



General Certificate of Secondary Education
2011

Science: Biology

Paper 1
Higher Tier

[G0903]

THURSDAY 19 MAY, AFTERNOON



Centre Number

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| 71 | |
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Candidate Number

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

| | |
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| 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.



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.

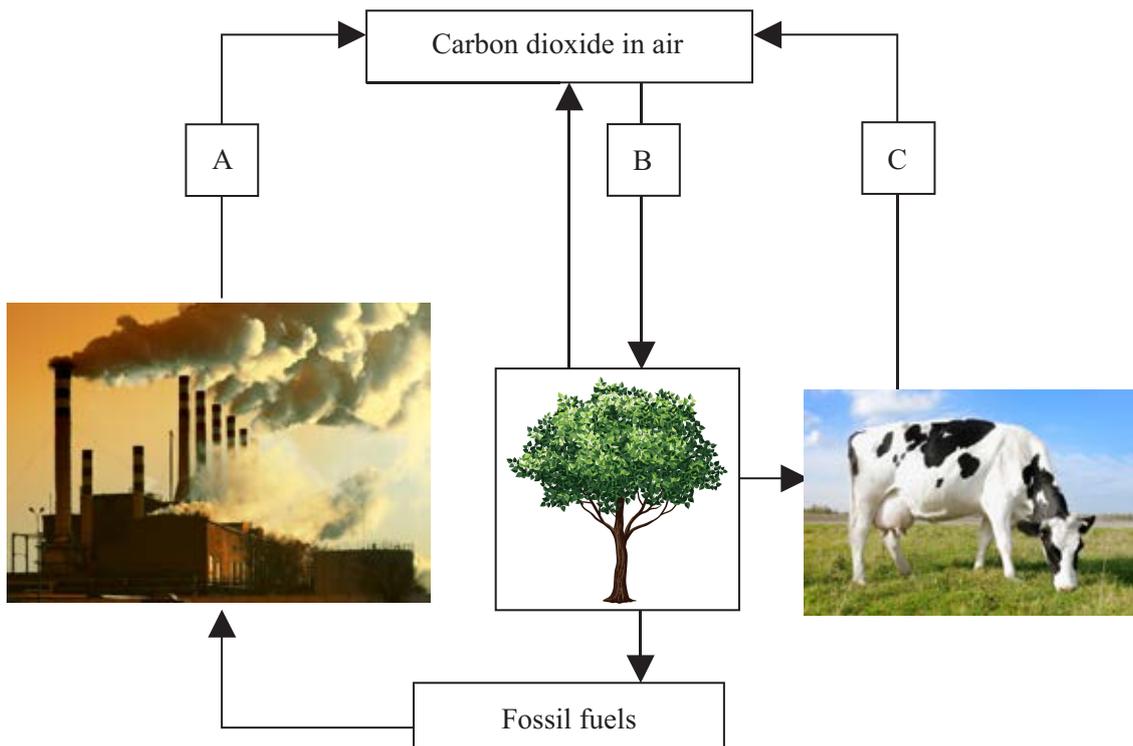
 _____ [2]

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

 _____ [1]

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| Marks | Remark |
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3 The diagram shows part of the carbon cycle.



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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.

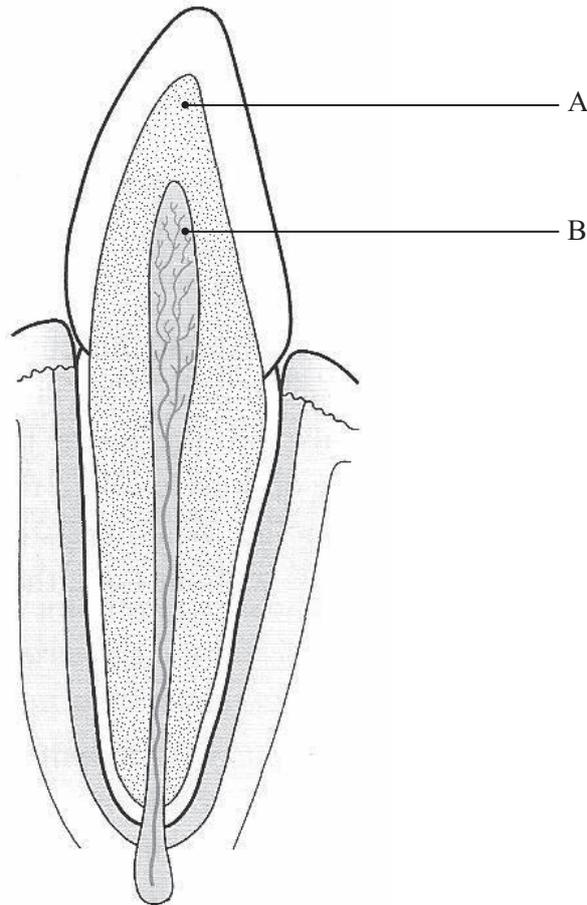
 _____ [2]

(c) Name a fossil fuel.

_____ [1]

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|---------------|--------|
| Marks | Remark |
| | |

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]

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

_____ [1]

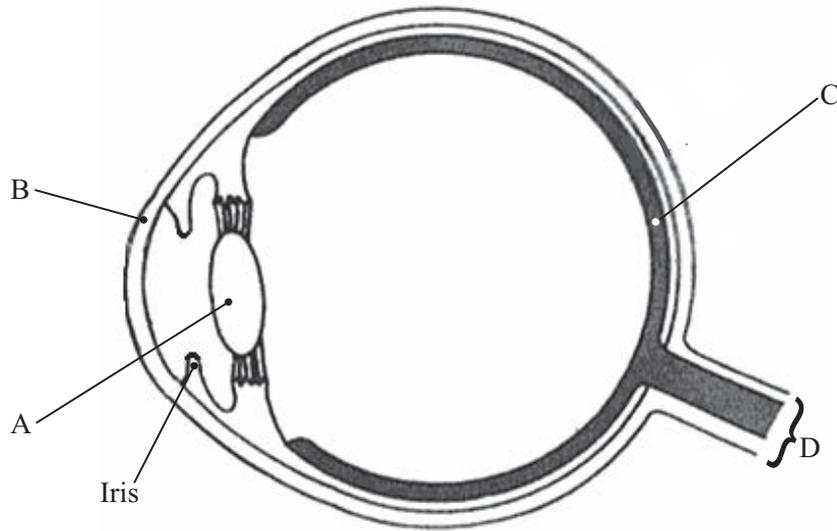
One way of ensuring that people get enough fluoride is to add it to the public drinking water.

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

_____ [1]

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|---------------|--------|
| Marks | Remark |
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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.

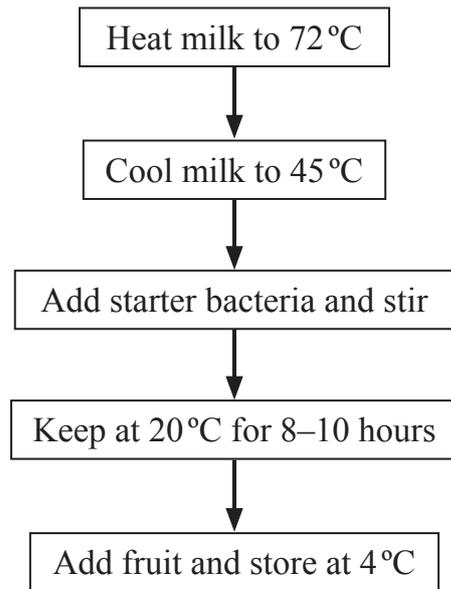
 _____ [1]

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

_____ [1]

| Examiner Only | |
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| Marks | Remark |
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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]

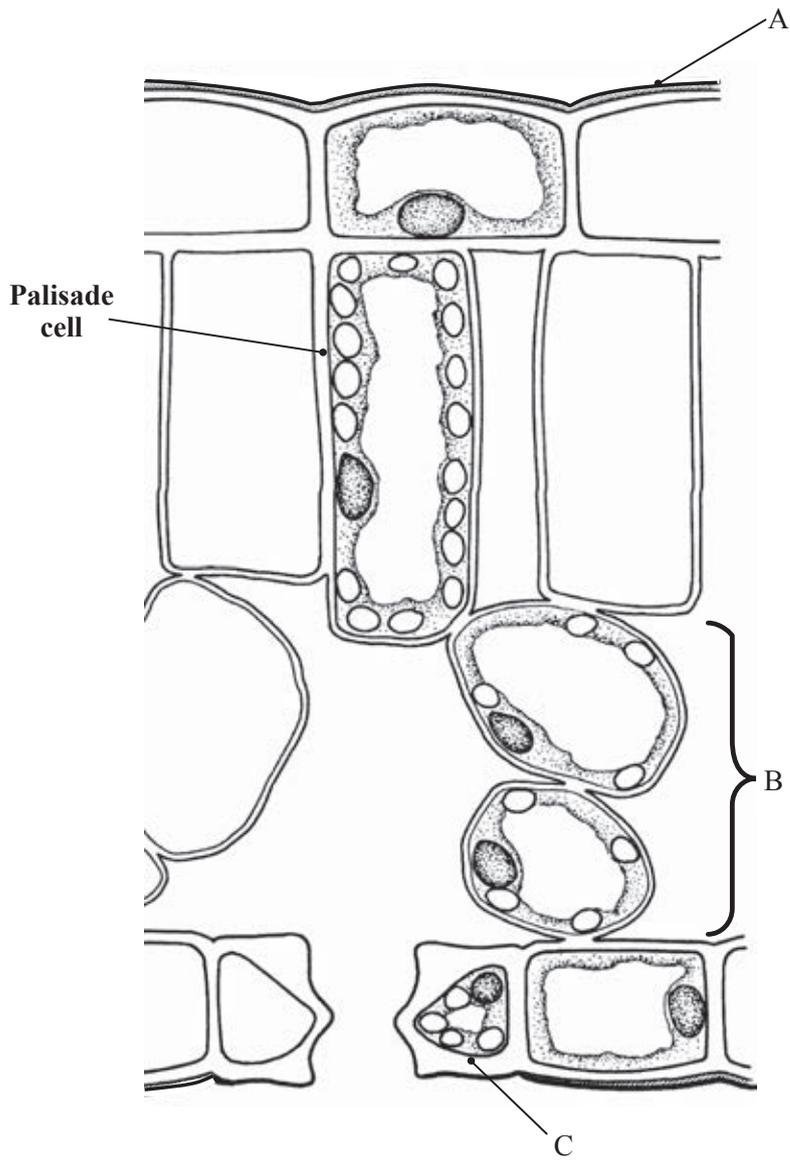
Quality of written communication [2]

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

 _____ [1]

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| Marks | Remark |
| | |

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]

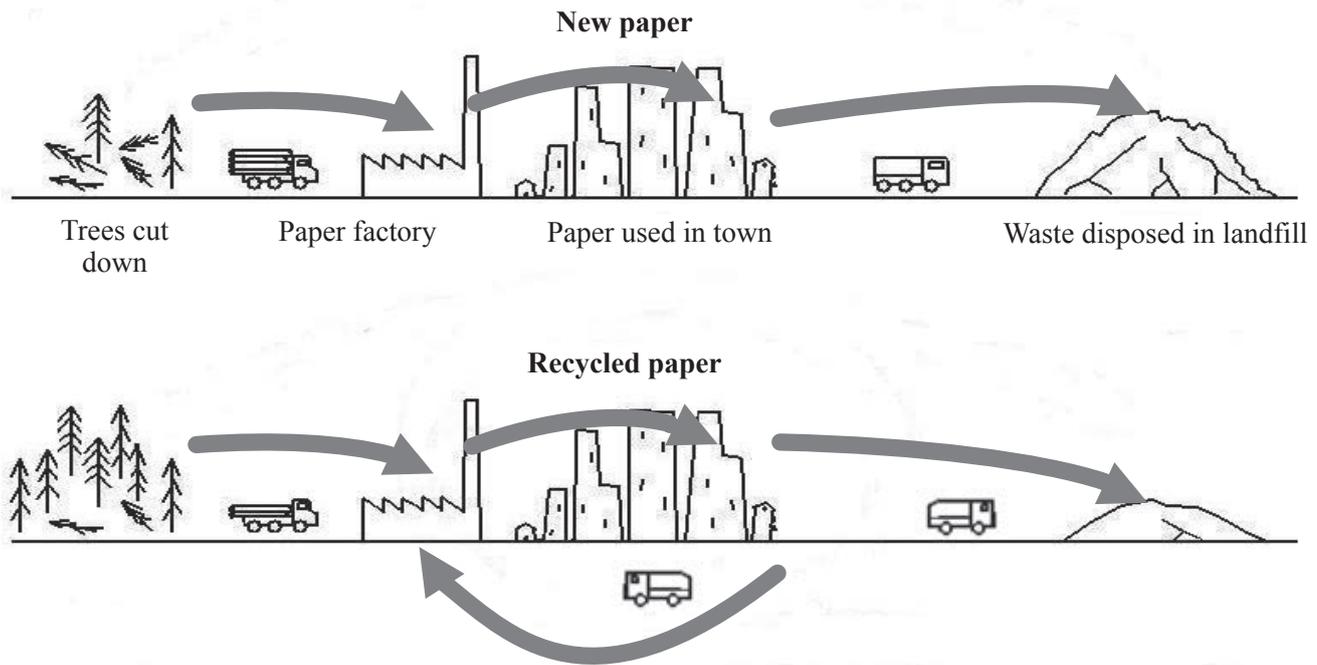
C _____ [1]

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

 _____ [2]

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| 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

(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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| Marks | Remark |
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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]

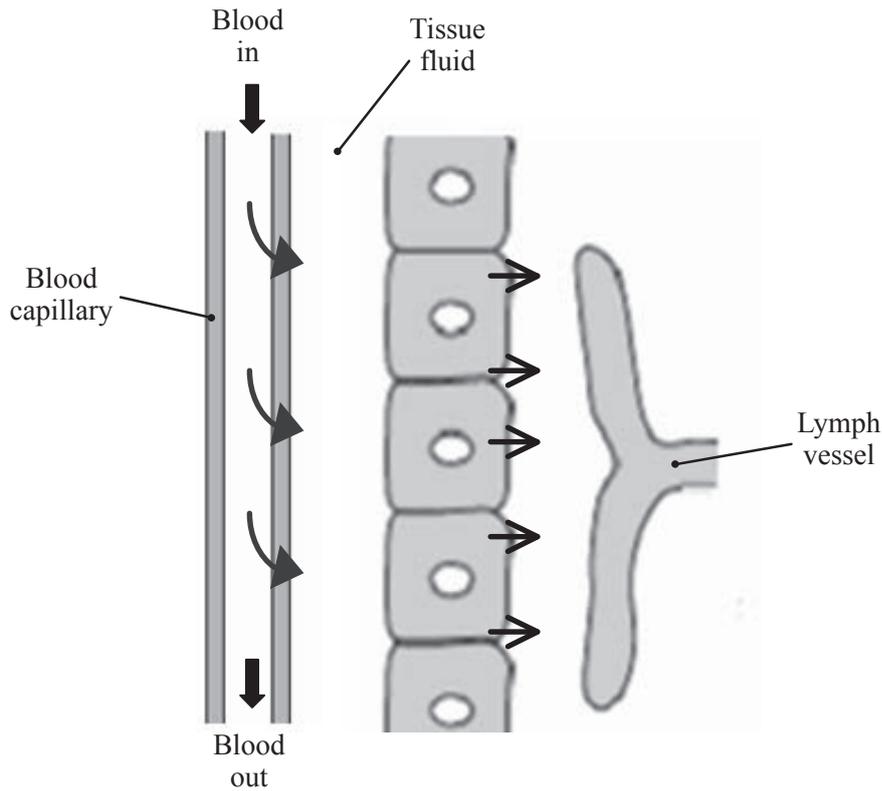
(c) Describe **two** ways solvent abuse can be damaging to society.

1. _____ [1]

2. _____ [1]

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| Marks | Remark |
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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 |
| | |

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



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

[2]

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

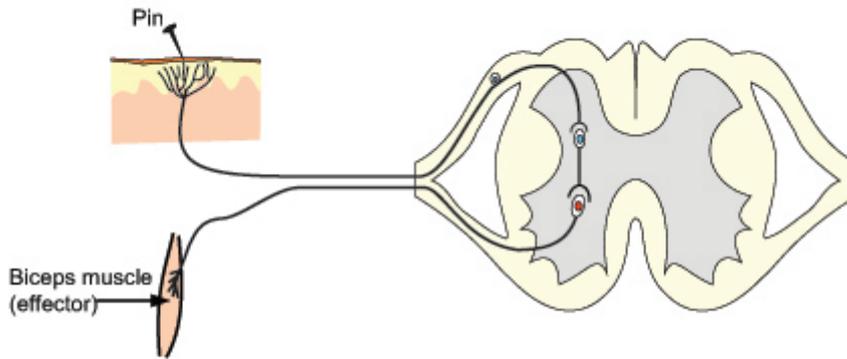
[2]

The process was caused by a plant hormone.

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

1. _____ [1]
2. _____ [1]

12 The diagram shows a reflex arc.



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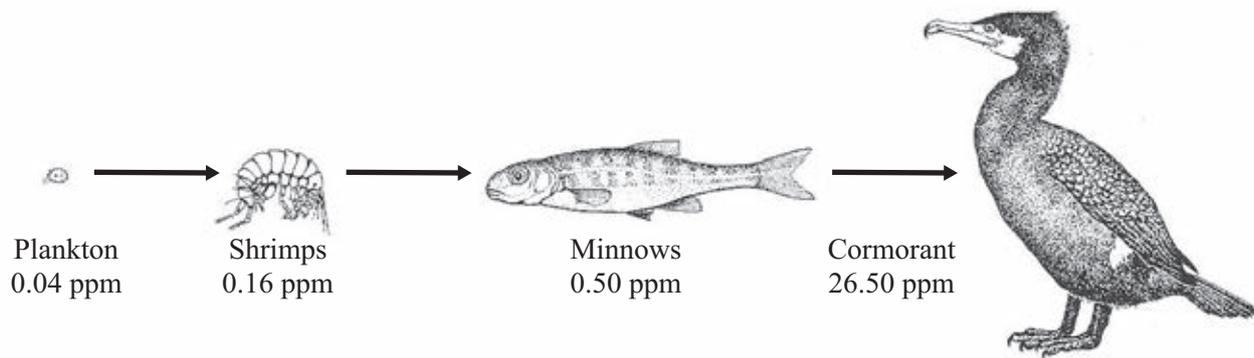
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| Marks | Remark |
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(a) Draw a line labelled **R** to show the receptor. [1]

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

(c) Describe the response when the impulse reaches the effector. [3]

- 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]

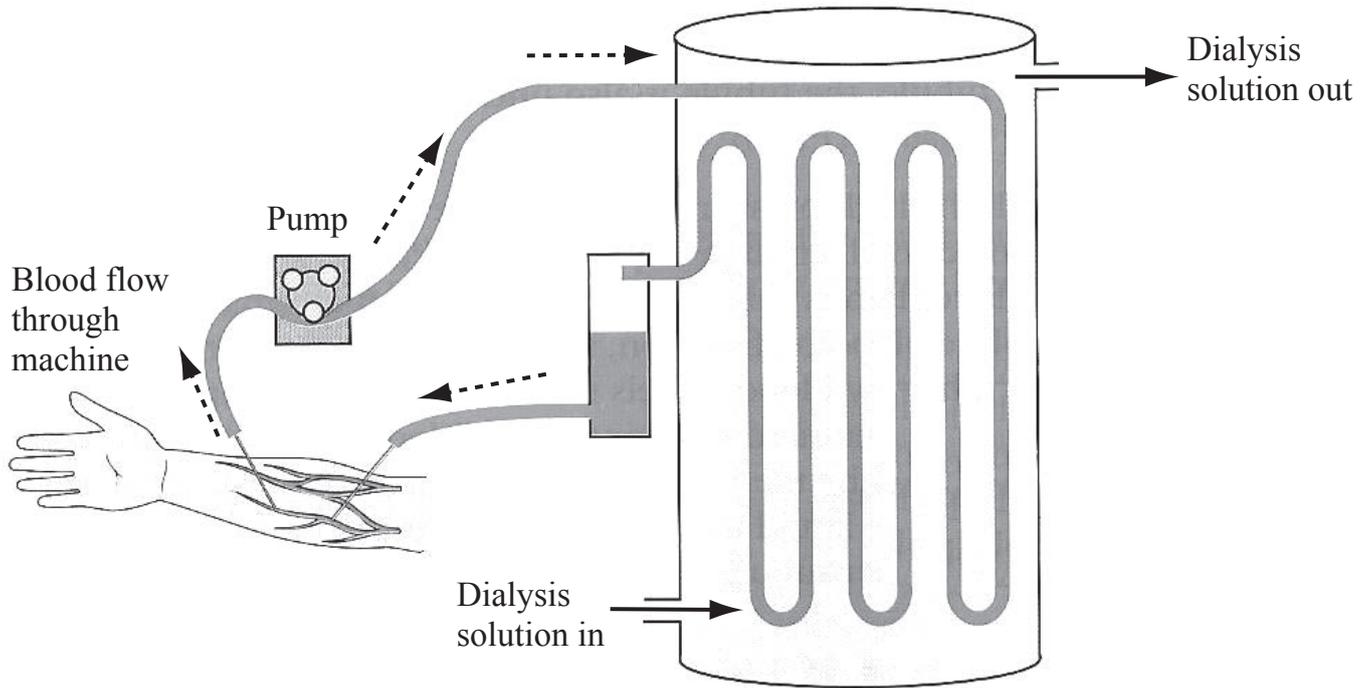
- (d) Give **two** reasons why, although it is banned in many countries, DDT is still used in some underdeveloped countries.

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.
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(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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| Marks | Remark |
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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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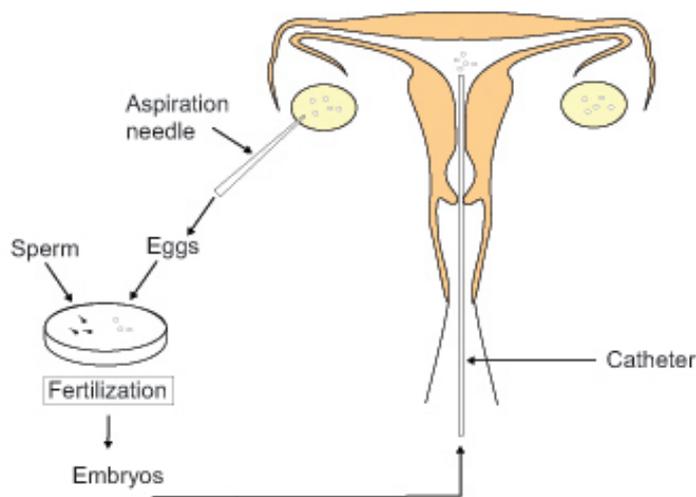
Marks Remark

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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|---------------|--------|
| Marks | Remark |
| | |

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



© iStockphoto / Thinkstock



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

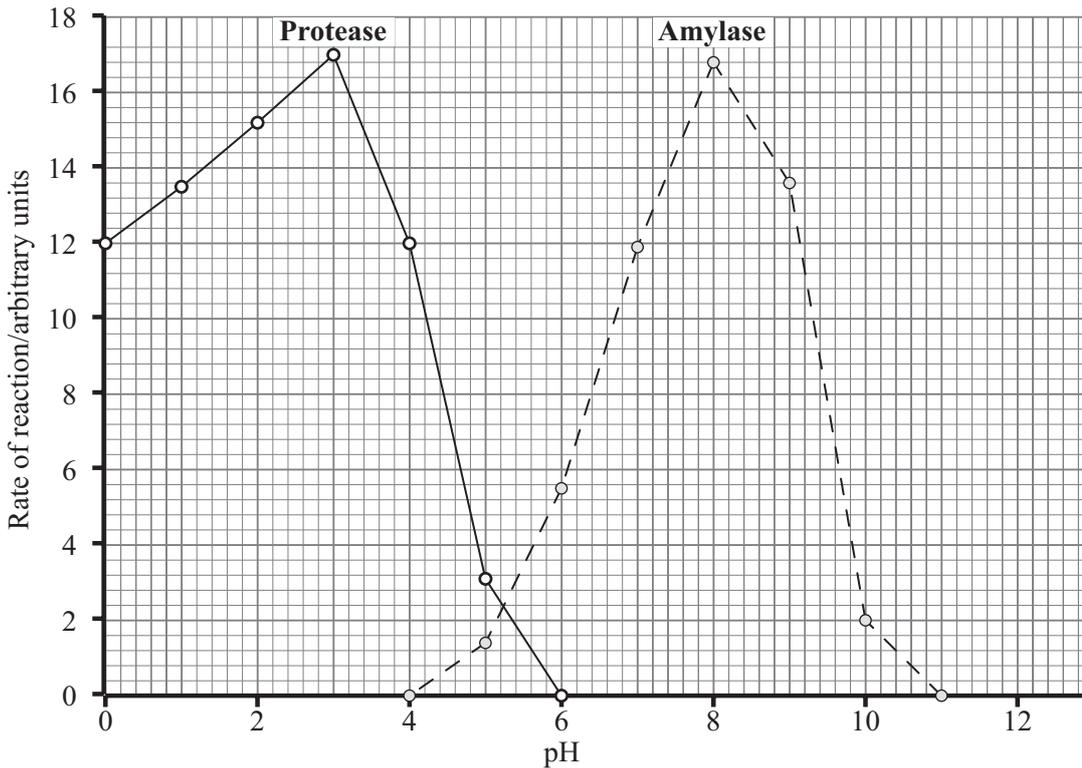
[1]

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

[2]

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|---------------|--------|
| Marks | Remark |
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18 The graph shows how pH affects the activity of two human enzymes.



(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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| Marks | Remark |
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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]

THIS IS THE END OF THE QUESTION PAPER

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| Marks | Remark |
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