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BIOLOGY
HIGHER LEVEL
PAPER 2

Thursday 17 May 2012 (afternoon)

2 hours 15 minutes

Candidate session number

0	0								

Examination code

2	2	1	2	–	6	0	1	4

INSTRUCTIONS TO CANDIDATES

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all questions.
- Section B: answer two questions.
- Write your answers in the boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is *[72 marks]*.

SECTION A

*Answer **all** questions. Write your answers in the boxes provided.*

1.

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(Question 1 continued)

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(Question 1 continued)

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2. Two foods were measured with a calorimeter to determine the energy in each. Five trials on potato chips and five trials on walnuts were performed. The results are shown in the table below.

Trial	Potato chip / $kJ\,g^{-1}$	Walnut / $kJ\,g^{-1}$
1	22.4	24.1
2	21.7	23.8
3	21.9	25.2
4	22.0	28.0
5	22.0	27.9
Mean	22.0	missing value
Standard deviation	0.1	2.0

(a) Calculate the mean energy for the walnut. *[1]*

(b) Explain how this data shows which food had the greatest variation in its energy content. *[2]*

(c) Both potato chips and walnuts contain lipids. State **one** function of lipids. *[1]*

3. (a) Blood transports molecules throughout the body. State where the blood absorbs

    (i) hormones. *[1]*

    (ii) carbon dioxide. *[1]*

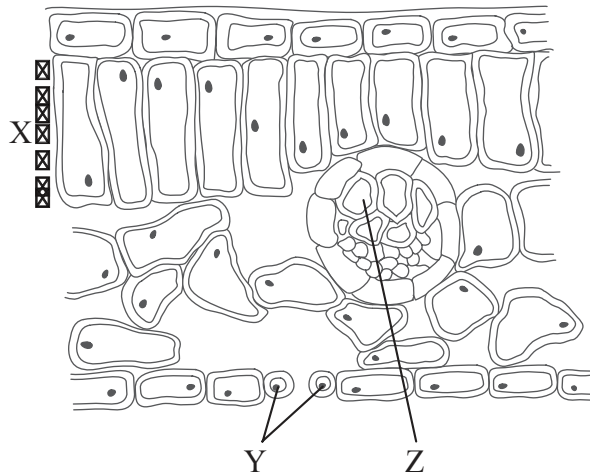(b) Describe **three** features of alveoli that adapt them to gas exchange. *[3]*

(c) Explain how the structure of capillaries relates to their functions. *[3]*

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4. The diagram shows a cross section of a leaf.

(a) Identify the tissues labelled X, Y and Z.

(i) X: . . . .   *[1]*

(ii) Y: . . . .   *[1]*

(iii) Z: . . . .   *[1]*

(b) Outline **two** adaptations of xerophytes that help to reduce transpiration from the leaves.   *[2]*

1. . . . .

2. . . . .

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(Question 4 continued)

(c)   Angiospermophyta have vascular tissue (xylem and phloem) that bryophyta lack.
      Suggest advantages that vascular tissue confers.   *[3]*

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SECTION B

*Answer **two** questions. Up to two additional marks are available for the construction of your answers. Write your answers in the boxes provided.*

5. (a) List the general functions of non-membrane proteins.   *[4]*

    (b) Outline the digestion, absorption and assimilation of proteins in humans.   *[6]*

    (c) Actin and myosin are two proteins found in muscles. Explain how skeletal muscle contracts, including the interaction of these proteins.   *[8]*

6. (a) Describe the relationship between genes, polypeptides and enzymes.   *[4]*

    (b) Outline control of metabolic pathways.   *[6]*

    (c) Discuss the use of lactase in the production of lactose-free milk.   *[8]*

7. (a) Outline pollination, fertilization and seed dispersal.   *[4]*

    (b) Compare the processes of spermatogenesis and oogenesis.   *[8]*

    (c) Describe the consequences of overpopulation of a species.   *[6]*

8. (a) Outline how **three** properties of water enhance its use by living organisms.   *[6]*

    (b) Describe the role of ADH in osmoregulation.   *[4]*

    (c) Explain how water is moved from roots to leaves in terrestrial plants.   *[8]*

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