Common Entrance 13+ Scholarship

Biology Section

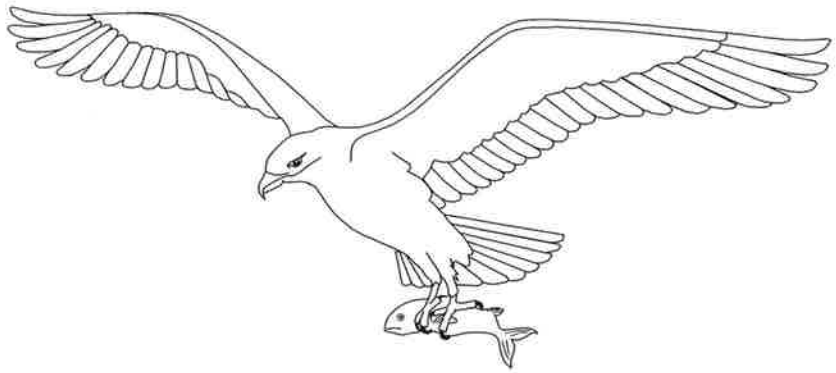
(Total Marks = 30)

Please answer all sections in the space provided.

The number of marks available are indicated next to each question.

Turn over to begin.....

1. Ospreys are birds which used to be common in Europe, but their numbers have fallen in the last fifty years. Ospreys eat large fish which swim in rivers. Ospreys are at the top of their food chain.



(a) Suggest **two** features of the osprey which make it good at catching fish.

feature 1: ..... (1)

feature 2: ..... (1)

A food chain for the ospreys is shown below.

phytoplankton → small fish → large fish → ospreys

(b) Identify the producer of this food chain.

..... (1)

One of the reasons for the fall in numbers of ospreys in Europe was the widespread use of a chemical called DDT to kill insects. Eventually the DDT was washed into the rivers in low concentrations. The table below shows the approximate concentration of DDT in the water and in the organisms in the food chain.

location	**DDT concentration (relative to that found in water)**
water	1
phytoplankton	1 000
small fish	10 000
large fish	100 000
osprey	5 000 000

(c) How many times more concentrated is the DDT in ospreys compared with the water of the river?

..... (1)

(d) What is the evidence from the table that DDT does not decompose into harmless chemicals?

.....

..... (2)

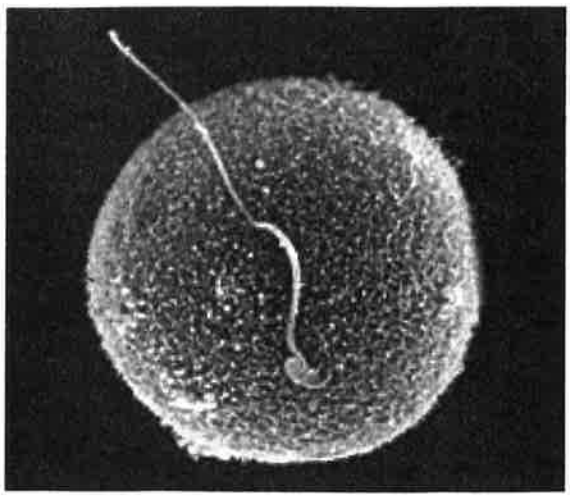
One of the effects of DDT on ospreys is to cause their eggs to have very thin and soft shells.

(e) Suggest and explain how this might affect the production of young healthy birds.

.....

..... (2)

2. The photograph below shows a human sperm and egg.



(a) Name the organs in the human body which make sperms and eggs.

sperms: .....

eggs: ..... (2)

(b) Each month a woman usually releases a single egg, whilst a male may release up to 600 million sperms during sexual intercourse.

Explain the advantages of a male producing so many sperms and a female producing so few eggs.

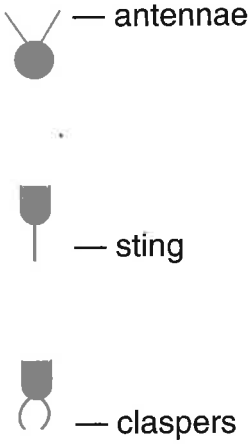
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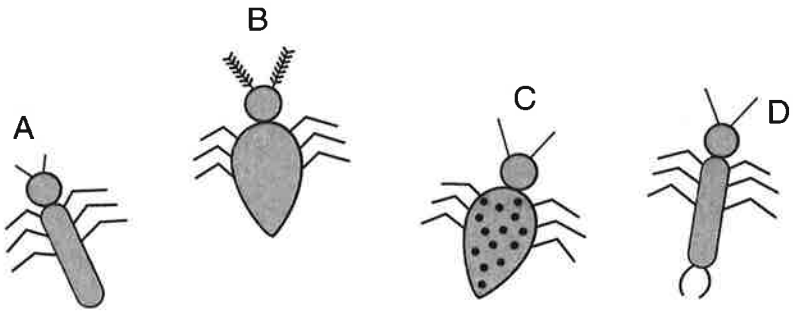
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..... (2)

3. A scientist visted an uninhabited island and discovered the animals shown below.

key





Below is a key which can identify these animals.

1	broad body	go to 2
	narrow body	go to 5
2	antennae feathered	go to 3
	antennae straight	go to 4
3	antennae short	shortfeather shield bug
	antennae long	longfeather shield bug
4	body spotted	spotted shield bug
	body striped	jack o'stripey
5	sting at rear	go to 6
	no sting	go to 7
6	short sting	lesser stingpill
	long sting	greater stingpill
7	claspers at rear	clasper-ended pillbug
	no claspers	common pillbug

(a) Use the key to identify each of the animals shown. Write the letter of the animal (A, B, C, D) next to its name.

animal name	letter
shortfeather shield bug	
longfeather shield bug	
spotted shield bug	
jack o'stripey	
lesser stingpill	
greater stingpill	
clasper-ended pillbug	
common pillbug	

(4)

(b) Describe one way of telling the difference between an insect and a spider.

.....

..... (2)

4. (a) Complete the word equation for aerobic respiration.

..... + oxygen ⟶ ..... + ...

..... (3)

(b) Cyanide is a poison which kills people by preventing respiration.
Explain why respiration is essential for life.

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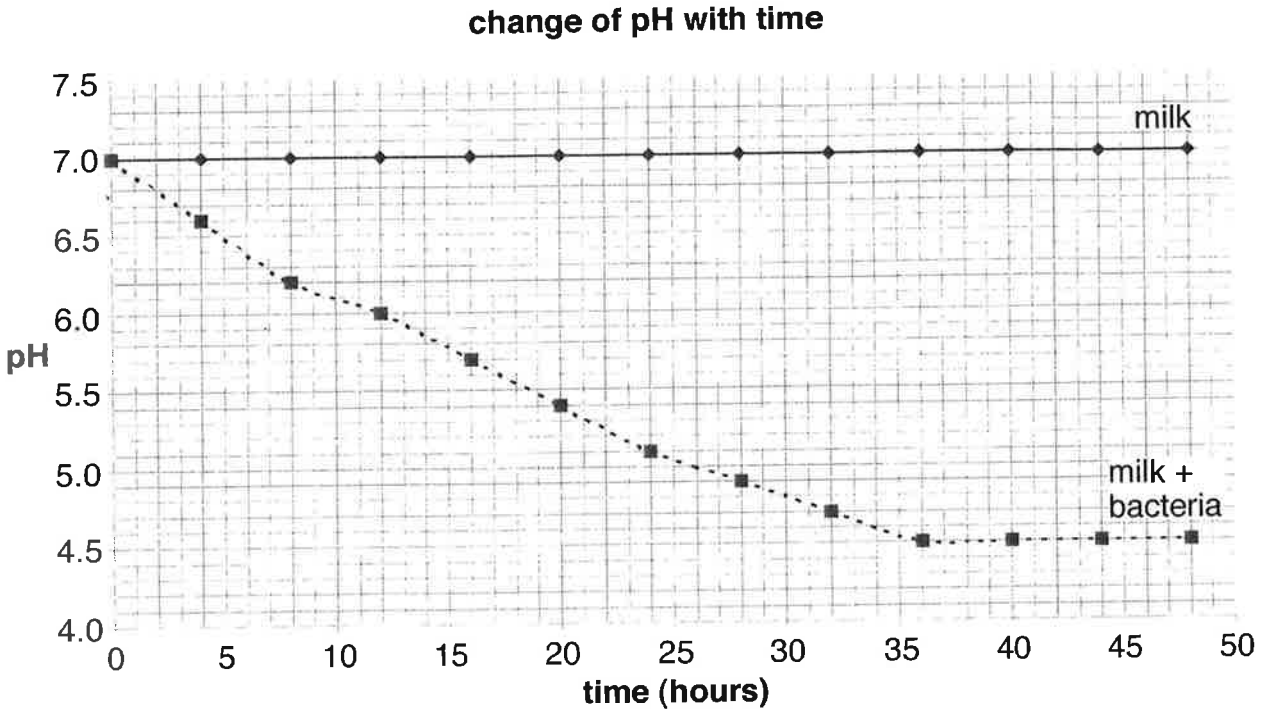
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..... (3)

5. The acidity (pH) of milk was measured with a probe connected to a computer. It was monitored continuously for 48 hours at 30 °C.



(a) What was the pH of the milk during the experiment?

..... (1)

An identical sample of milk was mixed with bacteria called *Lactobacillus*, and was monitored in the same way.

(b) Describe the changes in the pH during the 48 hours of the experiment.

.....

.....

..... (3)

(c) What is the evidence that the *Lactobacillus* is causing the change in pH?

.....

.....

..... (2)