Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

9267208149

BIOLOGY **5090/22**

Paper 2 Theory **May/June 2014**

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

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

Section B
Answer **both** questions in this section.
Write your answers in the spaces provided on the Question Paper.

Section C
Answer **either** question 8 **or** question 9.
Write your answers in the spaces provided on the Question Paper.

You are advised to spend no longer than one hour on Section A.
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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Section A

Answer **all** the questions in this section.

Write your answers in the spaces provided.

1 **(a)** State **three** substances found in the urine of a healthy person.

1 .....

2 .....

3 ..... [3]

(b) The concentration of a person's urine can vary according to their diet.

Explain how changes in a person's diet can affect the concentration of their urine.

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.....[4]

(c) An investigation was carried out into the effect of diet on the rate of production of urine. Three students each took 1.5 dm^3 of a different drink **A**, **B** or **C**.

Fig. 1.1 shows the volume of urine released by each student over the next two and a half hours.

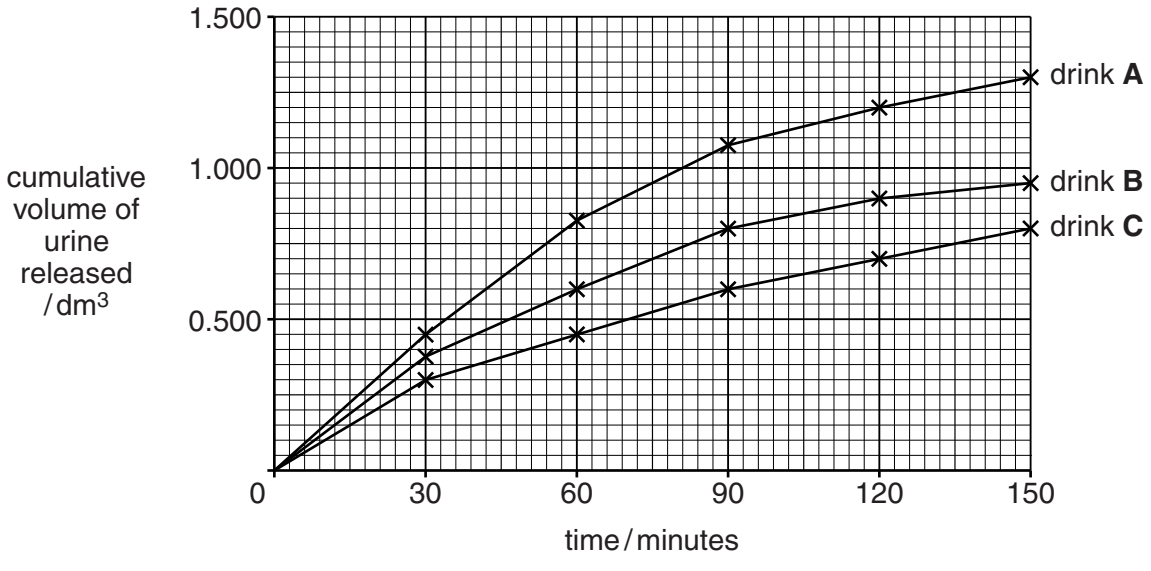


Fig. 1.1

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Suggest which of the three drinks it would be better to avoid on a very hot day.

Give an explanation for your answer.

drink ..... [1]

explanation .....

.....

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.....[4]

[Total : 12]

2 Two students performed an experiment to illustrate inheritance. They each made a 'spinner' similar to the one shown in Fig. 2.1. A result is recorded when a disc is spun and stops with one side nearest the surface.

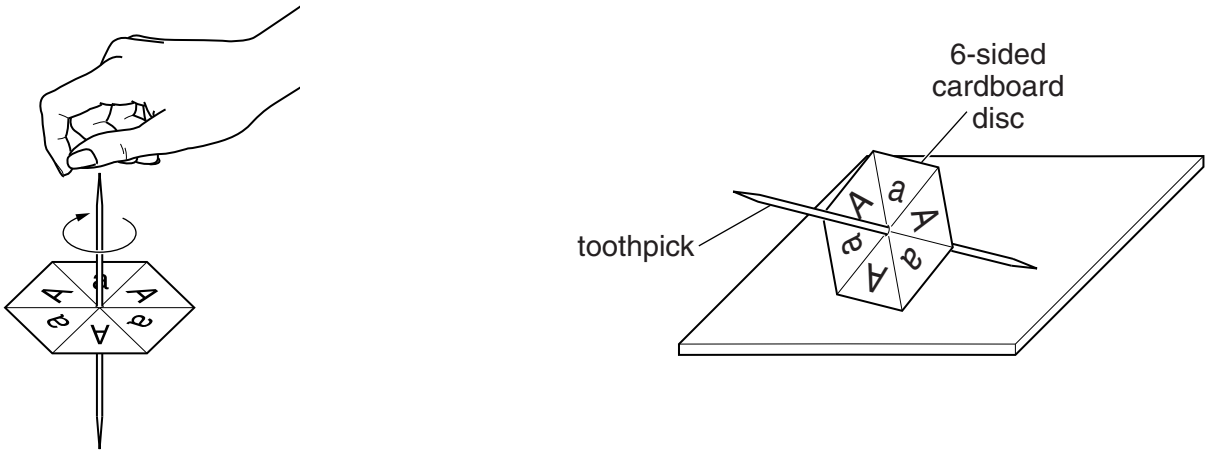


Fig. 2.1

(a) Complete Table 2.1, to show the expected results if the two students spin their discs, at the same time, on 80 separate occasions.

Table 2.1

combination of letters on each occasion	number of times each combination of letters is recorded
A and A	20
A and a	
a and a	

[1]

(b) Suggest **two** reasons why the results they obtained may have been different from the expected results.

.....

.....[2]

(c) Suggest the feature or stage in the process of inheritance represented by each of the following:

(i) the students .....

(ii) the spinning of the disc .....

(iii) the letters on the disc .....

[3]

(d) Describe how the students could modify their spinners and use them to illustrate the possible inheritance of blood groups by children of a father who has codominant blood group alleles and a mother who is heterozygous for blood group A.

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..... [5]

[Total: 11]

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[Turn over

3 Fig. 3.1 shows a flowering head of wheat, and individual flowers before and after opening.

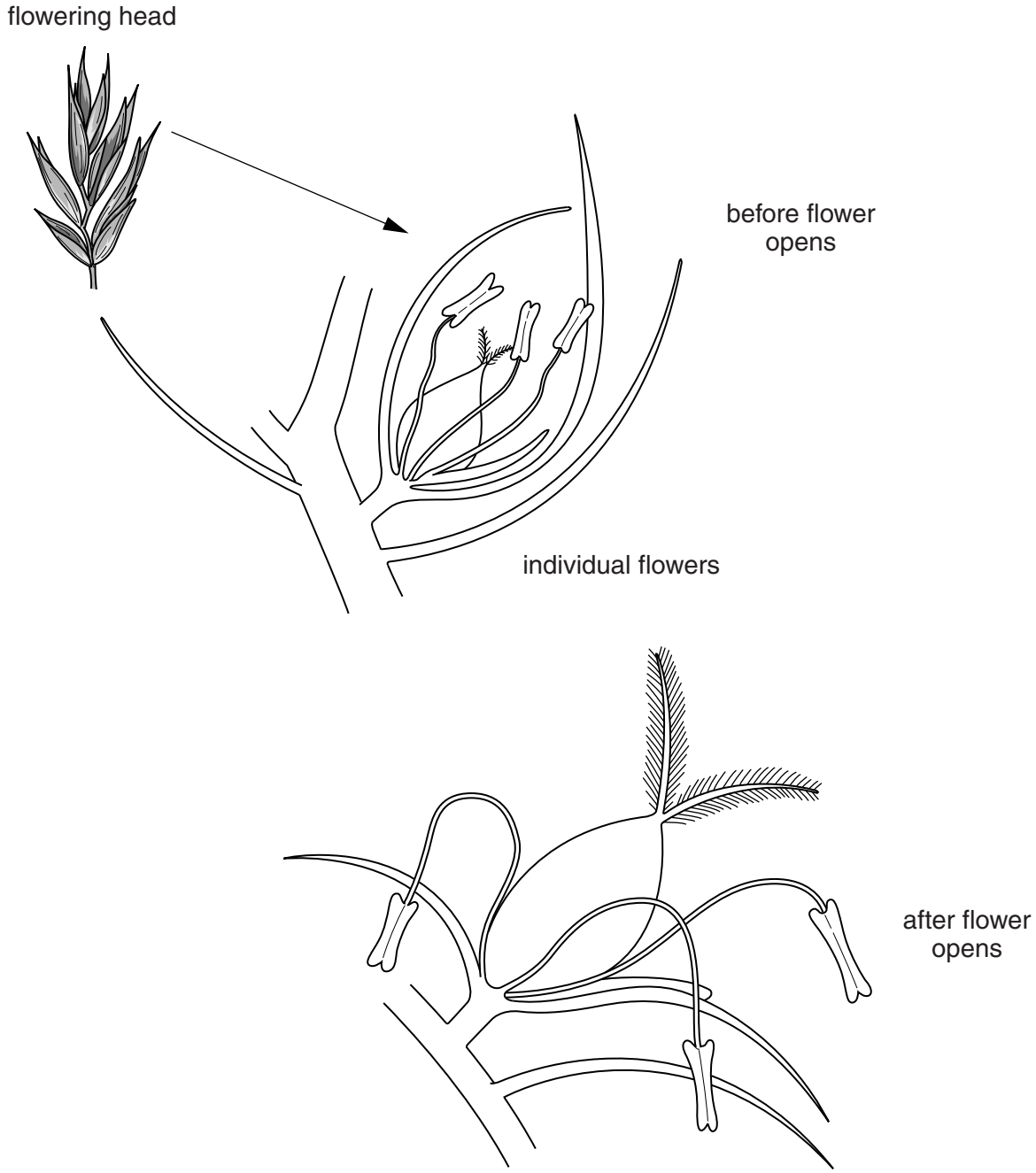


Fig. 3.1

The anthers release most of their pollen before the flower opens. The rest is released after the flower opens.

(a) Name the type of pollination found in the wheat plant before the flower opens.

..... [1]

(b) **(i)** Using the information provided by Fig. 3.1, describe pollination in the wheat plant after the flower opens.

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.....[3]

(ii) Wheat pollen is relatively heavy and is released for only a few hours after the flowers open.

Suggest **two** disadvantages of this.

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.....[2]

(c) Scientists are working to introduce genes into wheat plants to make them resistant to attack by insect pests (greenfly) and to encourage root nodule bacteria from pea and bean plants to live in their roots.

(i) Name the type of experimental work in which these scientists are involved.

..... [1]

(ii) Suggest how the growth of root nodule bacteria on the roots of wheat plants could reduce the amount of fertiliser required by a growing wheat crop.

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.....[5]

[Total:12]

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4 Fig. 4.1(a) shows the reproductive organs of a man and Fig. 4.1(b) shows the reproductive organs of a woman.

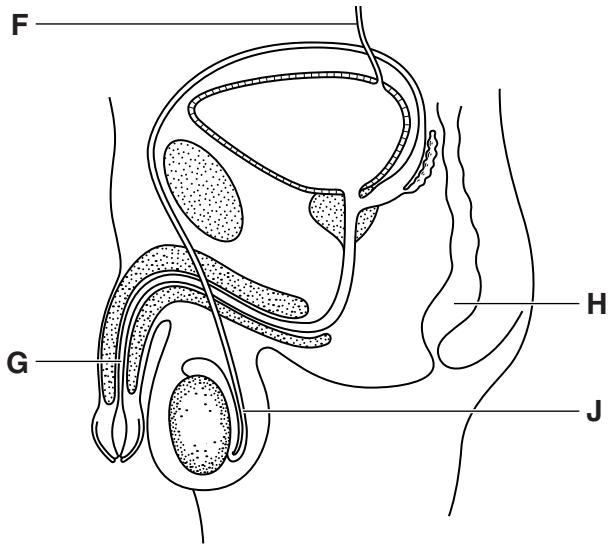


Fig 4.1(a)

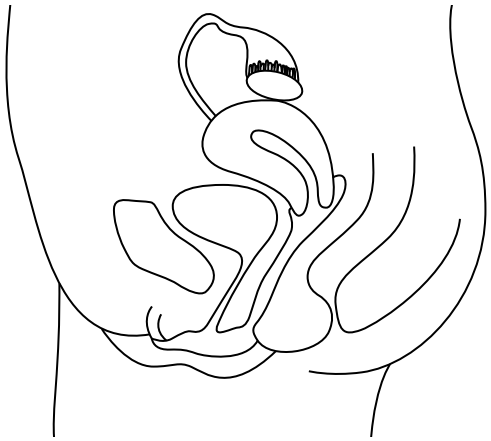


Fig. 4.1(b)

(a) Complete Table 4.1, stating the names of the structures in Fig. 4.1(a) and indicating whether they carry urine and/or sperms using yes **or** no as appropriate.

Table 4.1

structure identified by letter	name of structure	carries urine (yes or no)	carries sperms (yes or no)
F			
G			
H			
J			

[4]

(b) Indicate by drawing a line across each of the relevant parts **in both Fig 4.1(a)** and **4.1(b)**, where a cut may be made in order to carry out a form of surgical contraception.

[2]

(c) In older men, the prostate gland tends to increase in size. Suggest an explanation for how this may affect urination.

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.....[2]

[Total : 8]

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5 Cacti are plants that grow in desert conditions. Fig. 5.1 shows a type of cactus.

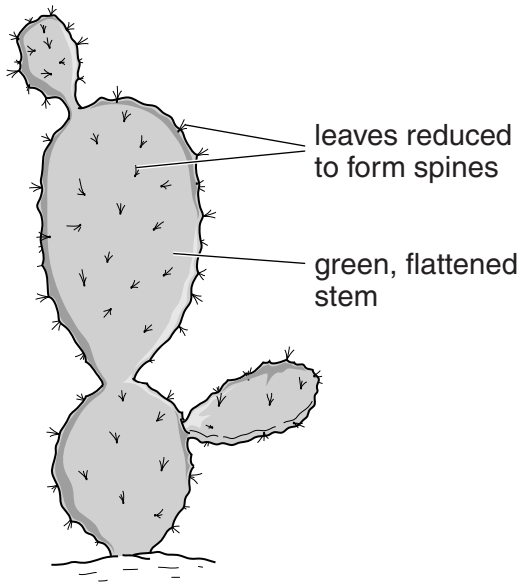


Fig. 5.1

(a) (i) State **two** processes that would normally occur in the leaves of a plant.

1 .....

2 ..... [2]

(ii) Suggest why it is an advantage for a cactus to have leaves with a small surface area.

.....

.....[2]

(b) Fig. 5.2 shows the surface of the stem of the cactus seen using a microscope.

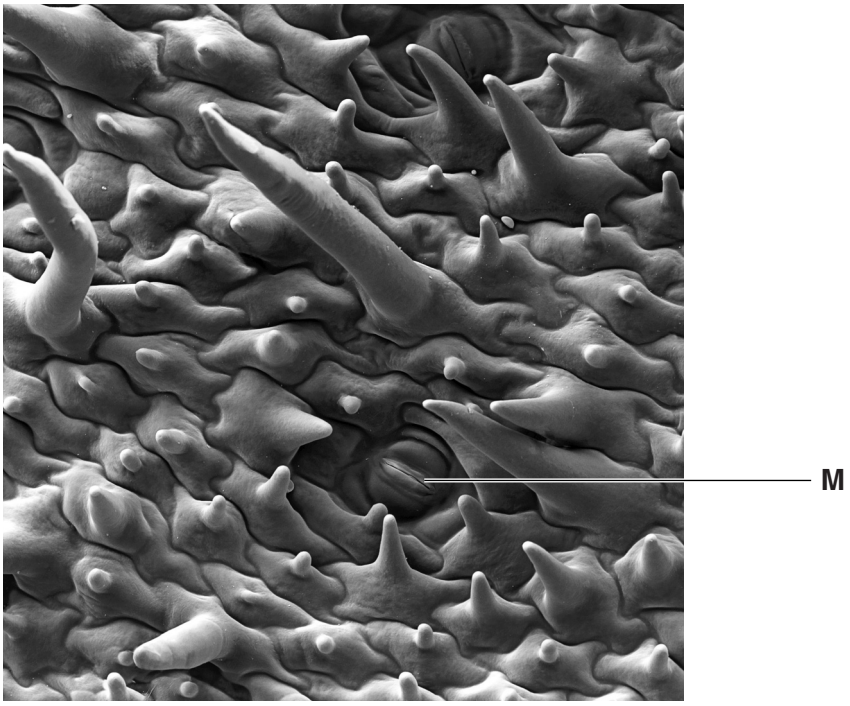


Fig. 5.2

(i) Name the part labelled **M** on Fig. 5.2 .....[1]

(ii) Suggest why there are many of these structures on the stems of a cactus.

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.....

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.....[2]

[Total: 7]

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Turn over for Section B

Section B

Answer **both** questions in this section.

Write your answers in the spaces provided.

6 **(a)** Explain the fact that humans breathe while plants do not.

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.....[3]

(b) Explain why the respiration rate of humans is relatively high and constant, while that of plants may vary widely.

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.....[7]

[Total: 10]

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7 **(a)** Describe how a virus differs from a bacterium.

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.....[6]

(b) Explain how microorganisms are involved in the recycling of materials in dead organic matter.

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.....[4]

[Total: 10]

Section C

Answer **either** question 8 **or** question 9.

Write your answers in the spaces provided.

8 **(a)** Describe how peristalsis causes food to be moved along the alimentary canal.

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.....[6]

(b) Explain why the heart muscle is **not** described as an antagonistic muscle.

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.....[4]

[Total: 10]

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9 **(a)** Explain the health risks of each of the following:

(i) a high-fat diet

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.....[5]

(ii) a low-protein diet

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.....[3]

(b) Explain why women may sometimes require iron supplements to their diet.

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.....[2]

[Total: 10]

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