

**ADVANCED GCE****BIOLOGY**

Environmental Biology

2805/03

Candidates answer on the Question Paper

OCR Supplied Materials:

None

Other Materials Required:

- Electronic calculator
- Ruler (cm/mm)

Friday 25 June 2010**Afternoon****Duration:** 1 hour 30 minutesCandidate
ForenameCandidate
Surname

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- 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 **90**.
- You will be awarded marks for the quality of written communication where this is indicated in the question.
- You are advised to show all the steps in any calculations.
- This document consists of **16** pages. Any blank pages are indicated.

Examiner's Use Only:

1			
2			
3			
4			
5			
6			
7			
Total			



Answer **all** the questions.

- 1 Biological Oxygen Demand (BOD) is used to assess levels of water pollution.

Typical figures are shown in Table 1.1.

Table 1.1

level of pollution	BOD / mg dm ⁻³
low	3
moderate	100
high	250

- (a) State a type of pollution that might lead to such an increase in BOD **and** explain exactly how this increase is brought about.

type of pollution

explanation

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..... [4]

- (b) BOD is determined as follows:

- take several samples of water
- measure the oxygen concentration in each sample
- place each sample in the dark for five days at 25 °C
- re-measure the oxygen concentration in each sample.

Explain:

- (i) why several samples of water are taken;

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(ii) how the concentration of oxygen is measured;

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(iii) why the samples are placed in the dark;

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(iv) why the samples are kept at 25 °C;

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(v) why the samples are left for five days.

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..... [10]

[Total : 14]

- 2 (a)** In this question, one mark is available for the quality of use and organisation of scientific terms.

Discuss why tropical rain forests are considered to be of global importance.

..... [7]

Quality of Written Communication [1]

- (b) The disappearance of rain forests is a cause for concern.

State **three** reasons why rain forests continue to disappear.

- 1.....
- 2.....
- 3..... [3]

- (c) Suggest **four** measures that can be used to reduce the decline of the rain forests.

- 1.....
- 2.....
- 3.....
- 4..... [4]

[Total : 15]

- 3 A group of students used randomly placed **0.25 m²** quadrats to analyse the distribution of plant species in an area of chalk grassland. The data they recorded on two particular species, yarrow, *Achillea millefolium*, and salad burnet, *Sanguisorba minor*, is shown in Table 3.1.

Table 3.1

quadrat	number of individual plants per quadrat	
	yarrow	salad burnet
1	3	0
2	2	0
3	0	6
4	4	7
5	3	0
6	2	5
7	5	5
8	2	0
9	3	8
10	6	0
11	0	3
12	0	6
13	2	4
14	1	0
15	5	4
16	4	7
17	3	0
18	1	6
19	0	8
20	4	0

- (a) Explain how the students would have determined the most suitable size of quadrat to use in this investigation.

.....

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..... [3]

- (b) State which of the two plants shows the highest species frequency. Explain your reasoning.

species.....

reasoning.....

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.....

..... [3]

- (c) Calculate the mean number of salad burnet plants per **square metre**.

Show your working.

number of plants =m² [2]

The students also investigated the quality of the soil in the area, by determining the percentage of water and organic matter, including humus.

- (d) Describe how they would have determined,

- (i) the percentage of water;

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..... [3]

- (ii) the percentage of organic matter.

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..... [3]

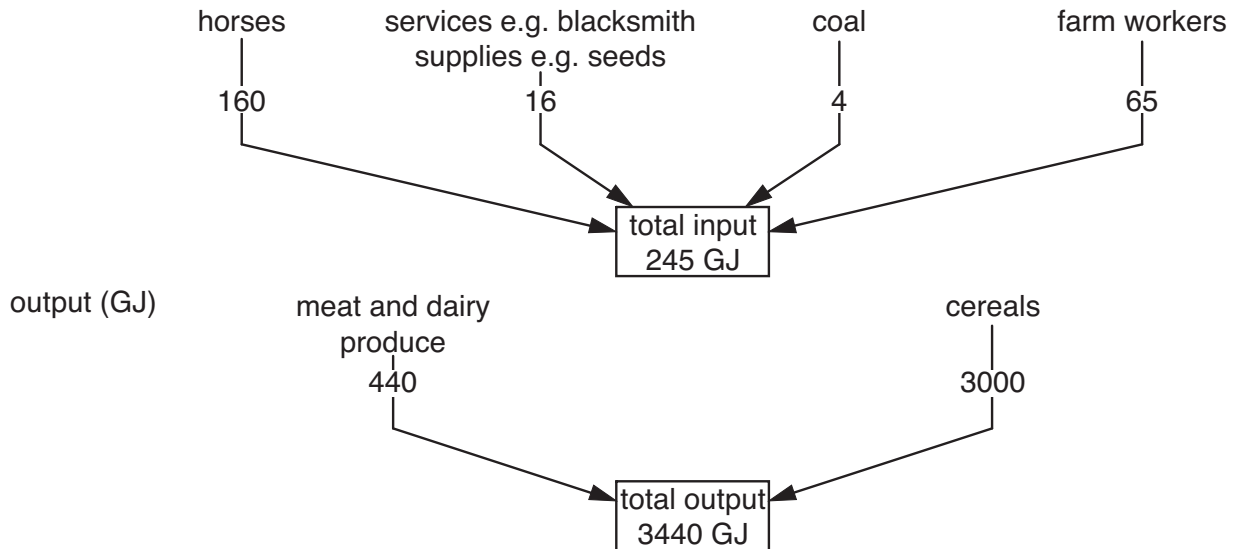
[Total : 14]

Turn over

- 4 Fig. 4.1 compares all the various energy inputs and outputs of a 19th century extensive farm and a later 20th century intensive farm. The farms are mixed (arable and livestock), of a comparable size and situated in the same part of the UK.

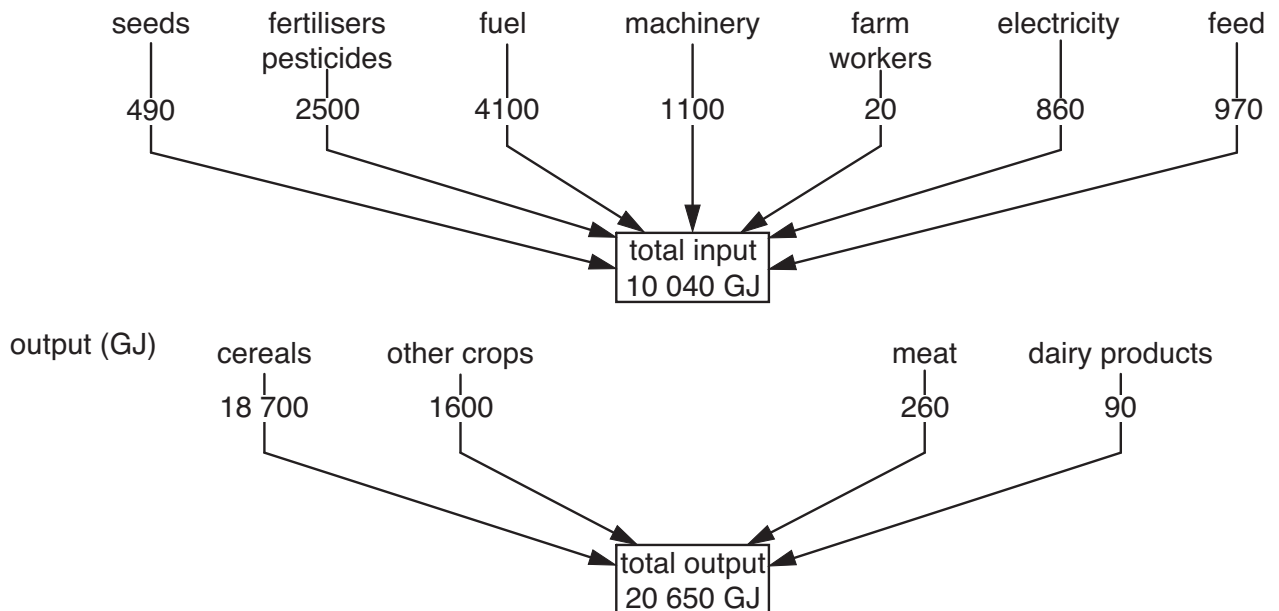
Extensive farm

input (GJ)



Intensive farm

input (GJ)



1 GJ = 10^3 kJ

Fig. 4.1

The output of the intensive farm is considerably greater than the extensive farm.

- (a) (i) State which farm is the most energy efficient.

..... [1]

- (ii) Explain your answer using the data in Fig. 4.1.

.....

 [3]

- (b) With reference to Fig. 4.1, explain how **three** named factors have contributed to the higher output in the intensive farm.

factor 1

explanation

.....

factor 2

explanation

.....

factor 3

explanation

.....
 [6]

QUESTION 4 (c) STARTS ON PAGE 10

Extensive farming used crop rotation to increase crop yield. Legumes, such as clover, help to maintain soil fertility when used in crop rotation.

(c) Explain how legumes can contribute to increased crop yield.

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..... [5]

[Total : 15]

- 5 The National Parks of England and Wales were established under the National Parks and Access to the Countryside Act of 1949. The purpose was to conserve the natural beauty, wildlife and cultural heritage of the parks and to provide for the enjoyment of their special qualities by the public.

(a) List **four** features of the areas selected to become National Parks.

- 1.....
- 2.....
- 3.....
- 4..... [4]

Table 5.1 provides data about some of the National Parks.

Table 5.1

	Dartmoor	Exmoor	Lake District	Peak District	Snowdonia	Yorkshire Dales
area/ha	95 570	69 280	229 198	143 833	214 159	176 869
resident population	29 100	10 645	42 239	38 100	26 251	17 980
visitor days/ millions per year	4.0	1.4	22.0	19.0	10.5	9.0

- (b) The individual National Park authorities, which are responsible for the running of the parks, are faced with many difficulties. Whilst this is true of all parks, the problems are especially acute in the Lake District and the Peak District.

Using the data in Table 5.1, suggest **two** reasons why the Lake District and Peak District experience particular problems.

- 1.....
- 2..... [2]

- 6 (a) Asian elephants are now ten times as rare as African elephants in the wild. During the 1990s, their numbers halved to 20 000. It is estimated that if a similar rate of decline was to continue, they would face extinction in the wild within thirty years.

Suggest **two** reasons for the decline in the numbers of Asian elephants in the wild.

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..... [2]

- (b) Early in 2002, London Zoo's Asian elephants were transferred to Whipsnade Wildlife Park, in the hope that they might breed. At this time, there was only one male and six females in this group of captive elephants. Only four or five Asian elephants are usually born in captivity each year.

Explain why captive breeding using only one male may be a disadvantage to this breeding programme.

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..... [4]

- (c) State **two** reasons why animals often **do not** breed successfully when in captivity.

1.....

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2.....

..... [2]

[Total: 8]

QUESTION 7 STARTS ON PAGE 14

- 7 The management of North Sea fisheries involves investigations by scientists in the UK in order to assess the impact that fishing has on fish population sizes.

The Spawning Stock Biomass (SSB) is the total mass of a species population capable of reproducing.

Fig. 7.1 shows the changes in SSB of cod populations in three fishing areas around the UK between 1968 and 1998.

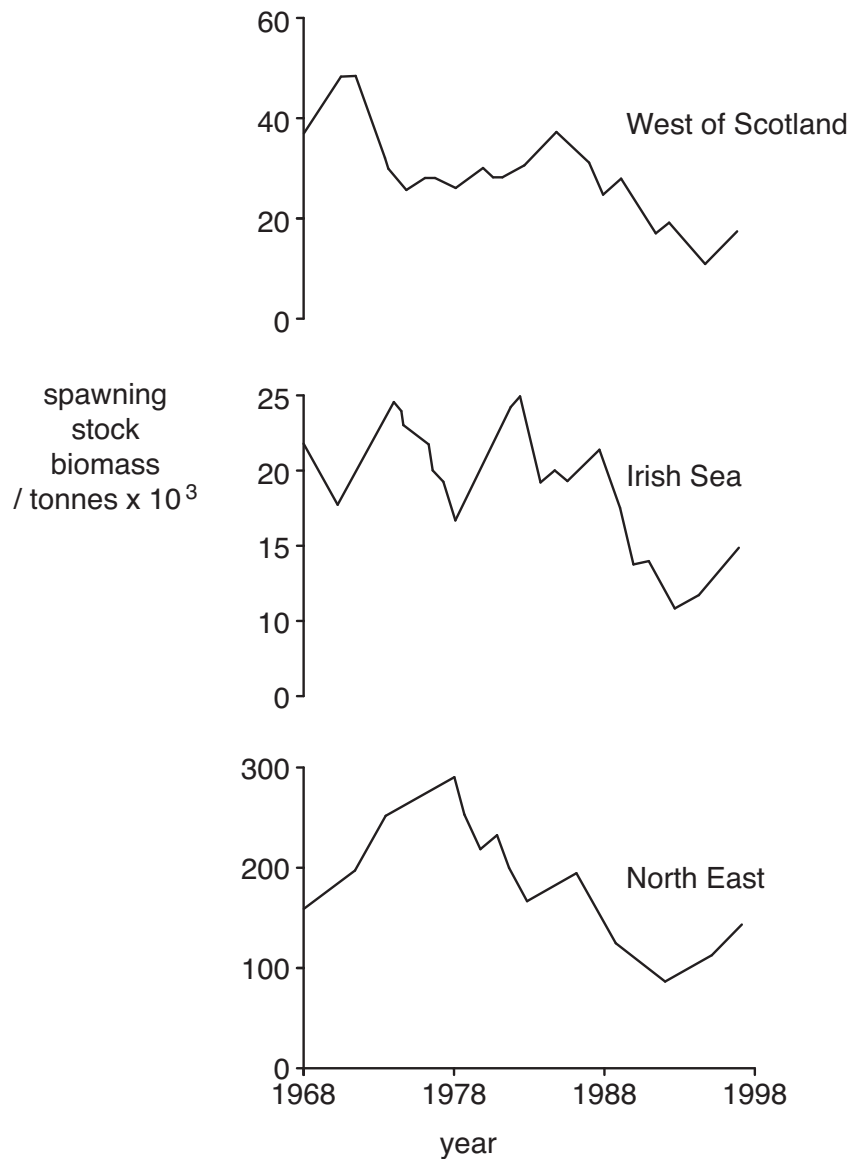


Fig. 7.1

- (a) Describe the changes shown by Fig. 7.1 between 1968 and 1998 for the fisheries in the **West of Scotland** and the **Irish Sea**.

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..... [3]

- (b) Suggest **three** factors which could have contributed to the fluctuations in the SSB figures for these fish populations.

1.....

2.....

3..... [3]

- (c) A possible measure to conserve cod populations is to stop fishing for them in one North Sea fishery.

Suggest and explain what would happen to the numbers of cod in the **North East** fishery if they were no longer fished there.

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..... [3]

[Total : 9]

END OF QUESTION PAPER

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