



Rewarding Learning

General Certificate of Secondary Education
2014

Centre Number

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Candidate Number

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GCSE Biology

Unit 1

Higher Tier



[GBY12]

GBY12

FRIDAY 6 JUNE, AFTERNOON

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.

You must answer the questions in the spaces provided. Do not write outside the box, around each page or on blank pages.

Complete in blue or black ink only. **Do not write with a gel pen.**

Answer **all twelve** questions.

INFORMATION FOR CANDIDATES

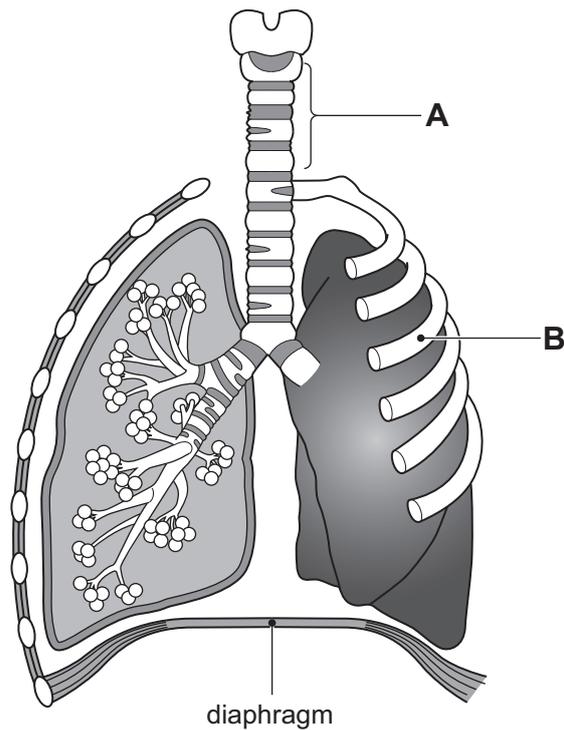
The total mark for this paper is **100**.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in questions **10** and **12(d)**.



1 The diagram shows part of the respiratory system.



© OCR Gateway GCSE Biology by S Broadley, S Hocking, M Matthews,
published by Oxford University Press, ISBN 978 0199135684

Look at the diagram.

(a) Name parts **A** and **B**.

A _____ [1]

B _____ [1]

(b) The diaphragm changes when you breathe in and out.

Describe these changes.

Breathe in _____

Breathe out _____

_____ [2]

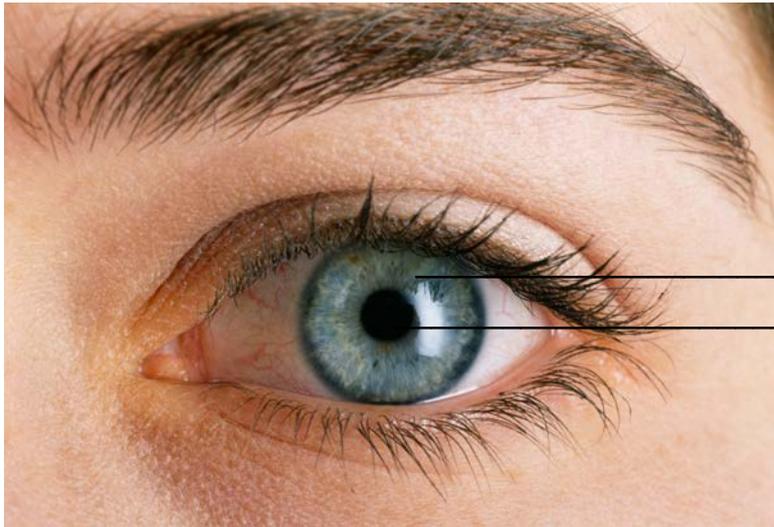
Examiner Only

Marks Remark

Total Question 1



2 The photograph shows the front of a human eye in bright light.



© Jupiterimages/Photos.com/ Thinkstock

Look at the photograph.

(a) Name parts **A** and **B**.

A _____ [1]

B _____ [1]

(b) The bright light is switched off.

(i) Describe what happens to **part B**.

_____ [1]

(ii) Explain why this change in **B** is necessary.

 _____ [2]

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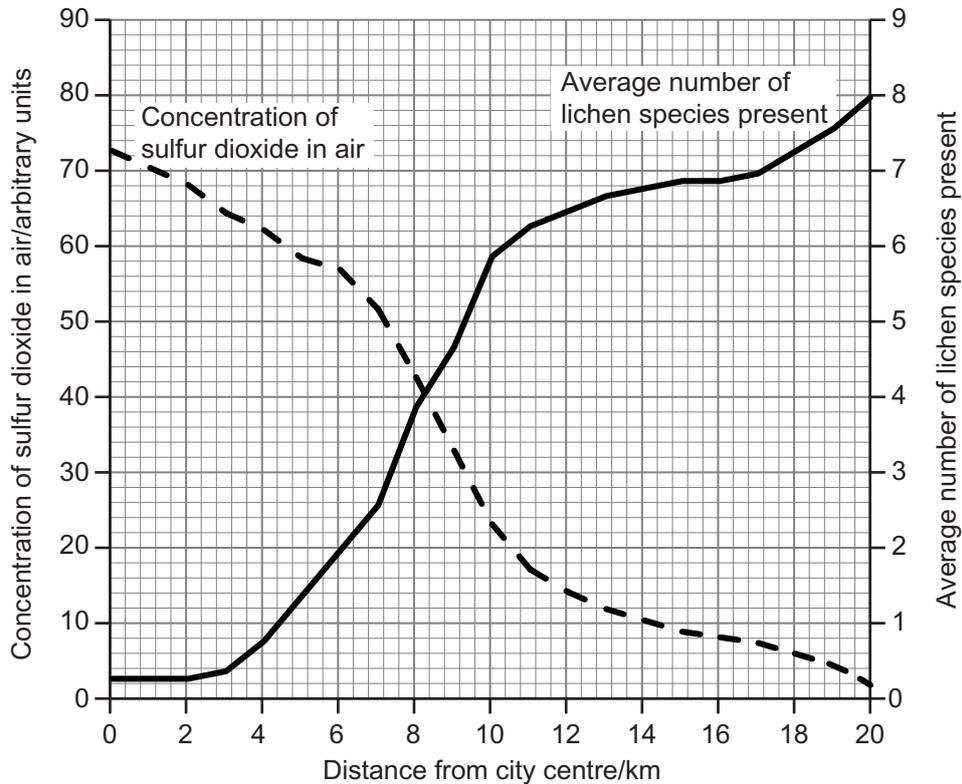
Marks Remark

Total Question 2

[Turn over



- 3 The graph shows the concentration of sulfur dioxide in the air and the average number of lichen species present on trees at different distances from a city centre.



Look at the graph.

- (a) The concentration of sulfur dioxide in the air changes as you move away from the city.

Describe the change.

[1]

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



- (b) The graph shows that some species of lichens tolerate high concentrations of sulfur dioxide in the air.

Give data from the graph which supports this conclusion.

[2]

- (c) Give **one** source of sulfur dioxide in air.

[1]

- (d) Species such as lichens can be used to monitor pollution.

What term is used to describe species like these?

[1]

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| Marks | Remark |
|------------------|--------|
| | |
| Total Question 3 | |
| | |

[Turn over

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32GBY1205

- 4 The table shows the loss of vitamin C content of four types of salad leaves stored for 10 days after picking.

| Type of salad leaf | Vitamin C content per 100 g of salad leaves/mg | | Percentage loss of vitamin C |
|--------------------|--|--------|------------------------------|
| | Day 0 | Day 10 | |
| Green lettuce | 0.10 | 0.09 | |
| Wild rocket | 72.97 | 3.55 | 95.10 |
| Lamb's lettuce | 59.18 | 13.61 | 77.00 |
| Red lettuce | 0.07 | 0.07 | 0.00 |

Look at the table.

- (a) Calculate the percentage loss of vitamin C content in green lettuce.

Show your working.

Write your answer in the table.

[2]

- (b) Use data from the table to explain which type of salad leaf is most suitable for use after storing for 10 days.

[2]

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



- (c) A bag of fresh mixed salad leaves has a vitamin C content of 20 mg per 100 g.

A portion of fresh salad leaves weighs 60 g.

- (i) Calculate the mass of vitamin C in a 60 g portion of fresh mixed salad leaves.

Show your working.

Mass _____ mg [1]

An adult is advised to have a daily intake of 50 mg of vitamin C.

- (ii) What percentage of their daily vitamin C is provided by this portion of fresh mixed salad leaves?

Show your working.

Percentage _____ [1]

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| Marks | Remark |
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| Total Question 4 | |
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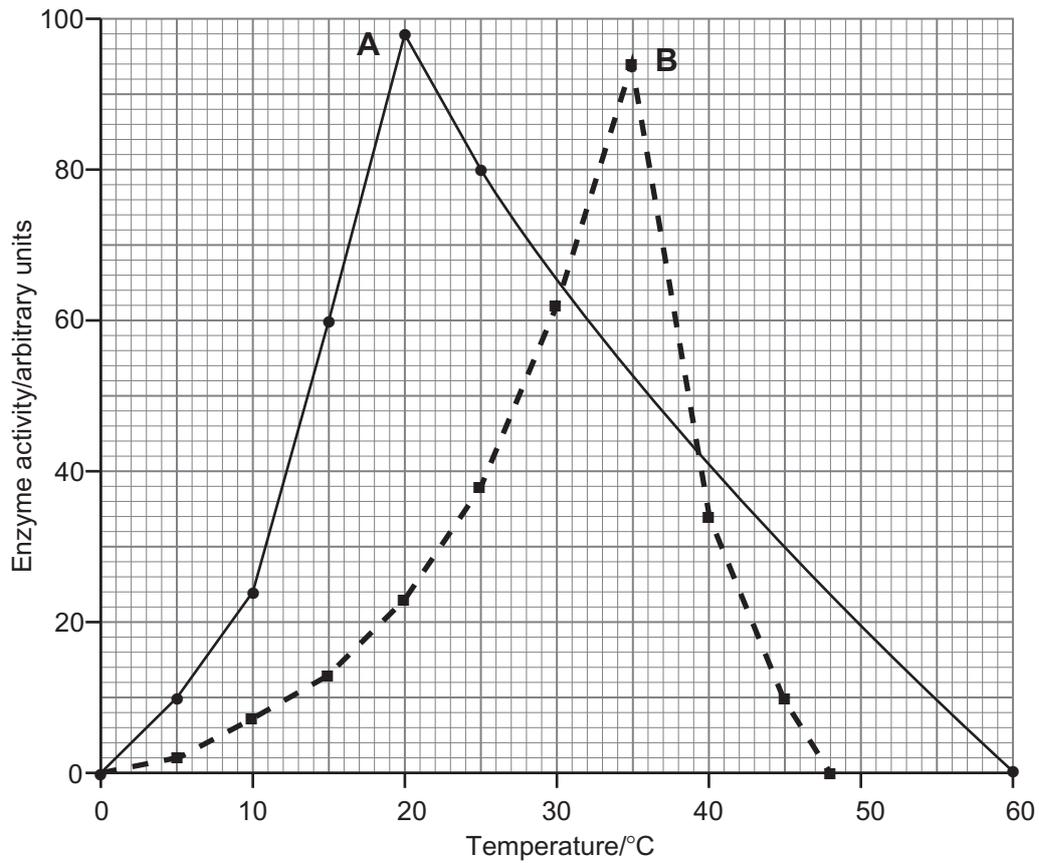
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32GBY1207

- 5 The graph shows the activity of two different enzymes, **A** and **B**, over a range of temperatures.



Source: Chief Examiner

- (a) Describe **two** differences between the activity of the two enzymes **above 20°C**.

[2]

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



Enzyme **A** is found in biological washing powders.

- (b) Give the optimum temperature for enzyme **A** and explain why it is more economical to use in washing powders than enzyme **B**.

[2]

Enzyme **B** digests food molecules in the duodenum.

- (c) Why is it necessary to digest food molecules?

[2]

Enzymes are described as biological catalysts.

- (d) Explain what is meant by a catalyst.

[1]

Examiner Only

Marks Remark

Total Question 5

[Turn over

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32GBY1209

The photograph shows Euglena.

It is another single-celled organism.



flagellum for movement

chloroplast

cell membrane

© Biophoto Associates/ Science Photo Library

(c) Euglena is difficult to classify because it has both plant and animal features.

Use the photograph to give one plant and one animal feature.

plant _____

animal _____

[2]

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| Marks | Remark |
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| Total Question 6 | |
| | |



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32GBY1213

7 (a) Diabetes can be treated with injections of insulin into the bloodstream.

Describe what effects insulin has in the liver.

[3]

(b) The graph shows the changes in the blood glucose concentration of two people with diabetes, over a period of twenty-four hours.

One person has started treatment.



© The Association of the British Pharmaceutical Industry

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



(i) Give the value for normal blood glucose concentration.

[1]

(ii) Describe what happens to the blood glucose concentration after each meal.

[1]

(iii) Nicholas has not started treatment for his diabetes.

Give two pieces of evidence from the graph which show this.

_____ [2]

(iv) Give **two other** symptoms of diabetes.

1. _____ [1]

2. _____ [1]

(v) Give **two long-term effects** of untreated diabetes.

1. _____ [1]

2. _____ [1]

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Marks

Remark

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32GBY1217

- 8 The table shows measurements of three men, Ajay, Michael and Rory made during a health check.

| Name | Height/m | Mass/kg |
|---------|----------|---------|
| Ajay | 1.55 | 63.6 |
| Michael | 1.75 | 81.8 |
| Rory | 1.60 | 81.8 |

The chart shows the Body Mass Index (BMI) values for men of different heights and masses.

Use the measurements of Ajay, Michael and Rory in the table and data from the chart to compare the BMI of the three men.

| | | Body mass index | | | | | | | | | | | | | | | | | |
|------------------|------|---------------------|----|----|----|----|------------|----|-----|-----|-----|-------|-----|-----|-----|-----|-----|-----|-----|
| | | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
| Height in metres | | Weight in kilograms | | | | | | | | | | | | | | | | | |
| | | 1.50 | 45 | 47 | 50 | 52 | 54 | 56 | 59 | 61 | 63 | 65 | 68 | 70 | 72 | 74 | 77 | 79 | 81 |
| | 1.55 | 48 | 51 | 53 | 55 | 58 | 60 | 63 | 65 | 67 | 70 | 72 | 75 | 77 | 79 | 82 | 84 | 87 | 89 |
| | 1.60 | 51 | 54 | 56 | 59 | 61 | 64 | 67 | 69 | 72 | 74 | 77 | 79 | 82 | 85 | 87 | 90 | 92 | 95 |
| | 1.65 | 54 | 57 | 60 | 63 | 65 | 68 | 71 | 74 | 76 | 79 | 82 | 84 | 87 | 90 | 93 | 95 | 98 | 101 |
| | 1.70 | 58 | 61 | 64 | 67 | 69 | 72 | 75 | 78 | 81 | 84 | 87 | 90 | 93 | 95 | 98 | 101 | 104 | 107 |
| | 1.75 | 61 | 64 | 67 | 70 | 74 | 77 | 80 | 83 | 86 | 89 | 92 | 95 | 98 | 101 | 104 | 107 | 110 | 113 |
| | 1.80 | 65 | 68 | 71 | 75 | 78 | 81 | 84 | 88 | 91 | 94 | 97 | 100 | 104 | 107 | 110 | 113 | 117 | 120 |
| | 1.85 | 69 | 72 | 75 | 79 | 82 | 86 | 89 | 92 | 96 | 99 | 103 | 106 | 110 | 113 | 116 | 120 | 123 | 127 |
| | 1.90 | 72 | 76 | 79 | 83 | 87 | 90 | 94 | 98 | 101 | 105 | 108 | 112 | 116 | 119 | 123 | 126 | 130 | 134 |
| | 1.95 | 76 | 80 | 84 | 88 | 91 | 95 | 99 | 103 | 107 | 110 | 114 | 118 | 122 | 126 | 129 | 133 | 137 | 141 |
| | | Healthy | | | | | Overweight | | | | | Obese | | | | | | | |

© New Zealand Ministry of Health

- (a) Which man is obese? _____

Use evidence from the chart to support your answer.

_____ [2]

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



(b) Another man, Darren, was found to be overweight.

He was advised to reduce his body mass by walking for 1 hour each day instead of watching television for 1 hour.

Walking for 1 hour uses 1090 joules of energy.

The energy required to reduce body mass by 1 kg is 32 700 joules.

Watching television for 1 hour each day uses 32 700 joules in 93 days.

(i) Calculate how much quicker Darren could reduce his body mass by 1 kg if he walks for 1 hour each day instead of watching television.

Show your working.

Number of days less _____ [3]

Once Darren reduces his body mass by the amount advised his BMI will be below 25.

(ii) Suggest what he should do to keep his BMI at 25 and so maintain his ideal mass.

 _____ [2]

(c) Give **two other** factors that affect the daily energy requirement of a person.

1. _____
 2. _____ [2]

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Marks Remark

Total Question 8

[Turn over

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32GBY1219

- (c) Use information from the diagram to help explain why the impulses in this reflex arc travel very quickly.

 [2]

- (d) Explain how a nerve impulse passes across a synapse.

 [4]

- (e) One disease of the nervous system causes the insulating sheath around some neurones to break down.

Suggest what effect this disease would have on the function of these neurones.

 [1]

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| Marks | Remark |
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| | |
| Total Question 9 | |
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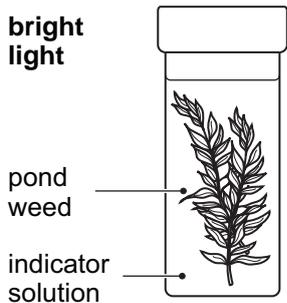


32GBY1223

11 A pupil set up an experiment using pond weed.

Each tube contained the same volume of indicator solution.

The tubes were left in different light conditions for 24 hours.

| Light condition | Colour of indicator | |
|--|---------------------|----------------|
| | at start | after 24 hours |
| bright light  | red | purple |
| dim light  | red | |
| dark  | red | yellow |

© Illustrated Biology Questions (1986), ISBN 0435591010, Philip Booth and Geoffrey Hall, publisher: Pearson. Duplication is prohibited other than for teaching and study.

(a) Describe the contents of a control tube for this experiment.

_____ [1]



(b) It may not be valid to compare the results for each tube.

Suggest **one** reason why.

_____ [1]

(c) Give **two other** variables which must be controlled.

1. _____ [2]

2. _____ [2]

(d) Name the indicator solution used in this experiment.

_____ [1]

(e) Explain the colour change observed in the test tube placed in bright light.

_____ [3]

_____ [3]

(f) The tube in dim light represents the compensation point.

(i) Give the colour of the indicator in the tube in dim light after 24 hours.

_____ [1]

(ii) What is meant by the compensation point?

_____ [2]

_____ [2]

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Marks Remark

Total Question 11

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32GBY1225

12 Plants absorb nitrates from the soil through their roots.

(a) Explain why plants need nitrates.

[2]

(b) Name the process roots use to absorb nitrates.

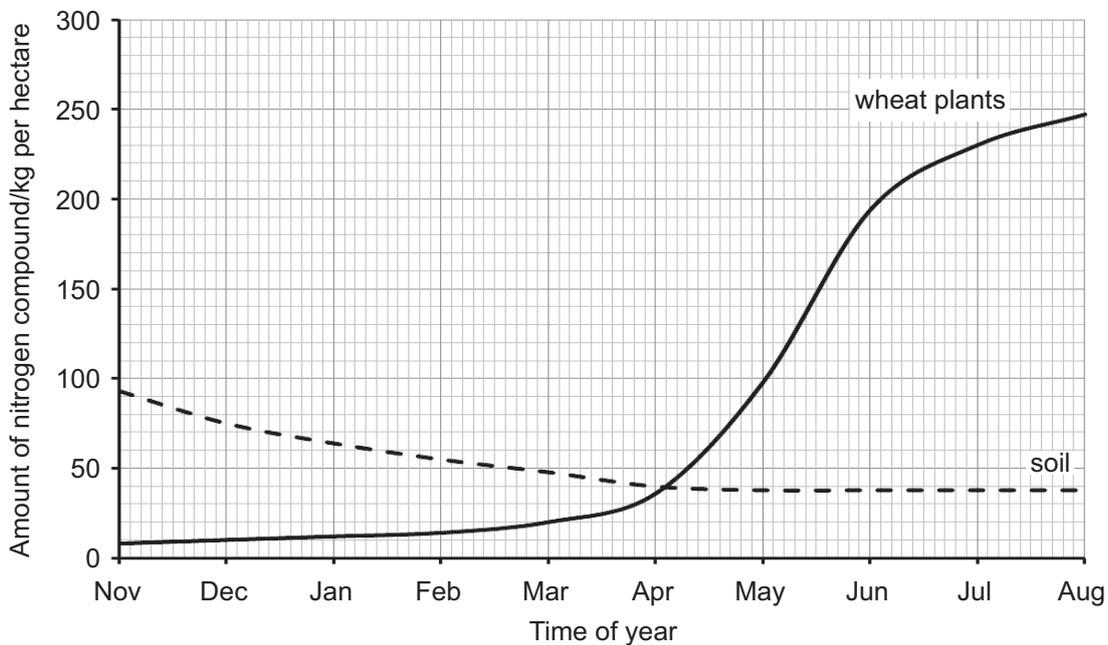
[1]

In the winter months, the temperature is low and the soil is often waterlogged.

In the summer, the temperature increases and the soil dries out.

These environmental conditions affect the bacteria of the nitrogen cycle that are active in the soil.

The graph shows changes in the amount of nitrogen compounds in wheat plants and the soil between November and August.



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| Question Number | Marks |
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