Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2014–2015

Double Award Science: Biology

GSD11

Unit B1
Foundation Tier

[GSD11]

TUESDAY 24 FEBRUARY 2015, MORNING

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all eight** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.
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 Question **8**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
Total Marks	

Examiner Only	
Marks	Remark

1 **(a)** Complete the passage by writing the correct words in the spaces.

Choose the correct words from the box below.

dark	**hormone**	**photosynthesis**
tip	**side**	**phototropism**

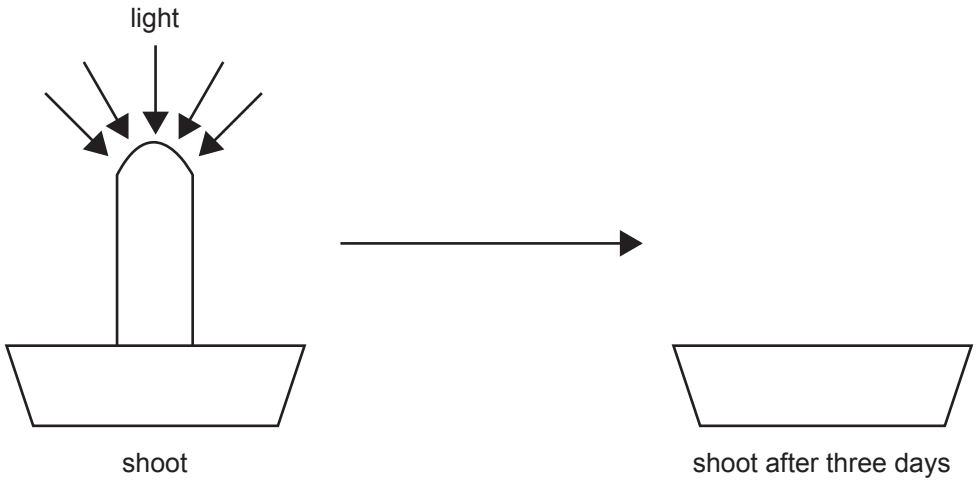
Auxin is a plant _____. It is found in the _____ of the shoot. Light coming from one _____ of the plant causes the shoot to bend towards the light. This growth response is called _____. [4]

(b) Suggest two advantages to the plant of bending towards the light.

1. _____

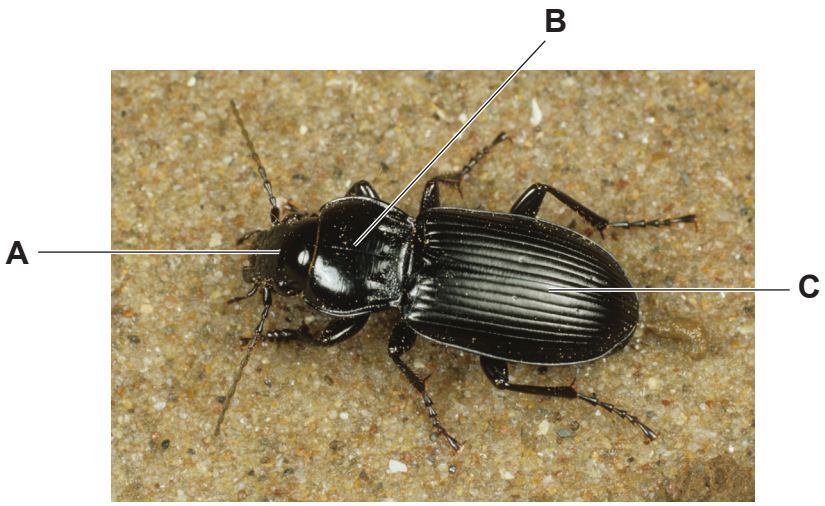
2. _____ [2]

(c) Complete the diagram to show how this shoot grows when light shines from all sides.



[2]

2 The photograph shows a beetle.



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(a) Beetles are insects. Insects have three main body parts.

Name parts **A**, **B** and **C**.

A _____

B _____

C _____ [3]

Examiner Only

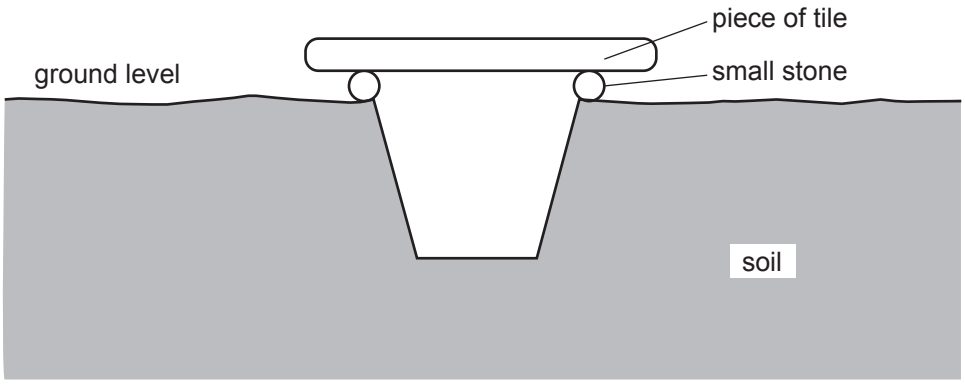
Marks	Remark

Examiner Only	
Marks	Remark

(b) A scientist wanted to estimate the number of beetles in a grassland.

He randomly placed ten sampling devices in the grassland and left them for three days.

The diagram shows the sampling device.



(i) Name the sampling device used.

_____ [1]

(ii) Suggest a reason for a piece of tile being placed on top of the sampling device.

_____ [1]

After three days, the scientist captured 50 beetles in the ten sampling devices. This is **Sample 1**.

He marked the underside of each beetle with a small spot of harmless paint.

Then he released all these beetles into the grassland.

After a further three days, he captured another sample of 45 beetles in the sampling devices. This is **Sample 2**.

Five of these beetles were marked with the paint. This is **Sample 3**.

The scientist used the equation below to calculate the number of beetles in the grassland.

$$\textbf{Number of beetles} = \frac{\textbf{Sample 1} \times \textbf{Sample 2}}{\textbf{Sample 3}}$$

(c) (i) Use the information given and the equation to calculate the number of beetles in the grassland.

Show your working.

_____ [3]

(ii) Beetles are eaten by birds and squirrels.

Suggest why the beetles in **Sample 1** were marked with paint on the underside of the body rather than on the top side.

_____ [1]

(iii) One month later, the scientist estimated the number of beetles again.

He found that it had decreased by 130.

Give two reasons to explain this decrease.

1. _____

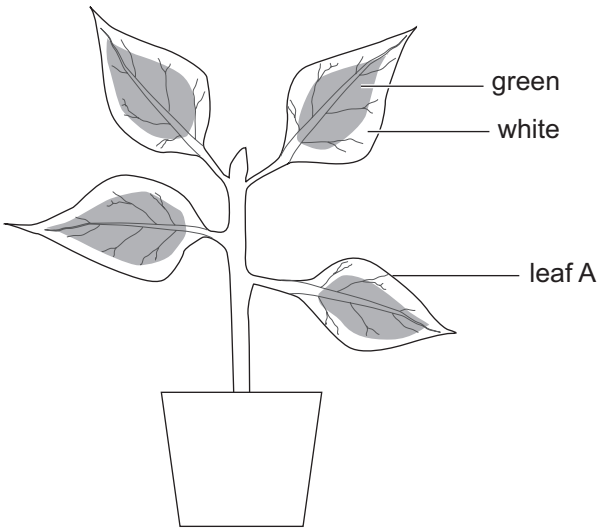
2. _____ [2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

3 **(a)** A variegated leaf is green and white.
The diagram shows a plant with variegated leaves.



The plant was left in a warm, sunny room for two days.
Leaf A was then tested for starch.

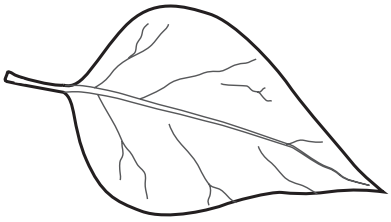
(i) Name the chemical used to test for starch.

_____ [1]

(ii) What colour would the leaf turn where starch is present?

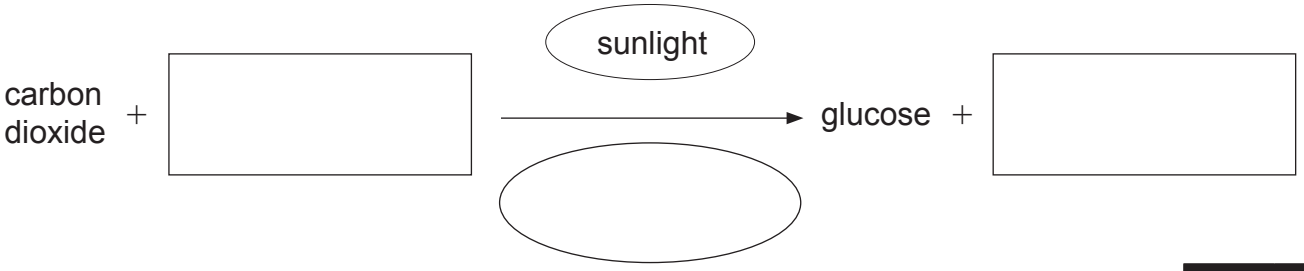
_____ [1]

The diagram below shows the outline of leaf A.



(iii) Shade the part of the leaf where you would expect to find starch. [1]

(b) (i) Write in the spaces to complete the word equation for photosynthesis.



[3]

(ii) Give two ways a plant uses glucose.

1. _____

2. _____ [2]

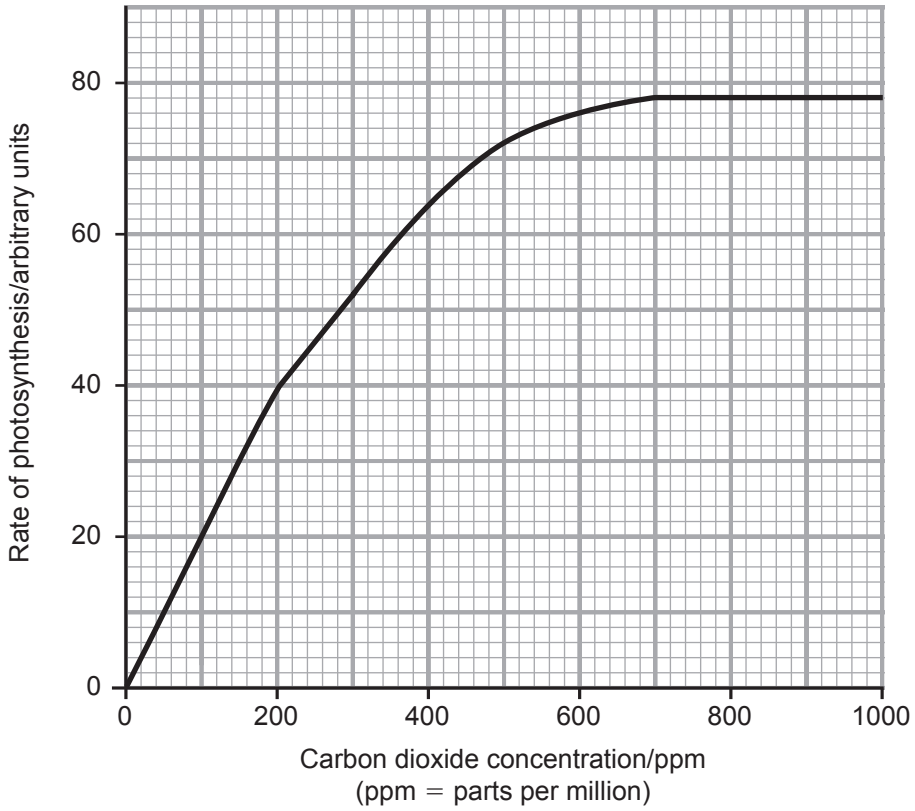
Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

(c) Tomato plants can be grown in a glasshouse.

A tomato grower can add carbon dioxide to increase the rate of photosynthesis. This increases the yield of tomatoes.

The graph shows the effect of carbon dioxide concentration on the rate of photosynthesis of tomato plants in a glasshouse.



(i) Use the graph to give the rate of photosynthesis when the carbon dioxide concentration is 200 ppm.

_____ arbitrary units [1]

(ii) Name two factors that could limit the rate of photosynthesis when carbon dioxide concentrations are above 700 ppm.

1. _____

2. _____ [2]

(iii) Extra carbon dioxide can be added in a glasshouse by using an oil burner.

Apart from adding carbon dioxide, explain another advantage to the tomato plants of using an oil burner.

_____

_____ [2]

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(Questions continue overleaf)

Examiner Only	
Marks	Remark

4 **(a)** A student investigated the effect of temperature on the action of a biological washing powder in 30 minute washing cycles.

She washed six pieces of cloth, each with the same size of egg yolk stain, at six different temperatures.

Egg yolk contains protein.

She used a biological washing powder containing the enzyme protease in the washing cycles.

At the end of the washing cycle, she recorded the percentage of stain **remaining** on each piece of cloth.

The table shows her results.

Temperature/°C	Percentage of stain remaining on cloth/%
10	90
20	75
30	60
40	10
50	25
60	70

(i) Use the information in the table to give the best temperature when using this washing powder.

Explain your answer.

_____

_____

_____ [2]

(ii) Even at the best temperature not all the stain is removed.

Suggest two changes the student could make so that more of the stain is removed.

1. _____

2. _____ [2]

(b) The student carried out another investigation with similar pieces of cloth stained with **fat**. She used the same biological washing powder as before.

Explain why none of the fat stains will be removed.

_____

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

5 The drawing shows a corncrake.

Read the following passage.

Line

The world population of corncrakes has been estimated to be between 2–3 million **pairs**. 1

Corncrakes spend the winter in Africa. They migrate northwards to arrive on their breeding grounds in Europe from early April onwards. 3
They live and lay their eggs in long grass in open fields. 5

Adults and young birds return to Africa in August and September.

The bird was once common in Ireland, but in 2005 only 164 singing males were heard in the country. The fall in corncrake numbers in 7
Ireland is mainly due to the earlier cutting of grass fields by farmers. 9
Grass fields are now often cut for the first time in May. Large machines attached to tractors are used to cut the grass. 11

Grass fields are usually cut from the outer edges towards the centre of the field. In some areas in Ireland where corncrakes nest, 13
government grants have been given to farmers to cut their fields starting from the centre going to the outer edges. 15

Examiner Only	
Marks	Remark

Use the information in the passage and your knowledge to answer the following questions.

Examiner Only	
Marks	Remark

(a) What is the **maximum** estimated number of **individual** corncrakes in the world? (lines 1–2)

_____ million birds [1]

(b) Explain why the corncrake is a rarely seen bird (line 5).

_____ [1]

(c) Suggest two reasons why the earlier cutting of grass fields leads to a fall in corncrake numbers (lines 7–11).

1. _____

2. _____ [2]

(d) Suggest why the numbers of corncrakes increase if farmers cut their grass fields from the centre outwards (lines 12–15).

_____

_____ [1]

(e) The corncrake is a chordate.
Give **one** feature of chordates.

_____ [1]

6 The digestive enzyme amylase is present in the mouth and small intestine.

(a) (i) Name the large food molecule that amylase breaks down to glucose.

_____ [1]

(ii) The small intestine is adapted to absorb glucose.
Give two ways it is adapted.

1. _____

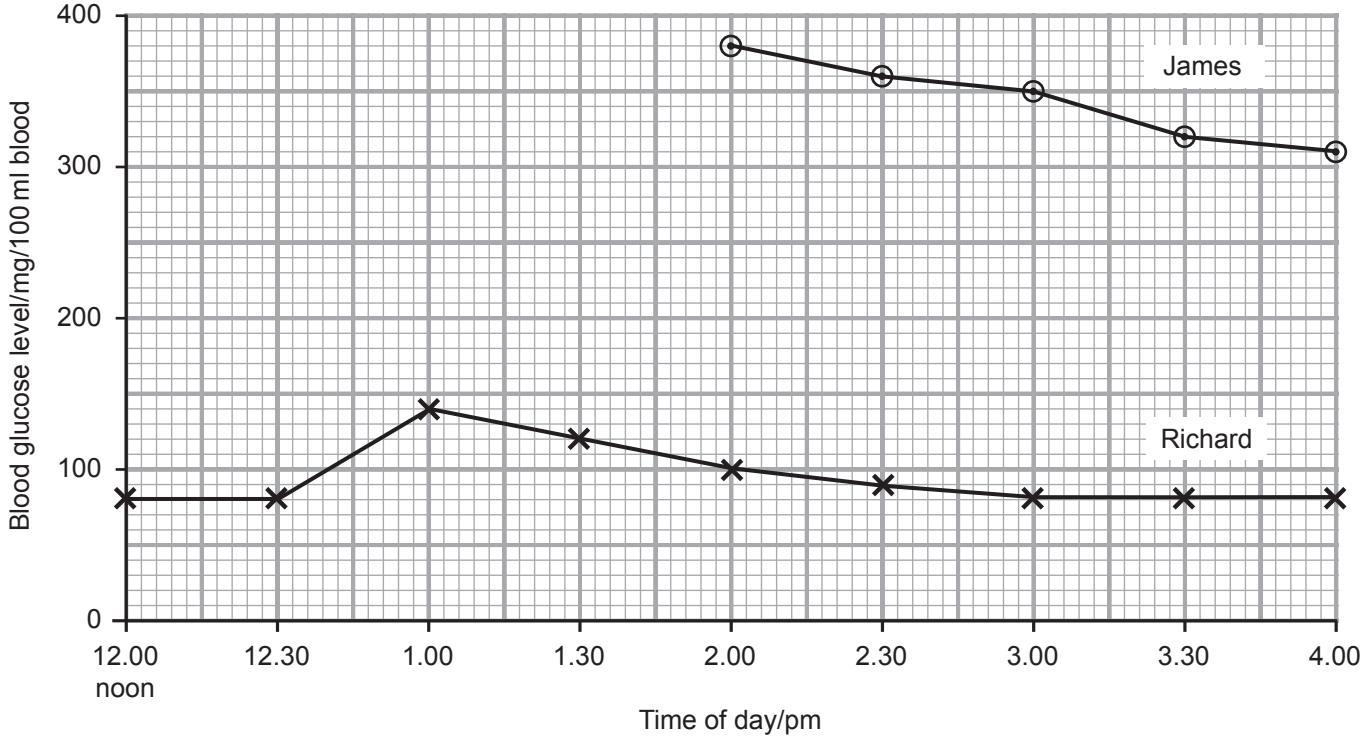
2. _____ [2]

The table shows the blood glucose levels for James and Richard before and after eating a meal containing mostly carbohydrates.
The meal was eaten at 12.30 pm.

Time of day/pm	Blood glucose level/mg/100 ml blood	
	James	Richard
12.00 (noon)	190	80
12.30 (meal eaten)	180	80
1.00	250	140
1.30	390	120
2.00	380	100
2.30	360	90
3.00	350	80
3.30	320	80
4.00	310	80

Examiner Only
Marks | Remark

(b) (i) Use the information in the table to complete the line graph for James on the grid below.



[2]

Examiner Only	
Marks	Remark

(ii) Use the graphs to state two ways that the trend for James is different from the trend for Richard.

1. _____

2. _____ [2]

(iii) Explain how Richard's blood glucose returns to its normal level.

_____

_____

_____

_____ [3]

(iv) James has diabetes.
Give two possible long term effects of diabetes.

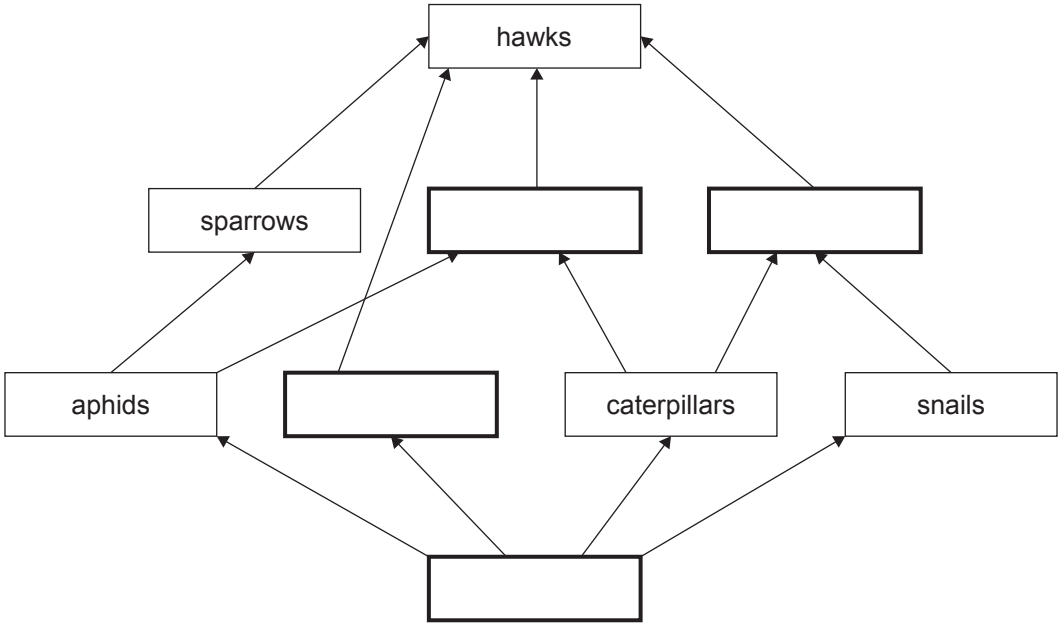
1. _____

2. _____ [2]

7 The table shows the diets of some animals in a grassland.

Aphids, rabbits, caterpillars and snails **eat** plants
Sparrows **eat** aphids
Thrushes **eat** caterpillars and snails
Blue tits **eat** aphids and caterpillars
Hawks **eat** sparrows, rabbits, blue tits and thrushes

(a) Use the information in the table to fill in the boxes in the food web.



[3]

(b) (i) Name a producer.

_____ [1]

(ii) Name an animal that is feeding at two trophic levels.

_____ [1]

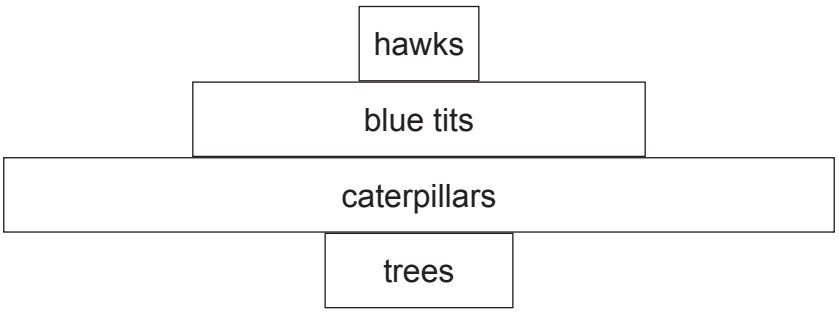
Examiner Only

Marks	Remark

(c) Give **one** way that energy is lost between the sparrows and the hawks.

_____ [1]

(d) A pyramid of numbers for a woodland is shown.



Use this information to draw and label the pyramid of biomass for this woodland in the space.

[2]

Examiner Only

Marks	Remark

8 Benedict's reagent is used to test for the presence of sugar (glucose) in food.

The intensity (strength) of the colour of Benedict's reagent at the end of the test indicates the amount of sugar (glucose) present.

Paula planned an investigation to compare the **amount** of sugar (glucose) in two types of biscuit.

- Describe the method Paula used to carry out her investigation.
- State two variables she would have controlled.
- Describe the results she would expect if one biscuit contained more sugar (glucose) than the other biscuit.

In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.

[6]

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Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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