

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE
B681/02
ENVIRONMENTAL AND LAND-BASED
SCIENCE

**Management of the Natural
Environment (Higher Tier)**

FRIDAY 12 JUNE 2015: Afternoon

DURATION: 1 hour
plus your additional time allowance

MODIFIED ENLARGED

| | | | |
|-------------------------------|--|------------------------------|--|
| Candidate forename | | Candidate surname | |
|-------------------------------|--|------------------------------|--|

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|--------------------------|--|--|--|--|--|-----------------------------|--|--|--|--|
| Centre number | | | | | | Candidate number | | | | |
|--------------------------|--|--|--|--|--|-----------------------------|--|--|--|--|

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Pencil

Ruler (cm/mm)

Calculator

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the boxes on the first page. 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).

INFORMATION FOR CANDIDATES

The 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.

Any blank pages are indicated.

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Answer ALL the questions.

1 There are many types of ecosystem in the UK.

Each ecosystem supports a different range of plants and animals.

Draw a straight line to match each PLANT on the left to its correct ECOSYSTEM on the right.

| PLANT | ECOSYSTEM |
|------------------|----------------------------|
| buttercup | coniferous woodland |
| heather | deciduous woodland |
| oak | meadow |
| pine | moorland |

[3]

[TOTAL: 3]

2 Some farmers have land that has a lot of clay.

Arable farmers would need to adapt their farming activities because of this clay.

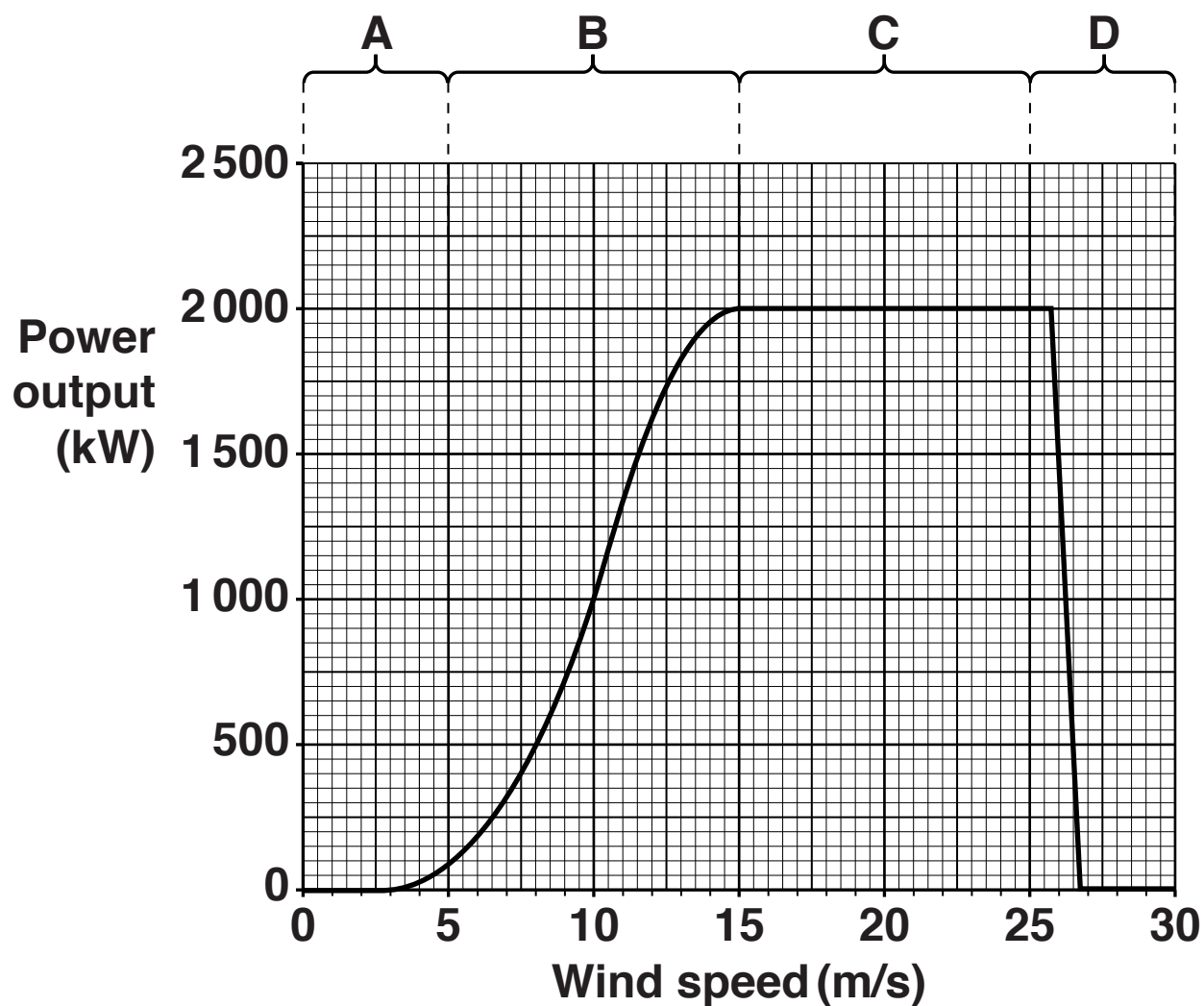
Explain why.

[2]

[TOTAL: 2]

3 Engineers measure the power produced by a wind turbine at different wind speeds.

The data has been included in a graph:



(a) Look at the graph.

Suggest reasons for the power output in:

Part A

Part B

Part C

Part D

[4]

(b) The wind turbine is in a farmer's field.

The engineers calculate that in this location the mean wind speed is 10m/s.

Explain how this wind speed would affect the efficiency of the wind turbine.

[2]

[TOTAL: 6]

- 4 In the UK, cucumbers are usually grown in glasshouses.**

Most farmers growing cucumbers use ICT to monitor, control and record the environmental conditions.

Which of the following is the main advantage of using ICT in the glasshouse for growing the cucumbers?

- A ensures the optimum growing conditions**
- B limits the amount of water getting to the crop**
- C produces cucumbers without seeds**
- D reduces the number of pest attacks**

Answer A, B, C or D _____ [1]

[TOTAL: 1]

5 National parks are popular with tourists.

Footpath erosion is often a problem in these parks.

Managers of these parks have to solve the problem of soil erosion while still allowing the public access.

Describe the erosion caused by large numbers of visitors.

Outline methods that can be used to reduce soil erosion while still allowing public access.



The quality of written communication will be assessed in your answer.

[6]

[TOTAL: 6]

- 6 Students studied the numbers of animals feeding on ONE oak tree.

The table shows their results.

| ANIMAL | NUMBER | FOOD WHICH EACH ANIMAL EATS |
|---------------|--------|-----------------------------|
| Moth larvae | 96 | leaves from the oak tree |
| Wren | 5 | moth larvae |
| Vole | 3 | fruits from the oak tree |
| Hawk | 1 | blue tits and wrens |
| Blue tit | 4 | moth larvae |
| Ground beetle | 5 | moth larvae |

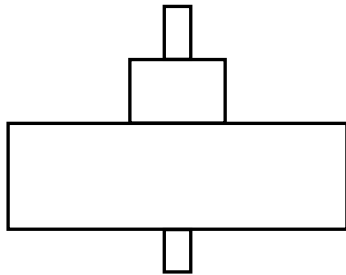
- (a) Use the students' results to complete the table below.

| TROPHIC LEVEL | NAME(S) OF ORGANISM(S) | TOTAL NUMBER OF ORGANISM(S) | BIOMASS (ARBITRARY UNITS) |
|---------------------|------------------------|-----------------------------|---------------------------|
| Tertiary consumers | | | 15 |
| Secondary consumers | | | 132 |
| Primary consumers | | | 651 |
| Producer | | 1 | 30 254 |

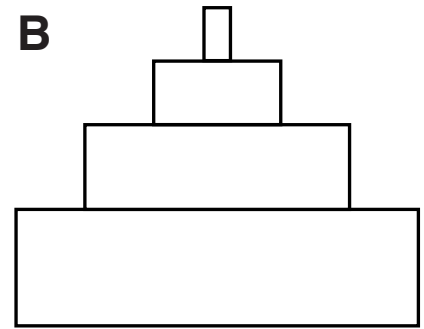
[4]

(b) Which of the following best represents the shape of the pyramid of biomass?

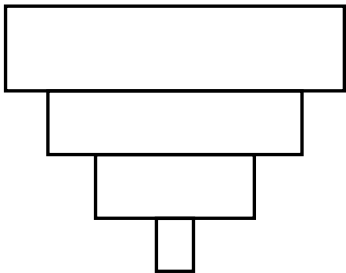
A



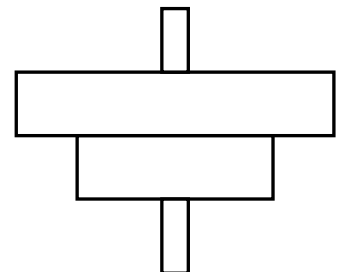
B



C



D



Answer A, B, C or D _____ [1]

(c) The oak tree is situated on a local farm.

The farmer decides to use organic pest control instead of using chemical pesticides.

Explain how this might affect the numbers of animals on the oak tree in the short-term AND in the long-term.

[4]

[TOTAL: 9]

7 Scientists have investigated the water quality in ponds across the UK.

Here are their results.

| Country | Mean pH | pH range recorded | Mean nitrate levels (mg/l) | Mean phosphate levels (mg/l) |
|-------------------------|----------------|--------------------------|-----------------------------------|-------------------------------------|
| England | 7.2 | 3.9–10.1 | 2.9 | 0.38 |
| Northern Ireland | 6.4 | 4.8–8.9 | 0.7 | 0.03 |
| Scotland | 5.7 | 3.6–9.1 | 1.2 | 0.02 |
| Wales | 6.7 | 4.3–9.0 | 0.6 | 0.20 |

(a) Look at the table.

(i) Which country shows the largest pH range?

Answer _____ [1]

(ii) Suggest reasons for this variation in pH.

_____ **[2]**

- (b) Use the data to suggest which country has the best water quality in its ponds for supporting biodiversity.**

Explain your answer.

[2]

- (c) The government wants to enforce the legislation relating to 'nitrate vulnerable' zones.**

In which country would this legislation have the greatest impact?

What would a farmer need to do to comply with the legislation?

[3]

[TOTAL: 8]

- 8 A land owner gets a grant to plant more hedges on some land.**

Explain how the planting of more hedges may affect the MICROCLIMATE of the area.



The quality of written communication will be assessed in your answer.

[6]

[TOTAL: 6]

- 9 Some students want to estimate the population size of a particular wild flower in a field.**

The students use a sampling technique.

Describe in detail how the students could sample the area to get valid results.



 **The quality of written communication will be assessed in your answer.**

[6]

[TOTAL: 6]

- 10 Clover is a legume that is often used by farmers as part of a rotation to improve the soil.**

Bacteria in the roots of the clover form a symbiotic relationship with the clover. The clover and the bacteria benefit from the relationship.

- (a) How do the clover and the bacteria both benefit from this symbiotic relationship?**

[2]

- (b) Which of the following is the MAIN BENEFIT of crop rotation?**

- A allows the farmer to use the wide range of machinery they own**
- B assists in pest and disease control**
- C gives additional employment in the area**
- D gives the farmer variety in the crops they grow**

Answer A, B, C or D _____ [1]

[TOTAL: 3]

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