

CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
NUMBER

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BIOLOGY

Paper 3 Extended

0610/33

May/June 2014

1 hour 15 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 a pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer **all** questions.

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.

1 Fungi were often classified as different species according to their visible reproductive structures.

Penicillium dodgei and *Eupenicillium brefeldianum* were classified as different species because they had different types of spores.

However, recently it was recognised that the spores of *P. dodgei* were asexual spores, while those of *E. brefeldianum* were sexual spores. A comparison of the DNA of these two fungi shows that they are the same species.

This fungus is now known as *Penicillium brefeldianum*.

(a) State how DNA analysis can show that *P. dodgei* and *E. brefeldianum* are the same species.

.....
.....
.....[2]

(b) (i) Describe how a fungus, such as *P. brefeldianum*, reproduces asexually.

.....
.....
.....
.....
.....
.....[3]

(ii) Discuss the advantages of **asexual** reproduction.

.....
.....
.....
.....
.....
.....
.....[3]

[Total: 8]

2 Sulfur dioxide (SO₂) can cause acid rain.

(a) Name **one** other pollutant that can cause acid rain.

.....[1]

(b) Describe the effects of acid rain on the environment.

.....
.....
.....
.....
.....
.....
.....
.....
.....[3]

(c) State **three** methods to reduce atmospheric SO₂ pollution.

1
.....
2
.....
3
.....
.....[3]

- (ii) Suggest why the concentration of sulfur in the plant tissues was calculated as a **percentage** of the **dry mass** of the plant tissue.

.....
.....
.....
.....
.....[2]

[Total: 12]

3 (a) Define the term *sensitivity*.

.....

 [2]

(b) Describe how voluntary actions differ from involuntary actions.

.....

 [2]

(c) Name the neurone that transmits impulses from a receptor.

..... [1]

(d) Reaction time is defined as the time taken to respond to a stimulus.

During a swimming relay race, the reaction times of four swimmers in two teams, **A** and **B**, were recorded.

In each team, swimmer 1 responded to the sound of the start gun; swimmers 2, 3 and 4 responded to seeing the previous swimmer touch the swimming pool wall.

Table 3.1 shows the reaction times for the swimming relay teams.

Table 3.1

swimmer	reaction time/s	
	team A	team B
1	0.81	0.75
2	0.48	0.40
3	0.58	0.06
4	0.31	0.35

- 4 (a) Fig. 4.1 shows a section through the anther of a lily flower. The cells in the centre are dividing by meiosis.

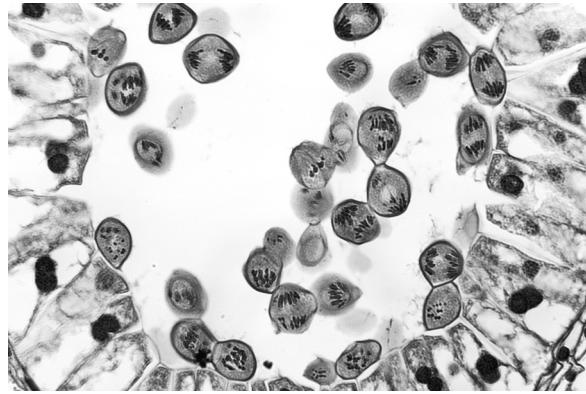


Fig. 4.1

- (i) Name the product of meiosis that is formed in anthers.

.....[1]

- (ii) Explain the importance of meiosis in sexual reproduction.

.....
.....
.....
.....
.....[2]

(b) Fig. 4.2 shows a flower of *Lilium polyphyllum*, a lily that grows in the Himalayan mountains. This species is cross-pollinated by insects.



Fig. 4.2

(i) Explain what is meant by *cross-pollination*.

.....
.....
.....
.....
.....[2]

(ii) Name **one** feature **visible** in Fig. 4.2 that helps to attract insects.

.....[1]

5 Fig. 5.1 shows a cross-section of a kidney.

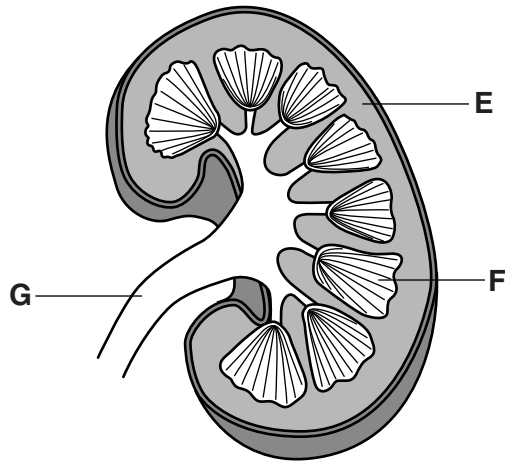


Fig. 5.1

(a) Name the structures labelled, **E**, **F** and **G** as shown in Fig. 5.1.

E

F

G

[3]

(b) Explain the function of the renal capsule in the kidney.

.....
.....
.....
.....
.....
.....
.....
.....
.....[3]

(c) Glucose is reabsorbed, back into the blood, by active transport.

Define *active transport*.

.....

.....

.....

.....

.....

.....[2]

(d) Give **one** example, other than glucose, of a substance that is reabsorbed into the blood from the renal tubule.

.....[1]

(e) Dialysis is a treatment for kidney disease.

Fig. 5.2 shows a dialysis machine.

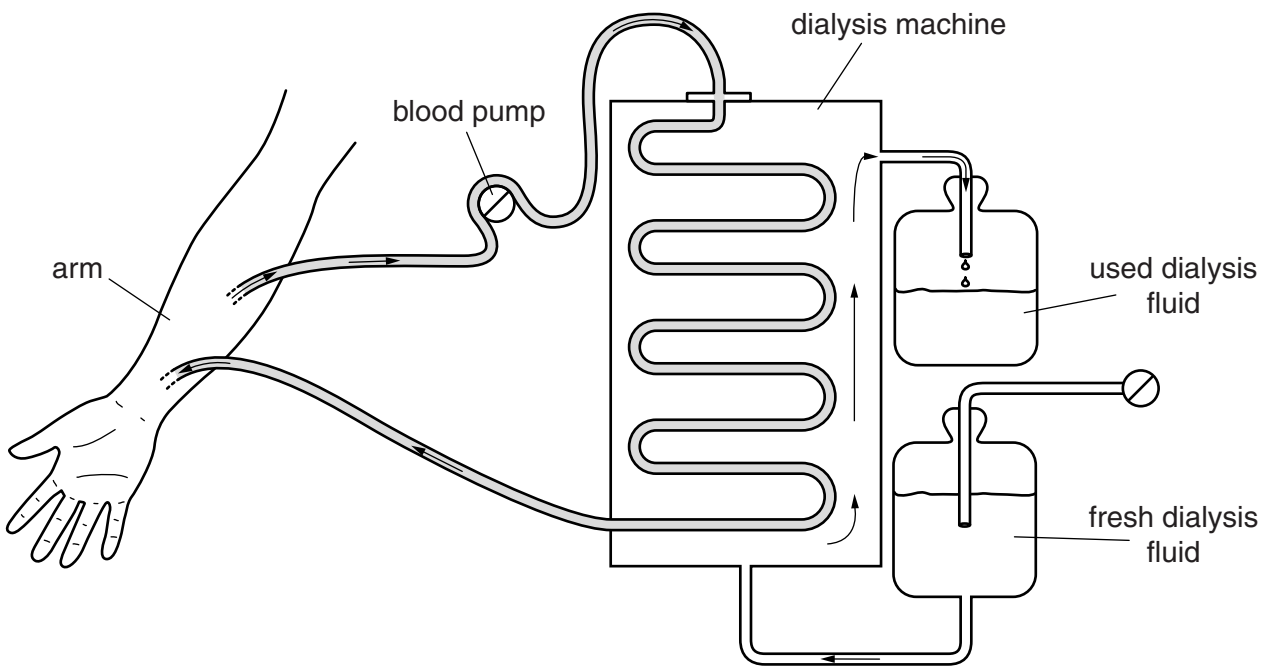


Fig. 5.2

- (g) Before a kidney is transplanted, it is important to match the tissue type of the donor with the tissue type of the recipient.

State why this is necessary.

.....
[1]

[Total: 20]

- 6 Fig. 6.1 shows the carbon cycle. P, Q, R, S and T each represent a part of the carbon cycle.

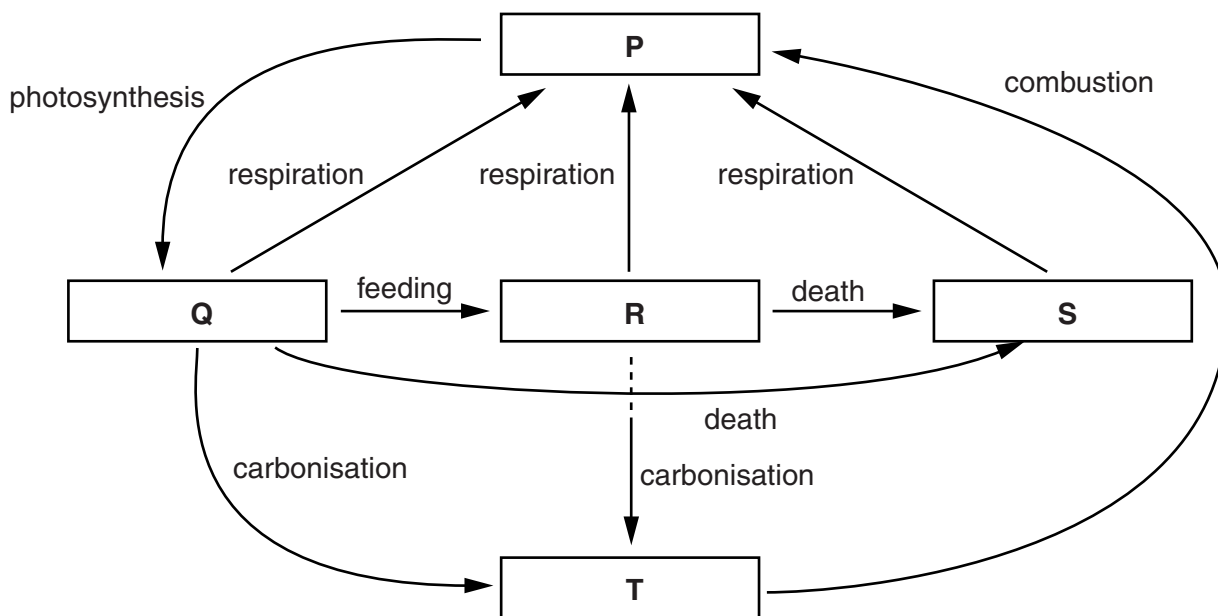


Fig. 6.1

- (a) Complete Table 6.1 by identifying P, Q, R and S and the name of **one** example of a carbon compound found in each. T has been completed for you.

Table 6.1

letter	part of cycle	carbon compound found in each part
P		
Q		
R		
S		
T	fossil fuels, e.g. natural gas	methane

[4]

(d) Environmental factors can be controlled in glasshouses.

Describe how **three** environmental factors are controlled in a glasshouse to improve crop yield.

factor 1:

how is it controlled:

.....

factor 2:

how is it controlled:

.....

factor 3:

how is it controlled:

.....

[3]

[Total: 15]

Copyright Acknowledgements:

- Question 2 Figure 2.1 © Xue-Yan Liu, Hua-Yun Xiao, Cong-Qiang Liu, Hong-Wei Xiao, Yan-Li Wang; Assessment of atmospheric sulphur with the epilithic moss *Haplocladium microphyllum*: Evidences from tissue sulphur and d34S analysis. *Environmental Pollution*; Elsevier; 2009.
- Question 4 Figure 4.1 © Biodisc; Cross-section of a Lily anther showing the second meiotic division (*Lilium*), a monocot. LM X65; Visuals Unlimited; 2011.
- Question 4 Figure 4.2 © Anurag Dhyani; LILIES and Related Plants, 2011-2012. Phenology of *Lilium polyphyllum* in Garhwal Himalaya, India; RHS Lily Group; 2011.

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