

**Tuesday 18 June 2013 – Morning**

**GCSE ENVIRONMENTAL AND LAND-BASED SCIENCE**

**B683/02** Commercial Horticulture, Agriculture and Livestock Husbandry  
(Higher Tier)

Candidates answer on the Question Paper.  
A calculator may be used for this paper.

**Duration:** 1 hour

**OCR supplied materials:**  
None

**Other materials required:**

- Pencil
- Ruler (cm/mm)



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

**INFORMATION FOR CANDIDATES**

- Your quality of written communication is assessed in questions marked with a pencil (✎).
- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **50**.
- This document consists of **20** pages. Any blank pages are indicated.

Answer **all** the questions.

1 The photographs show four foods given to cattle.



(a) Which **one** of these foods is **most** suitable as the cattle's production ration?

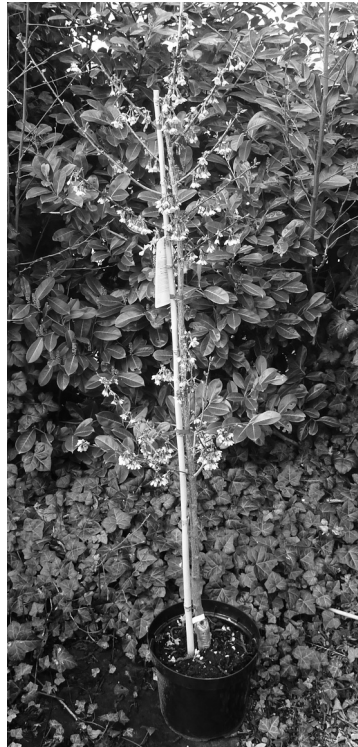
Answer **A, B, C** or **D** ..... [1]

(b) Explain the different uses of a **production** ration and a **maintenance** ration.

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

[Total: 3]

2 The picture shows a shrub growing in a pot.



Describe the tasks that need to be done to keep a shrub healthy for several years in a pot.

.....

.....

.....

.....

.....

..... [4]

[Total: 4]

3 Sheep are one example of a ruminant animal.



The structure of the digestive system of a ruminant differs from that of a non-ruminant.

Select **three** structures from the list that are found **only** in a ruminant.

**abdomen**

**abomasum**

**caecum**

**duodenum**

**ileum**

**rectum**

**reticulum**

**rumen**

1 .....

2 .....

3 .....

**[3]**

**[Total: 3]**

4 The photograph shows a type of mower.



Name **one** type of mower you have studied.

Describe how to alter the height of cutting blades in the type of mower you have chosen.

Type of mower .....

.....

.....

.....

..... [2]

[Total: 2]



(b) Different mixtures of grass seeds are used for growing different types of grassland.

Draw straight lines to join each **type of grassland** to its correct **mixture of grass seeds**.

**type of grassland**

back lawn play area

bowling green

fine ornamental lawn

football pitch

**mixture of grass seeds**

all ryegrass

40% ryegrass  
60% creeping red fescue

55% creeping red fescue  
40% chewings fescue  
5% browntop bent

all browntop bent

[3]

[Total: 9]

6 Sam grows tomatoes in soil in a glasshouse each year.



After several years, Sam finds that the tomato crop is not as good or as healthy.

Suggest reasons why the tomato crop is not as good or as healthy.

.....

.....

.....

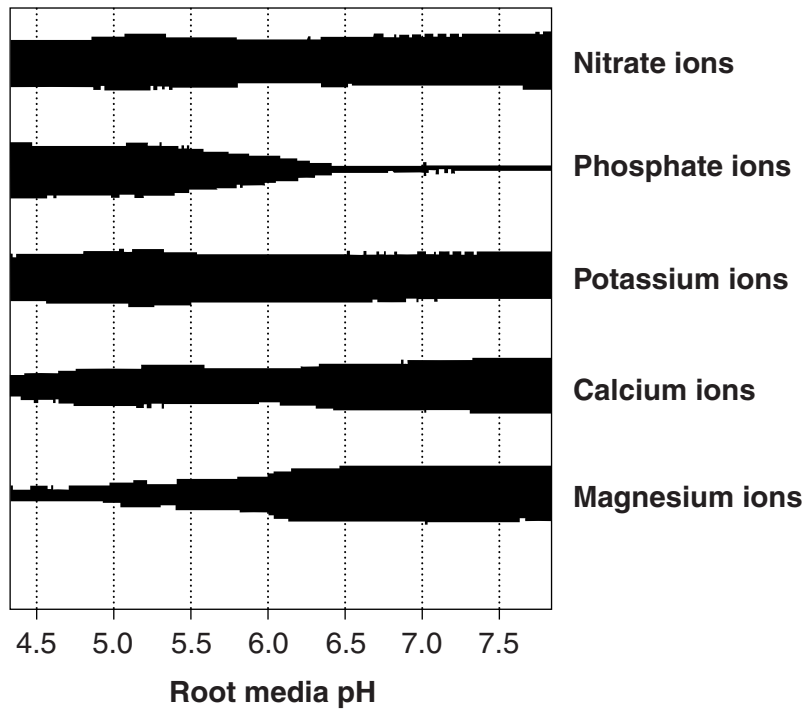
..... [2]

[Total: 2]

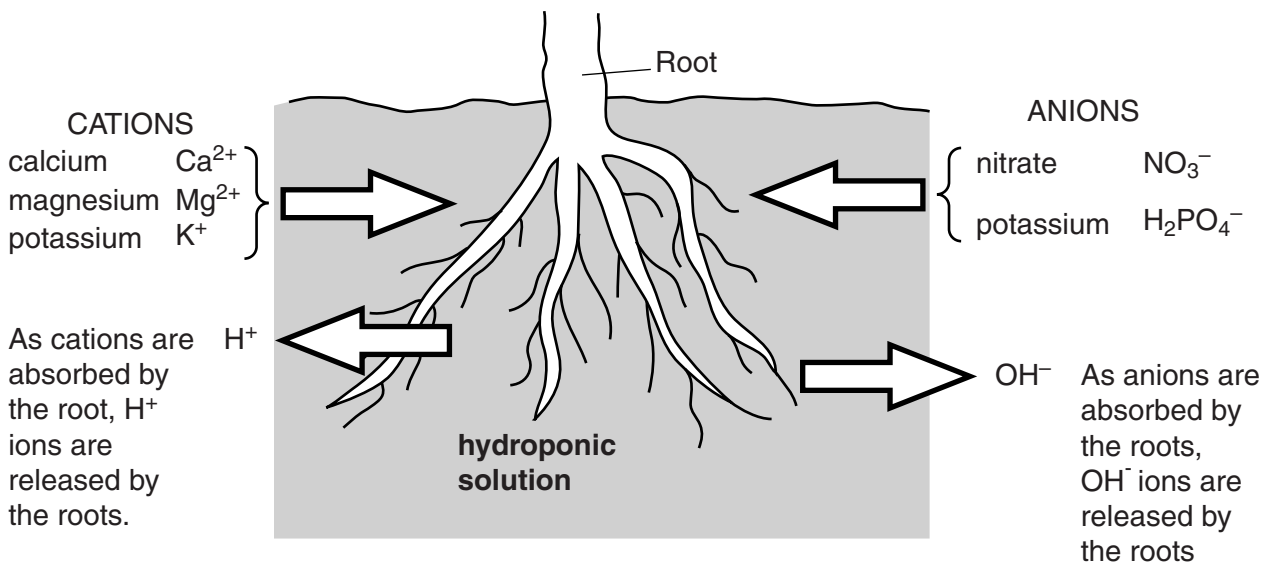




8 The chart shows how nutrient solubility changes with pH.



The diagram shows how some ions are exchanged between the hydroponic solution and the root.



(a) Plants can only absorb nutrients in solution.

The hydroponic solution can be at different pH values.

Which pH value is best for the absorption of nutrients?

Answer = pH ..... [1]

- (b) (i) What effect might the absorption of **cation** nutrients by the roots have on the pH of the hydroponic solution?

Explain your answer.

.....  
.....  
..... [1]

- (ii) Suggest why this effect may cause problems when growing crops.

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

- (iii) How may ICT be used to help prevent these problems?

.....  
.....  
..... [1]

[Total: 5]

9 Water is the most important input into a dairy cow.

If there is not enough clean water available for the cow, milk production falls rapidly.

Milk production per cow in litres per day	Range of volume of water needed per cow in litres per day	Mean volume of water needed per cow in litres per day
12	66–77	72
20	109–123	120
32	173–191	180
40	218–236	225

(a) How many litres of water does it take to produce one litre of milk if a cow is producing 20 litres of milk per day?

Answer = ..... litres [1]

(b) Suggest reasons why some cows drink more than others even though they are producing the same volume of milk.

.....

.....

.....

..... [2]

[Total: 3]

**13**  
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10 A dairy farmer studies the water consumption on the farm.

The table shows the **annual** water consumption on the farm.

<b>Water use:</b>	<b>m<sup>3</sup></b>
Drinking water for cattle	4718
Cooling milk	2304
Washing down parlour and yard	1168
Washing down equipment	334
Other general uses	77
Domestic uses	435
<b>Total of all water uses</b>	<b>9036</b>

(a) The farmer only uses the mains supply on the farm.

The water company charges 109p per m<sup>3</sup>.

What is the total annual cost of this water?

£..... per year [1]

(b) (i) Some of this water does not need to be of mains quality.

Suggest **other** possible alternative sources of water on the farm.

.....

.....

.....

..... [2]

(ii) If the farmer used these alternative sources of water for cooling the milk and washing down the parlour and yard, how much could he save per year on his mains water bill?

Show your working.

£..... per year [2]

- (c) The farmer needs to replace the mains water pipe to the farm.

The farmer has to work out the diameter of the pipe needed to supply the necessary amount of water to the farm.

This is the formula used to calculate the diameter of the pipe.

$$\text{Pipe diameter (m)} = \sqrt{\frac{4 \times \text{flow rate}}{\pi \times \text{velocity}}}$$

The velocity of the water = 331 m per hour.

$$\pi = 3.142$$

The flow rate (same as the hourly water consumption) = 1.03 m<sup>3</sup> per hour.

Use this information and the formula above to calculate the minimum diameter of pipe needed to supply the farm's water.

Show your working. Give your answer to the nearest **mm**.

Pipe diameter = ..... mm [2]

[Total: 7]

11 The photographs show **intensive** and **extensive** systems for keeping poultry for egg production.



**Intensive**



**Extensive**





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