virus;
Fungus; [2]

(b) Any **two** from:
Use sterile water/agar/wash hands;
Flamed wire loop;
Lid of Petri dish not completely removed;
Work beside Bunsen flame/swab bench; [2]

(c) Prevent dangerous/pathogenic microorganisms from **entering/leaving** the dish; [1]

(d) Prevent growth of **pathogenic/harmful** microorganisms; [1] 6

3 **(a)** **(i)** Hydrogen; Oxygen; [2]

(ii) Cellulose; [1]
Glucose/sugar; [1]

(b) **(i)** 1512; [1]

(ii) Butter; [1] 6

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				AVAILABLE MARKS
4	**(a)**	A – **Right** atrium/auricle;	[1]	
		B – Aorta;	[1]	
	(b)	Produce higher pressure;	[1]	
		Pump blood greater distance/all around the body;	[1]	
	(c)	Any **two** from: Lack of exercise; Obesity; Smoking/**excess** alcohol; **Excess** salt/high blood pressure; **Excess** fat/cholesterol;	[2]	6
5	**(a)**	SO_2/NOx;	[1]	
		Soot;	[1]	
	(b)	**(i)** Manure/slurry;	[1]	
		artificial fertilizer;	[1]	
		(ii) Uses up oxygen/aerobic;	[1]	
		Fish cannot respire;	[1]	
		(iii) Eutrophication;	[1]	7
6	**(a)**	A – Respiration;	[1]	
		B – Fossilisation;	[1]	
		C – Combustion/burning;	[1]	
	(b)	Any **three** from: Carbon in CO_2 assimilated/fixed/taken into plants; photosynthesis; Plants eaten/consumed by animals; Plants/animals die/Animals excrete urine/produce faeces; Microorganisms/bacteria/fungi **respire**; Producing/releasing CO_2 (into the atmosphere);	[3]	
		QWC;	[2]	8
7	**(a)**	DCPIP;	[1]	
	(b)	Blue to colourless/clear (**need both)**;	[1]	
	(c)	Blackcurrant;	[1]	
	(d)	Any **two** from: Vit C is broken down; Dissolves/leaches into the water; Damages/denatures cell membranes;	[2]	5

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				AVAILABLE MARKS
8	**(a)**	A – Bronchiole; B – Alveolus; C – (Blood) capillary;	[1] [1] [1]	
	(b)	Any **two** from: Large surface area; Thin; Moist; Good blood supply/many capillaries/concentration gradient; Permeable;	[2]	5
9	**(a)**	Transferred from person during sexual intercourse /in sexual fluids;	[1]	
	(b)	Gonorrhoea/any other named example;	[1]	
	(c)	(HI)Virus;	[1]	
	(d)	Acts a (physical) barrier /stops sexual fluids entering (the woman's vagina);	[1]	
	(e)	Any **two** from: Blood to blood/described; Reusing/sharing hypodermic (syringe) needles; Through placenta/during birth/breast milk;	[2]	6
10	**(a)**	360 000; 3000; 120; 1	[2]	
	(b)	Any **two** from: Respiration; Movement; Excretion/inedible parts;	[2]	
	(c)	Any **two** from: Larger mesh size; Smaller net size; Decommission boats; Quota set; Restricted season/ban;	[2]	6
11	**(a)**	Yes, No; Yes, Yes; No, Yes; Yes, Yes;	[1] [1] [1] [1]	
	(b)	Cells/muscles; Transported in the blood to the lungs/and breathed out;	[1] [1]	6

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				AVAILABLE MARKS
12	**(a)**	When hormone level rises the % of apple fall reduces/accept converse /inverse relationship;	[1]	
	(b)	To reduce/prevent apple fall /produce larger apples /seedless fruit /synchronise ripening;	[1]	
	(c)	Any **two** from: rooting powder/cloning; weed control; stimulation of flowering; fruit formation/ any from (b) if not already given;	[2]	
	(d)	Any **two** from: Insects carry less pollen between the flowers; /fewer flowers pollinated/reduced/no fertilization/seed development/ less hormones/less yield/fruit;	[2]	6
13	**(a)**	**Paul** – Heamophiliac male; **Emma** – X^HX^h;	[1] [1]	
	(b)	<table><tr><td>X^H</td><td>X^HX^H</td><td>X^HY</td></tr><tr><td>X^h</td><td>X^HX^h</td><td>X^hY</td></tr></table>	[3]	
	(c)	All received $\mathbf{X^h}$ from their mother/Julie/ Males/Martin only requires **one** $\mathbf{X^h}$/haemophiliac allete; Sisters also receive X^H from father/are carriers/hetyerozygous /require two X^h;	[1] [1]	7
14	**(a)**	Detect/receive **stimuli**;	[1]	
	(b)	Retina;	[1]	
	(c)	Rods respond to low intensity/dim light;	[1]	
	(d)	Any **two** from: Detect colours; High intensity light/bright conditions; Concentrated in centre of eye/fovea/yellow spot; Clearly defined/detailed image;	[2]	
	(e)	As a nerve/electric **impulse**; Through/along optic **nerve**;	[1] [1]	7

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				AVAILABLE MARKS
15	**(a)**	Any **two** from: Blocked oviducts; Ova not released from ovary; Lining of uterus does not allow implantation; STI/menopause/hysterectomy;	[2]	
	(b)	Hormones are injected;	[1]	
	(c)	Any **two** from: Collected and removed from **uterus/via vagina**; Sperm added; Fusion of **nuclei**;	[2]	
	(d)	(Observed with a) **microscope**;	[1]	
	(e)	(Allowed to) **implant**; In uterus **lining**;	[1] [1]	8
16	**(a)**	To mix **the fungus** with nutrients/air;	[1]	
	(b)	Temperature monitored/measured/sensed (by sensor); **Water jacket cools** the biodigester when required;	[1] [1]	
	(c)	High temperatures would kill the fungus;	[1]	
	(d)	To prevent other microorganisms entering; *(**NOT contamination** as could be chemicals)*	[1]	
	(e)	Any **three** from: Extraction/taken out of the biodigester; Purification/separating out the penicillin; Packaging/making into tablet/storage;	[3]	8
17	**(a)**	Increases (rapidly up to 1987); Increases slowly/levels off;	[1] [1]	
	(b)	Any **two** from: (Coolant in) fridge/freezer; (Coolant in) air-conditioner; Aerosol (propellant);	[2]	
	(c)	More UV light/radiation; (UV) causes mutations;	[1] [1]	
	(d)	Any **three** from: Stay in shade/out of midday sun (described); Cover up/ wear clothing/hat; Use sun block/(high factor) cream; Regularly check skin/moles;	[3]	9

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				AVAILABLE MARKS
18	**(a)**	Pancreas;	[1]	
	(b)	Absorption of digested food/sugar/glucose (in the intestine);	[1]	
	(c)	Carried/transported in the blood;	[1]	
	(d)	Any **three** from: Glucose **absorbed from** the blood; Converted to glycogen/fat; Stored; Respired;	[3]	
	(e)	Any **two** from: Blood **sensed**/**monitored** by organ A/pancreas; Continuous/always/constantly; Brings about change in opposite direction/described;	[2]	
	(f)	Diabetes;	[1]	9
			Total	**120**

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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2009

Science: Biology

Paper 1
Higher Tier

[G0903]

WEDNESDAY 20 MAY, AFTERNOON

For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
Total Marks	

TIME

1 hour 30 minutes

INSTRUCTIONS TO CANDIDATES

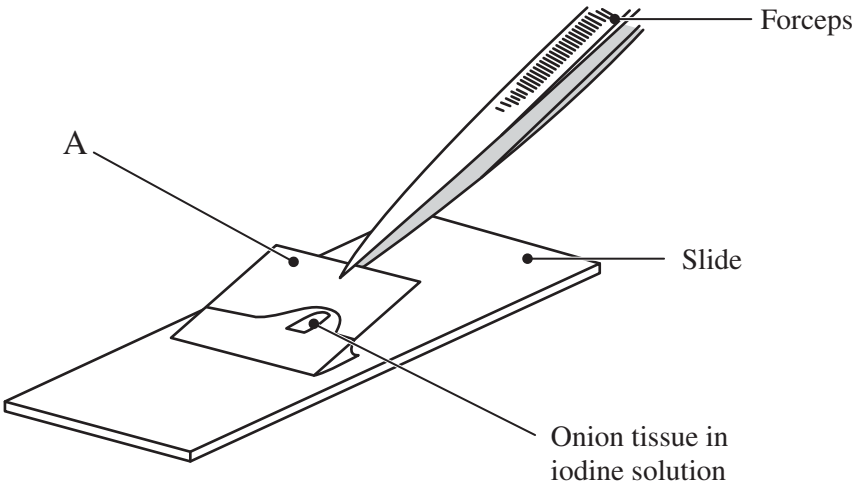
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all eighteen** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 120.
Quality of written communication will be assessed in question **6(d)**
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

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1 The diagram shows a microscope slide being prepared.



Source: A. D. G. Mackean, Life Study A Textbook of Biology. John Murray (Publishers) Ltd, 1981

(a) Name A.

_____ [1]

(b) Describe how the forceps are used when preparing a slide.

_____

_____[1]

(c) Explain why the onion tissue is placed in iodine solution.

_____

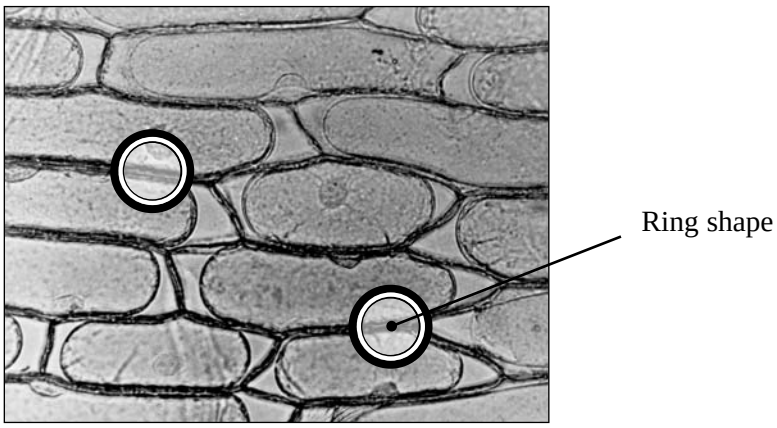
_____

_____[2]

Examiner Only	
Marks	Remark

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The drawing shows the appearance of a prepared slide.



(d) What causes the ring shapes?

_____

_____ [1]

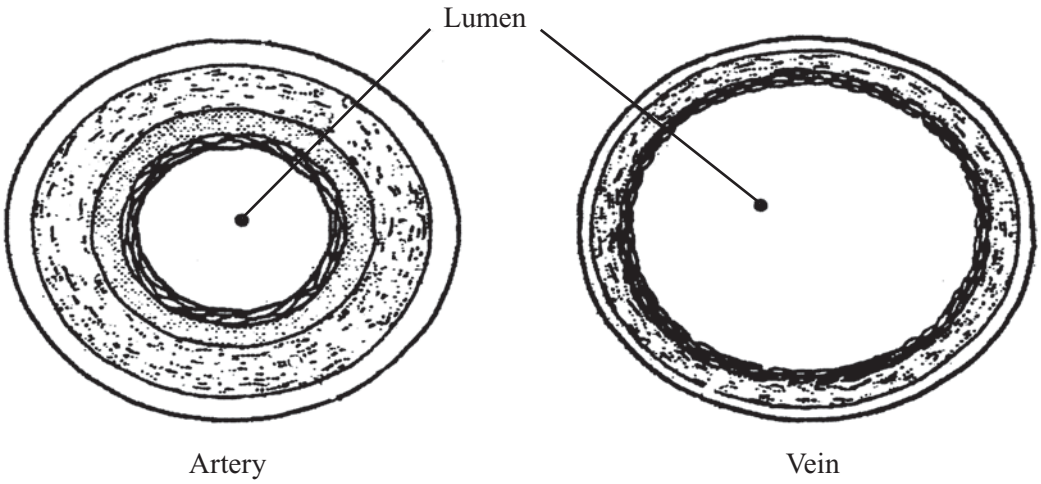
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

2 The diagram shows an artery and a vein.



Source: Human Biology An activity approach, P. Rowlinson, M. Jenkins, Cambridge University Press, 1982

(a) Give **two** ways the structure of an artery differs from a vein.

1. _____[1]

2. _____[1]

(b) Describe how the composition of blood in an artery differs from that in a vein.

_____

_____

_____[2]

(c) Name the artery which takes blood to the

kidney. _____ [1]

lung. _____ [1]

Examiner Only	
Marks	Remark

3 Thumb shape is controlled by a gene.

The dominant allele, **T** results in a normal thumb shape.

The recessive allele, **t** causes the thumb to be slightly bent to form hitch-hiker's thumb.

Normal thumb



Hitch-hiker's thumb



(a) Give the phenotype of someone whose genotype is **TT**.

_____ [1]

(b) Complete the Punnett square to show the possible offspring of a cross between a person with a normal thumb and one with a hitch-hiker's thumb.

		Hitch-hiker's thumb	
	Types of gamete		
Normal thumb	**T**		
	t		

[3]

(c) What portion of the offspring

would be expected to have hitch-hiker's thumb?

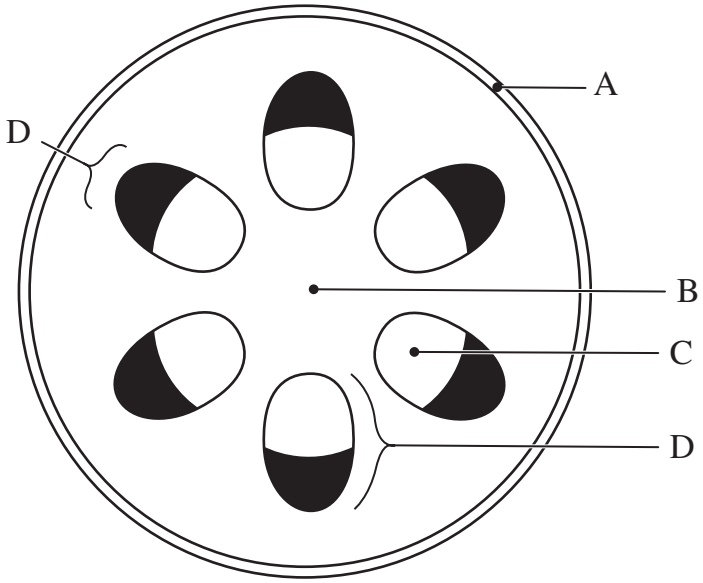
_____ [1]

are heterozygous?

_____ [1]

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4 The diagram shows a cross section of a stem.



(a) Name parts A, B, C and D.

A _____ [1]

B _____ [1]

C _____ [1]

D _____ [1]

(b) Describe the function of the phloem.

_____

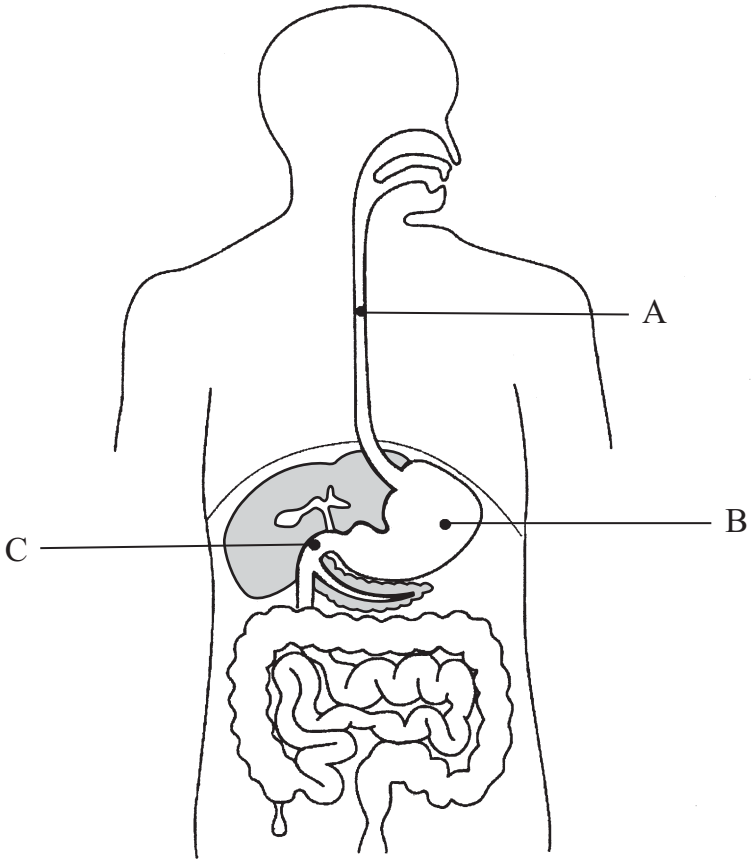
_____ [2]

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Marks	Remark

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5 The diagram shows the human digestive system.



Adapted from: R. McIlwaine, J Napier, GCSE BIOLOGY for CCEA, Hodder & Stoughton Educational, 2003

(a) **On the diagram** draw a line

labelled X to show where ingestion takes place. [1]

labelled Y to show where water is absorbed. [1]

(b) Name parts A, B and C.

A _____ [1]

B _____ [1]

C _____ [1]

(c) Explain why digestion is necessary.

_____

_____

_____ [2]

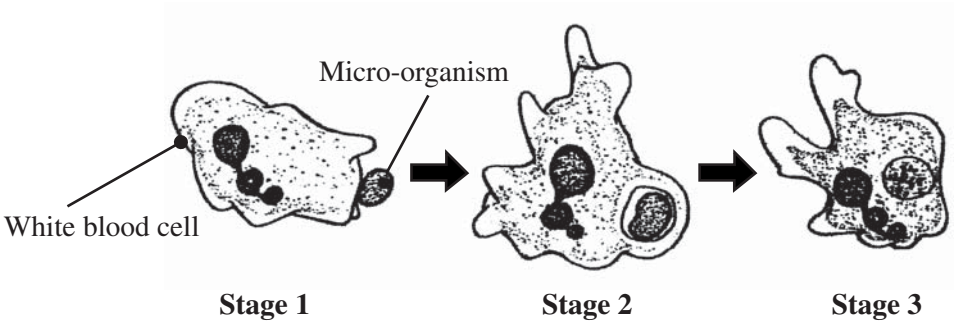
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

6 The diagram shows one way white blood cells destroy bacteria.



Source: G Jones, M Jones,(1984) BIOLOGY GCSE edition, Cambridge University Press

(a) Name the process shown in the diagram.

_____ [1]

(b) Explain how the bacteria are destroyed.

_____[1]

(c) Give **one** other way white blood cells fight infection.

_____[1]

Vaccination is another way of fighting infection.

(d) Describe how Jenner developed a vaccine for smallpox.

_____

_____

_____

_____

_____

_____

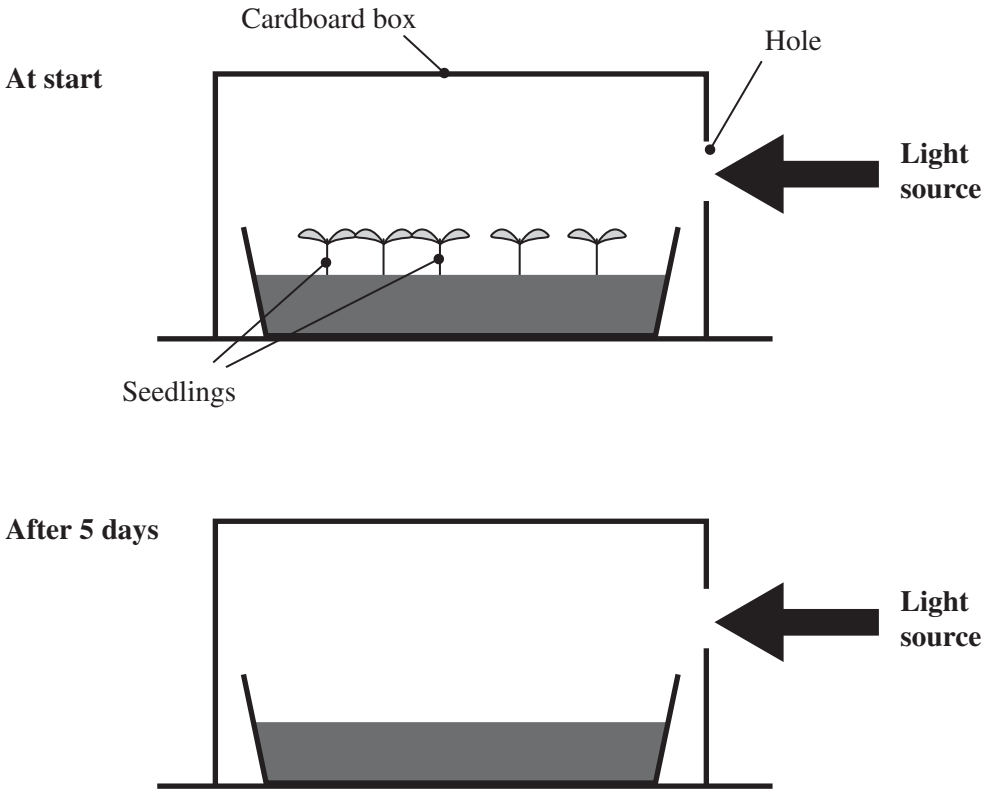
_____

_____[3]

Quality of written communication [2]

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7 The diagrams show an experiment to investigate the effect of shining a light from one side on some seedlings.



(a) **Complete the diagram** to show the appearance of the seedlings after 5 days. [2]

(b) **Name** this type of growth response.

_____ [1]

(c) Explain how this response is an advantage to the plant.

_____

_____

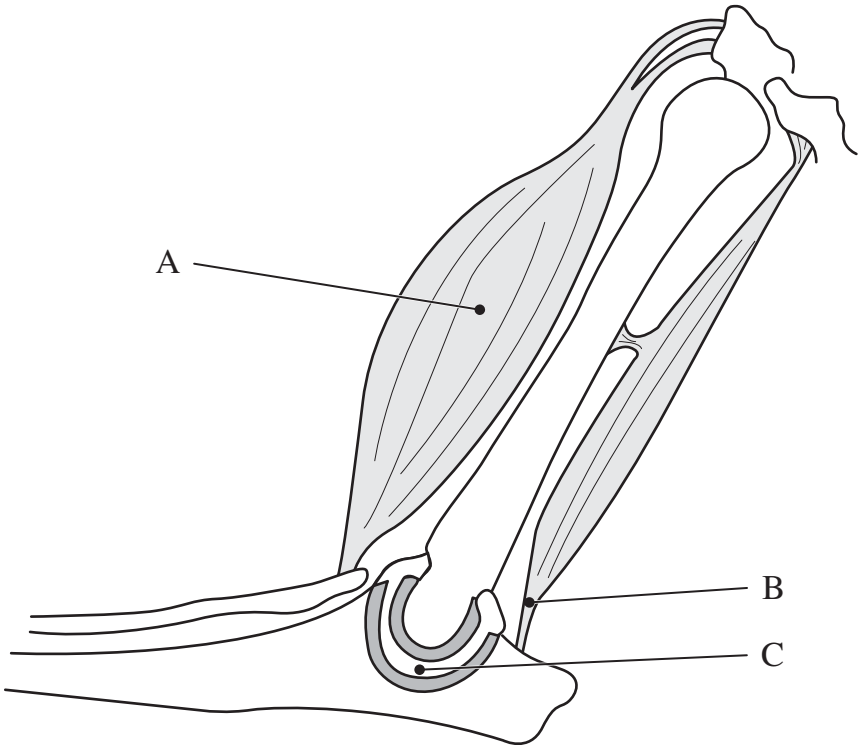
_____ [2]

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Marks	Remark

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8 The diagram shows an elbow joint.



(a) Name parts A, B and C.

A _____ [1]

B _____ [1]

C _____ [1]

(b) Describe how the arm straightens.

_____

_____

_____ [2]

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Marks	Remark

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9 The table shows the percentage distribution of skin cancer on different parts of the body.

	Percentage of skin cancer	
Part of Body	Males	Females
Head and neck	22	14
Trunk	38	17
Arm	17	21
Leg	15	42
Other	8	6

(a) Name the part of the woman's body where skin cancer is most common.

_____ [1]

(b) Suggest why men suffer from most skin cancers on their trunk.

_____

_____ [1]

(c) Give **one** way to reduce the risk of skin cancer.

_____

_____ [1]

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Marks	Remark

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(d) Explain why skin cancer has a 99% cure rate if detected early.

_____

_____[1]

(e) Explain how the over use of CFCs has resulted in an increase in the number of people suffering from skin cancer.

_____

_____

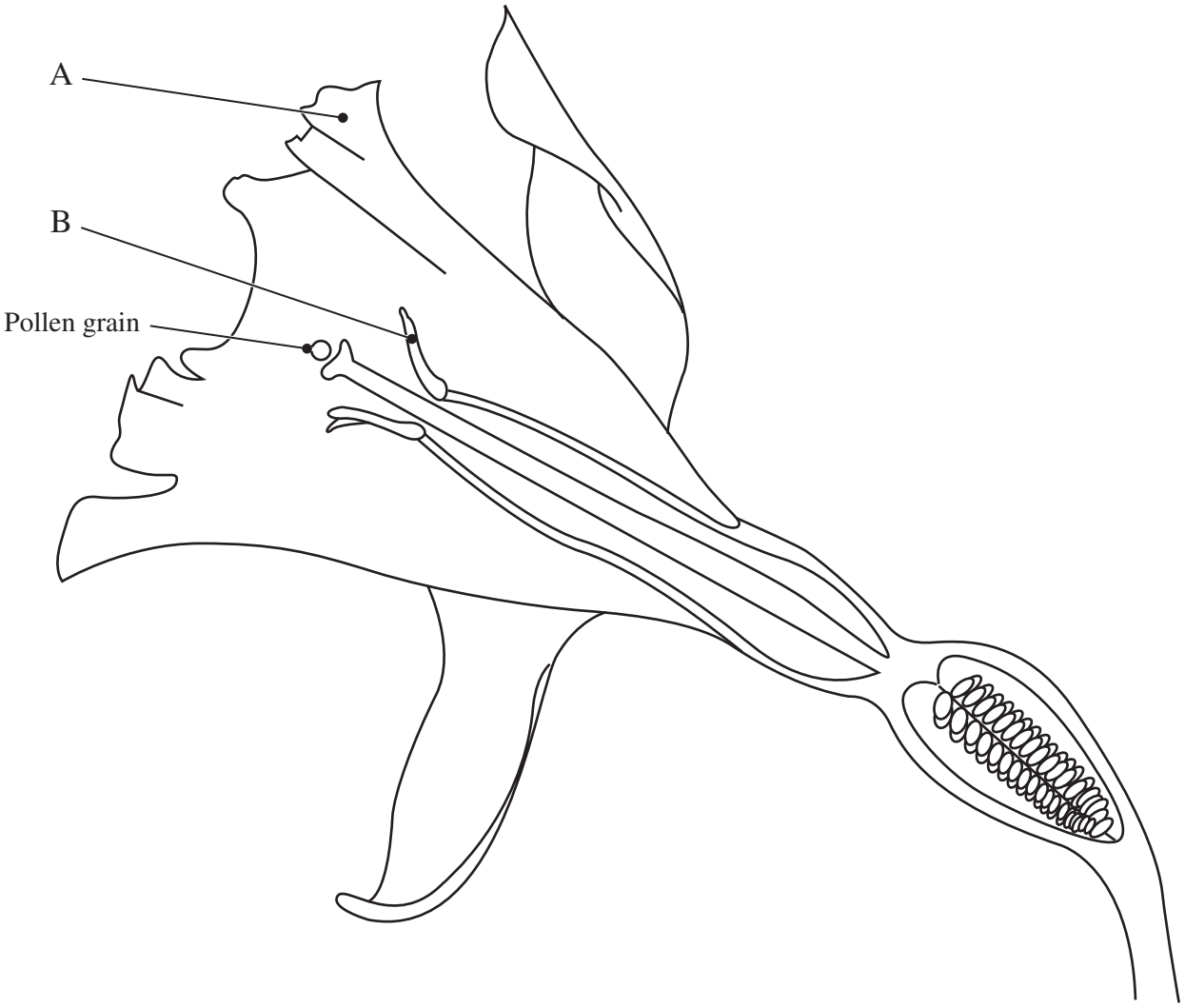
_____

_____[2]

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Marks	Remark

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10 The diagram shows parts of a daffodil flower.



Source: D. G. Mackean, GCSE Biology Second Edition, John Murray (Publishers) Ltd., 1995

(a) Name parts A and B.

A _____ [1]

B _____ [1]

(b) **On the diagram** draw a line to show the pathway of a pollen tube to an ovule. [2]

(c) Describe what happens to an ovule after it is pollinated.

_____

_____

_____ [2]

.

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Marks	Remark

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Examiner Only	
Marks	Remark

11 The leaves of a plant, in flooded ground, will turn yellow due to lack of magnesium.

(a) Explain why the leaves of a plant lacking in magnesium turn yellow.

_____

_____

_____[2]

(b) Give **one** mineral plants require for

growth. _____ [1]

cell walls. _____ [1]

In flooded ground there is no oxygen around the roots.

(c) Explain why this stops minerals being absorbed.

_____

_____

_____[2]

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12 **(a)** Name the type of organism which causes

gonorrhoea. _____ [1]

AIDS. _____ [1]

(b) Explain how AIDS can be passed from a mother to a baby during pregnancy.

_____

_____

_____[2]

(c) Give **two other** ways AIDS can be spread from one person to another.

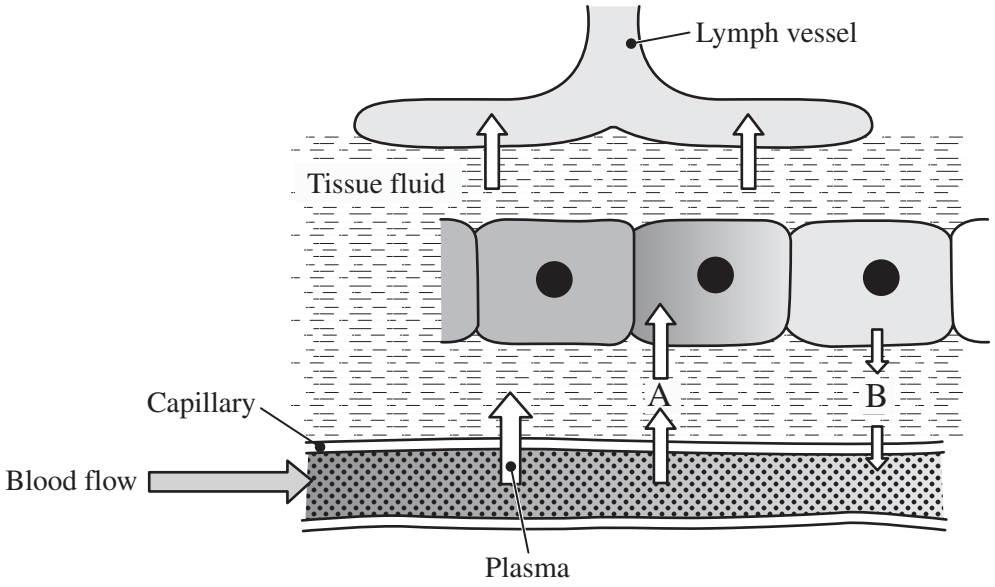
1. _____ [1]

2. _____ [1]

Examiner Only	
Marks	Remark

13 The diagram shows the formation of a tissue fluid.

Examiner Only	
Marks	Remark



Source: D. G. Mackean, GCSE Biology Second Edition, John Murray (Publishers) Ltd., 1995

(a) Describe how tissue fluid forms.

_____

_____

_____[2]

(b) Name **one** chemical which moves in the direction of arrow

A _____ [1]

B _____ [1]

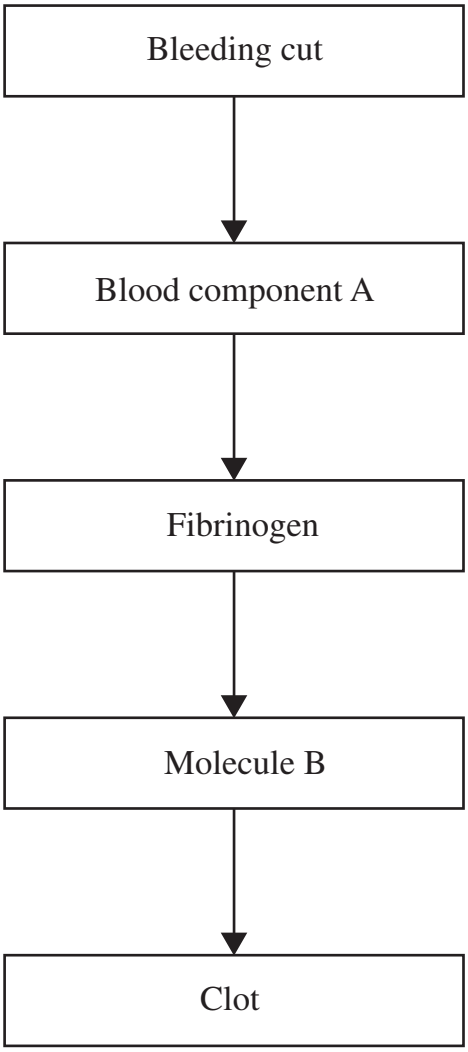
(c) Explain why plasma proteins are not found in tissue fluid.

_____

_____[1]

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The diagram summarises the processes involved in blood clotting.



(d) Name

blood component A. _____ [1]

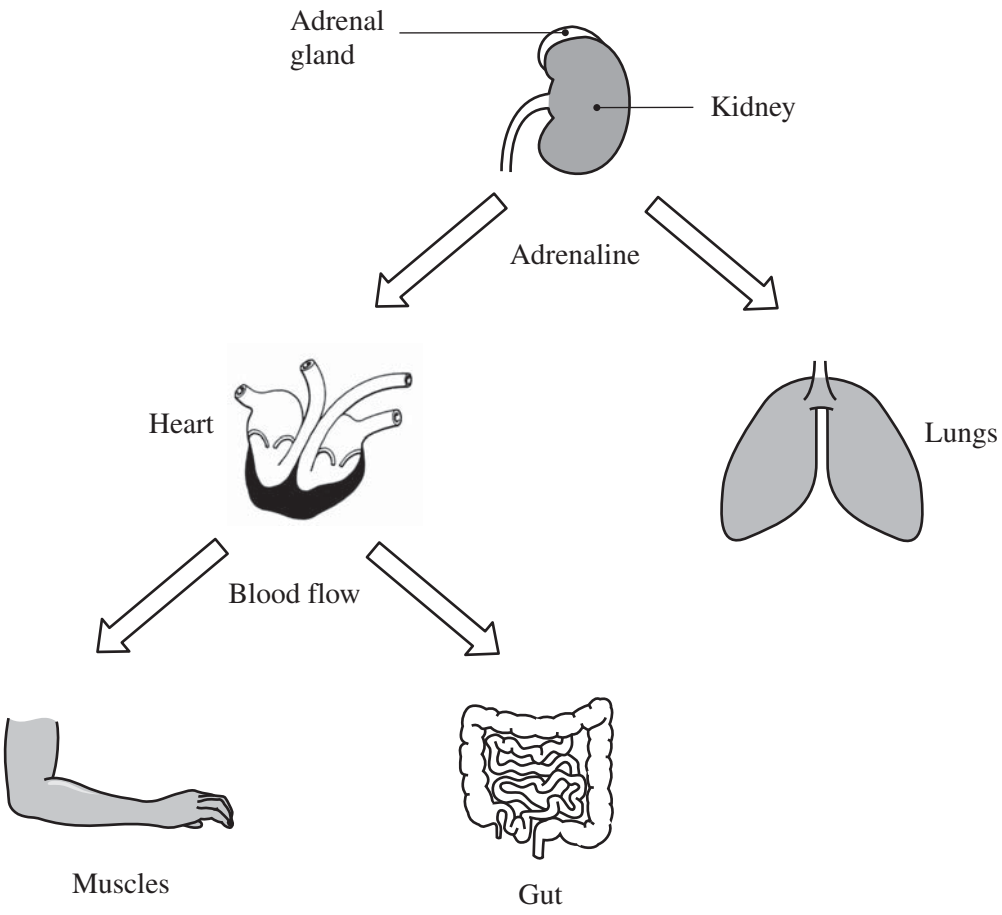
molecule B. _____ [1]

Examiner Only

Marks	Remark

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14 The diagram shows some effects of adrenaline.



(a) Give **one** condition which causes adrenaline to be released.

_____ [1]

(b) Complete the table.

Organ	Effect of adrenaline
Heart	
Gut	
Muscles	

[3]

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Marks	Remark

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(c) Describe the effect adrenaline has on the lungs and explain the advantage of this to the body.

Effect. _____[1]

Advantage. _____

_____

_____[2]

Examiner Only	
Marks	Remark

15 The following method was used to investigate the effect of temperature on the time human amylase enzyme requires to breakdown starch.

1. Five cm^3 of starch solution was placed in test tube A and five cm^3 of amylase solution was placed in test tube B.

2. Tubes A and B were placed in a waterbath at 10 °C for five minutes.

3. The contents of tube A were added to tube B which was returned to the waterbath. A timer was started.

4. A drop of the amylase and starch mixture was removed from tube B every minute and tested with iodine.

5. The time was recorded when the iodine no longer changed colour.

6. Steps 1 to 5 were repeated at temperatures 20 °C, 30 °C, 40 °C, 50 °C and 60 °C.

(a) Explain why tubes A and B were placed in the waterbath in step 2.

_____

_____[1]

(b) Explain the colour change in step 4 when the first drop of amylase and starch mixture was tested with iodine.

_____

_____

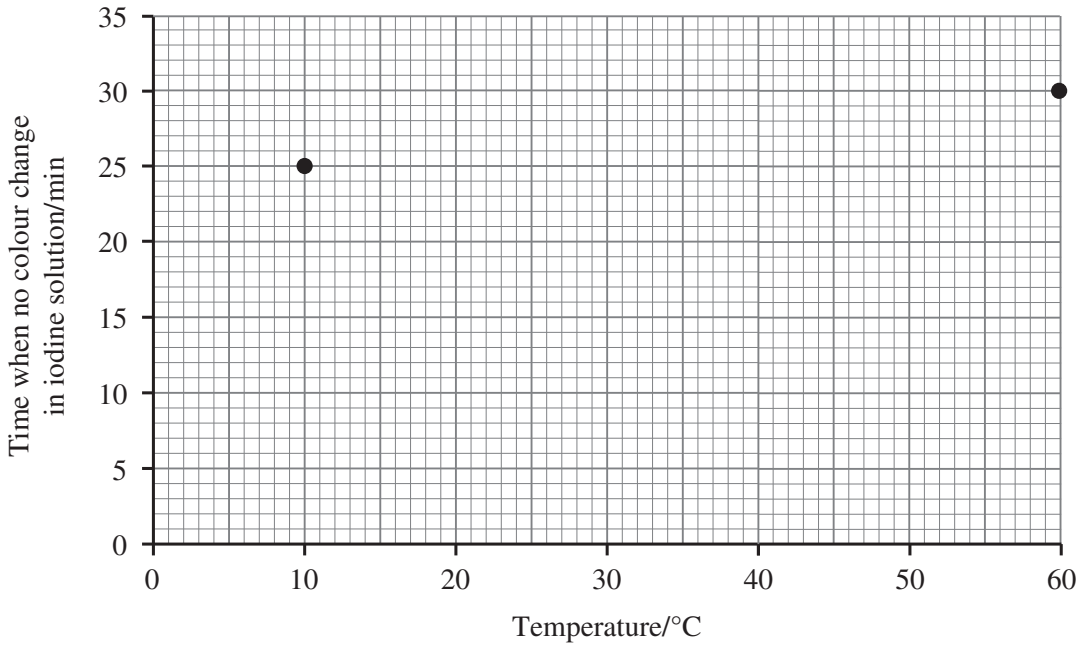
_____

_____[3]

Examiner Only	
Marks	Remark

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(c) **On the axes complete the sketch of the graph** to show the results you would expect for this experiment.



[2]

(d) Explain why there was no colour change after

25 minutes at 10 °C.

_____

_____[1]

30 minutes at 60 °C.

_____

_____

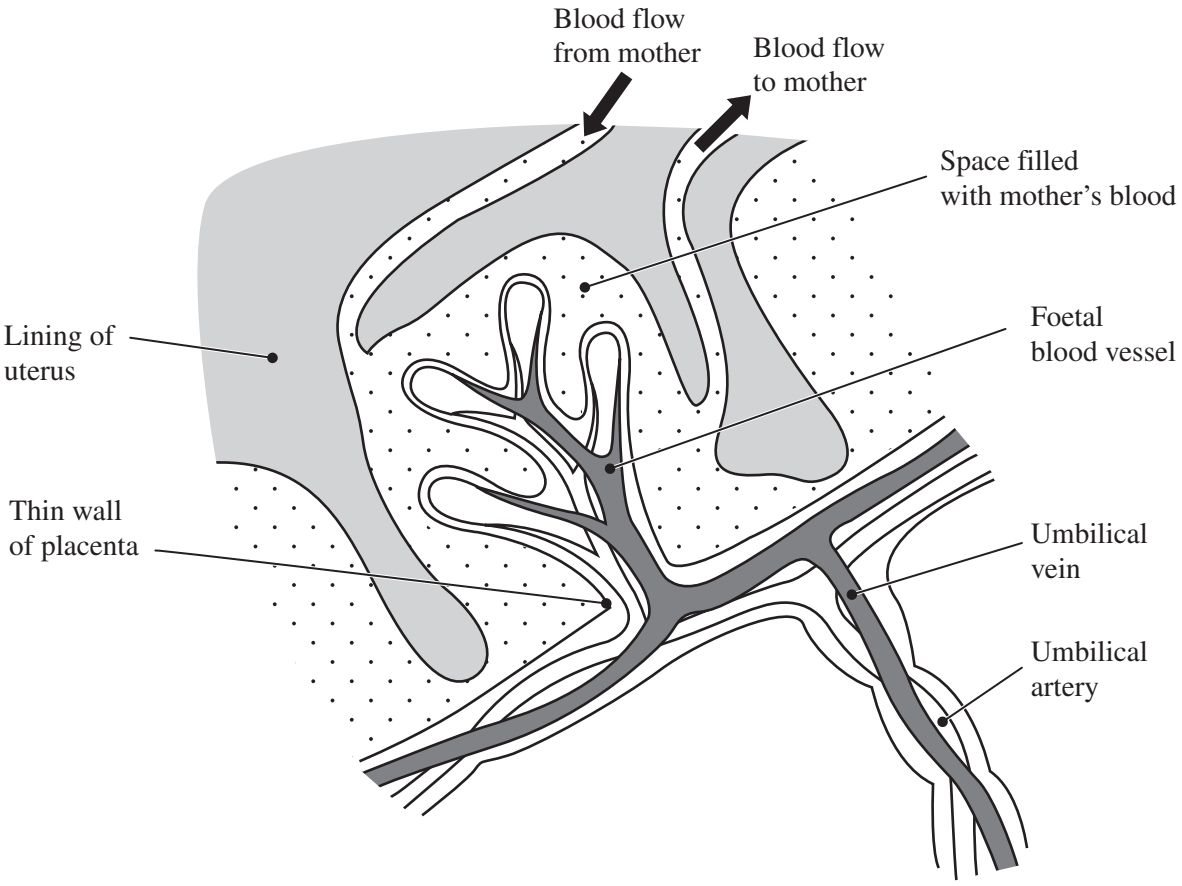
_____[1]

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Marks	Remark

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16 The diagram shows part of a placenta.



Source: G. Jones, M. Jones, BIOLOGY GSCE edition, Cambridge University Press, 1984

(a) Use the features shown in the diagram, to explain how the placenta is adapted for exchange of substances between the mother and the foetus.

Examiner Only	
Marks	Remark

_____

_____

_____

_____

_____

_____ [3]

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(b) Give **one similarity** and **two differences** in the substances carried by the blood in the umbilical artery and vein.

Similarity _____

_____[1]

Difference 1. _____

_____[1]

Difference 2. _____

_____[1]

(c) Describe the process of birth.

_____

_____

_____[2]

Examiner Only	
Marks	Remark

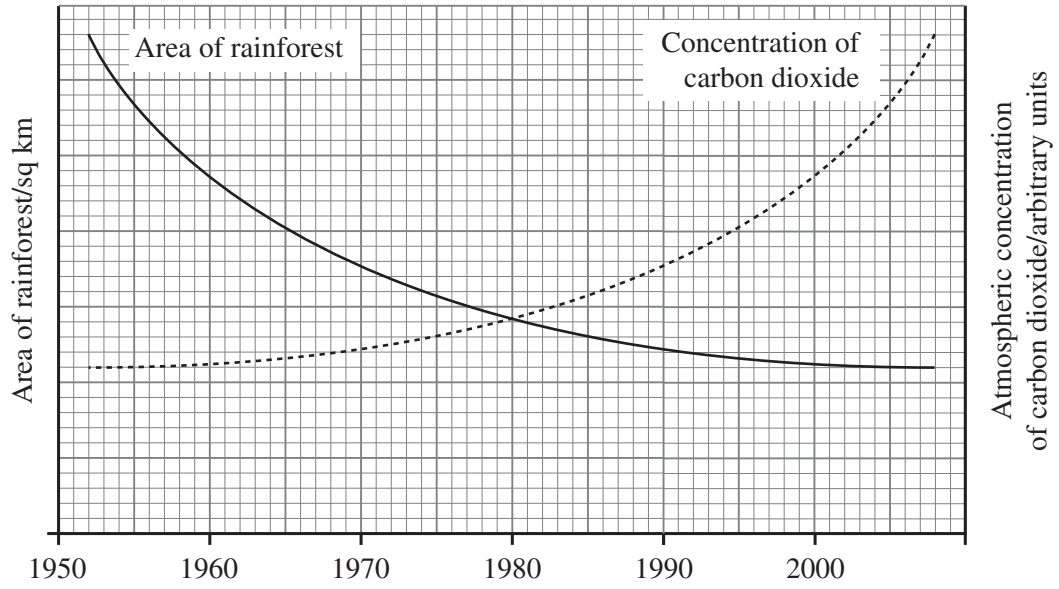
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17 **(a)** What is deforestation?

_____

_____[1]

The graph shows changes in the area of rainforest and atmospheric carbon dioxide concentration since 1950.



(b) What evidence is there of deforestation from the graph?

_____

_____[1]

(c) Explain how the change in atmospheric carbon dioxide concentration may be caused by deforestation.

_____

_____

_____[2]

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Marks	Remark

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(d) Suggest and explain **one other** way Man's activities could cause the changes in the atmospheric carbon dioxide concentration.

_____

_____

_____[2]

(e) Explain how changes in atmospheric carbon dioxide concentration are linked to changes in global temperatures.

_____

_____

_____

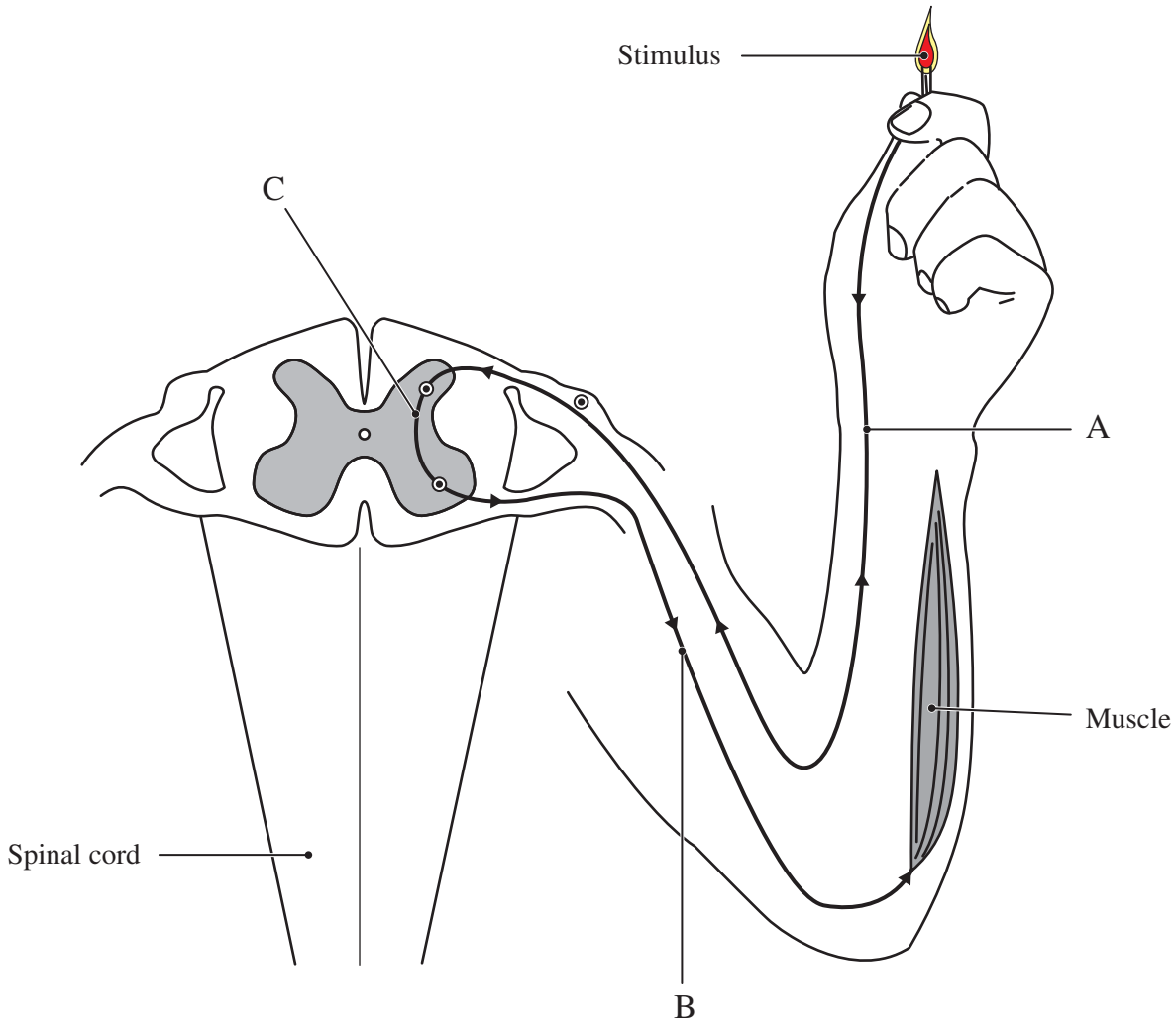
_____

_____

_____[3]

Examiner Only	
Marks	Remark

18 The diagram shows a reflex arc.



Adapted from: J. Sears, S. Taylor, Life and Living, Hodder & Stoughton Educational, 1994

Examiner Only	
Marks	Remark

(a) Name parts A, B and C.

A _____ [1]

B _____ [1]

C _____ [1]

(b) Use the information in the diagram to help explain why a reflex arc provides a very fast response.

_____

_____

_____ [2]

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Hormones such as insulin are chemical messages.

Examiner Only	
Marks	Remark

(c) (i) How are hormones transported?

_____[1]

(ii) Name the organ which produces insulin.

_____[1]

(iii) Explain how insulin controls blood sugar levels.

_____

_____

_____[2]

THIS IS THE END OF THE QUESTION PAPER

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GCSE

Science: Biology

Summer 2009

Mark Schemes

Issued: October 2009

Rewarding Learning

General Certificate of Secondary Education
2009

Science: Biology

Paper 1
Higher Tier

[G0903]

WEDNESDAY 20 MAY, AFTERNOON

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	Coverslip/coverglass;	[1]	
	(b)	Place/**lower** (coverslip/A) **on to the slide**/**over tissue**;	[1]	
	(c)	Colour/stain the cells; Make the cells/parts of cells more clearly/easily seen;	[1] [1]	
	(d)	Air/bubbles (trapped under the coverslip/coverglass);	[1]	5
2	**(a)**	Artery – smaller lumen; thicker wall; no valves; (Any **two)**	[2]	
	(b)	Artery more oxygen/glucose amino acids; vein more carbon dioxide/urea;	[2]	
	(c)	Renal artery; pulmonary artery; (2 × [1])	[2]	6
3	**(a)**	Normal thumb	[1]	
	(b)	t; [1] Tt; [1] tt; [1]		
	(c)	Half/50%; (Not 1:1) Half/50%; (Not 1:1)	[1] [1]	6
4	**(a)**	A – epidermis; B – pith; C – xylem; D – vascular bundle;	[1] [1] [1] [1]	
	(b)	Carries food/sugars/products of photosynthesis; from leaves around plant;	[2]	6
5	**(a)**	Labelled **line X** to mouth; Labelled line to large intestine/colon;	[1] [1]	
	(b)	A Oesophagus; B Stomach; C Duodenum;	[1] [1] [1]	
	(c)	Any **two** from Break down food/molecules/insoluble; to small/simple/soluble; which can be **absorbed** by blood;	[2]	7

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				AVAILABLE MARKS
6	**(a)**	Phagocytosis;	[1]	
	(b)	Engulfs/digests;	[1]	
	(c)	Produces antibodies;	[1]	
	(d)	Noticed milkmaids with cowpox did not get smallpox; Infected/injected boy with cowpox; Boy given smallpox and recovered;	[3]	
		Quality of written communication	[2]	8
7	**(a)**	Taller; bent towards the light;	[2]	
	(b)	(Photo)tropism;	[1]	
	(c)	More light; more photosynthesis/growth; ('more' once)	[2]	5
8	**(a)**	A – biceps; B – tendon; C – synovial fluid;	[1] [1] [1]	
	(b)	Triceps contracts; biceps relaxes/antagonistics	[2]	5
9	**(a)**	Legs	[1]	
	(b)	Don't wear a shirt in the sun/work outdoors without a shirt;	[1]	
	(c)	Cover up in sun/stay in shade/apply suncream;	[1]	
	(d)	Can be removed **before it spreads**;	[1]	
	(e)	Any **two** from: Ozone depleted/holes; **more UV** rays enter; causes mutations;	[2]	6
10	**(a)**	A – Petal; B – Anther/stamen;	[1] [1]	
	(b)	Line down style; Line into an ovule;	[1] [1]	
	(c)	After pollination An ovule is not pollinated; Fertilization/described; Seed development/described; (Any **two**)	[2]	6

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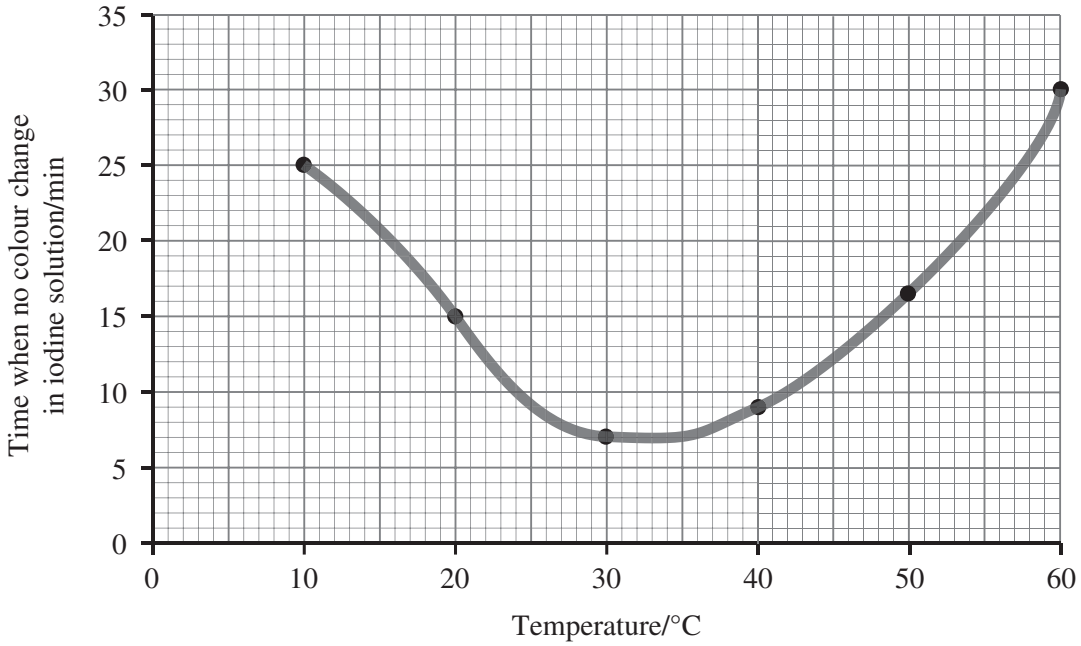
				AVAILABLE MARKS
11	**(a)**	Magnesium is required for chlorophyll production; Lack of chlorophyll makes the yellow/chlorophyll is green;	[1] [1]	
	(b)	Nitrogen; Calcium;	[1] [1]	
	(c)	Oxygen required for respiration/energy production; Energy used for active uptake/transport/absorption/described;	[1] [1]	6
12	**(a)**	Bacterium; Virus;	[1] [1]	
	(b)	Passes through placenta; from mother's blood/into baby's blood;	[2]	
	(c)	Any **two** from: Sexual intercourse; infected syringes; blood-to-blood contact;	[2]	6
13	**(a)**	**Plasma** forced out; through capillary wall;	[2]	
	(b)	A – glucose/amino acid/oxygen; B – CO_2 / urea;	[1] [1]	
	(c)	Too large to pass through capillary wall;	[1]	
	(d)	Platelets; Fibrin;	[1] [1]	7
14	**(a)**	Fright/stress/excitement;	[1]	
	(b)	Increases rate; Decreased blood flow; Increased blood flow/respiration;	[1] [1] [1]	
	(c)	Effect – Dilates bronchioles/deeper breaths/increased rate of breathing/increased blood flow; Advantage – Any **two** from: More oxygen absorbed/carried in blood; For respiration/energy; For fight/flight/described;	[1] [2]	7

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15 **(a)** Bring both to the same temperature (before mixing/reacting); [1]

(b) Yellow brown to blue-black; starch present;
No/little starch digested; [3]

(c)



Line down then up; [1]
Optimum/minimum between 30 ° < 40°; [1]

(d) 10 °C – Low temperature causes slow rate of starch digestion/all starch digested; [1]
60 °C – Amylase denatured/starch broken down; [1] 8

16 **(a)** Any **three** from:
Loops/described of foetal blood vessels;
Provide large surface area;
Thin wall of placenta; good blood supply;
Good diffusion gradient; short diffusion distance; [3]

(b) **Similarity:**
water/drugs (named example)/ethanol/nitrogen/blood proteins/antibodies; [1]

Differences: Any **two** from:
Oxygen; carbon dioxide; urea; glucose; amino acids;
minerals (named example); [2]

(c) Any **two** from:
Contraction of uterus;
Dilation of cervix;
Rupture of amniotic membrane;
Mucus plug shed;
Baby turns/head engages; [2] 8

AVAILABLE MARKS

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				AVAILABLE MARKS
17	**(a)**	Cutting down trees;	[1]	
	(b)	The area of rain forest has reduced;	[1]	
	(c)	Photosynthesis uses/traps CO_2/makes carbon part of the plant;	[1]	
		Fewer trees so more CO_2 in the atmosphere;	[1]	
	(d)	Combustion of fossil fuels;	[1]	
		Produces CO_2;	[1]	
	(e)	Any **three** from: CO_2 forms a layer/builds up; Heat trapped/enters but cannot leave; Greenhouse effect/global warming;	[3]	9
18	**(a)**	A – Sensory neurone;	[1]	
		B – Motor neurone;	[1]	
		C – Association neurone;	[1]	
	(b)	Any **two** from: Few/small number neurones/few synapses/short distance; Brain not involved/involuntary; No thinking time;	[2]	
	(c)	**(i)** In blood;	[1]	
		(ii) Pancreas;	[1]	
		(iii) Any **two** from: Negative feedback pathway; Liver; Converts glucose to glycogen/fat/respires it; When blood sugar is high/to reduce blood sugar	[2]	9
			Total	**120**

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