SURNAME ..... FIRST NAME .....

JUNIOR SCHOOL ..... SENIOR SCHOOL .....

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

BIOLOGY

Monday 1 June 2009

Please read this information before the examination starts.

- This examination is 40 minutes long.
- The answers should be written on the question paper.
- Answer **all** the questions.
- Calculators may be required.

© Independent Schools Examinations Board

1. Underline the option which best completes each of the following:

(a) During photosynthesis, a leaf makes

carbon dioxide **protein** **starch** **water**

(b) The human female gamete is

a cheek cell **an egg cell** **a kidney cell** **a liver cell**

(c) Digested carbohydrate molecules enter the blood in the

liver **mouth** **small intestine** **stomach**

(d) Cigarette smoking causes

lung cancer **obesity** **scurvy** **sneezing**

(e) The reaction in cells between glucose and oxygen is

digestion **perspiration** **respiration** **vaccination**

(f) Plants are

decomposers **herbivores** **predators** **producers**

(g) Iodine solution can be used to stain

fat **glucose** **protein** **starch**

(h) Fungi are not included with plants because they do not

die **photosynthesise** **reproduce** **respire**

(i) Ovulation is the

development of a placenta **loss of blood**

release of an egg from the ovary **release of sperm**

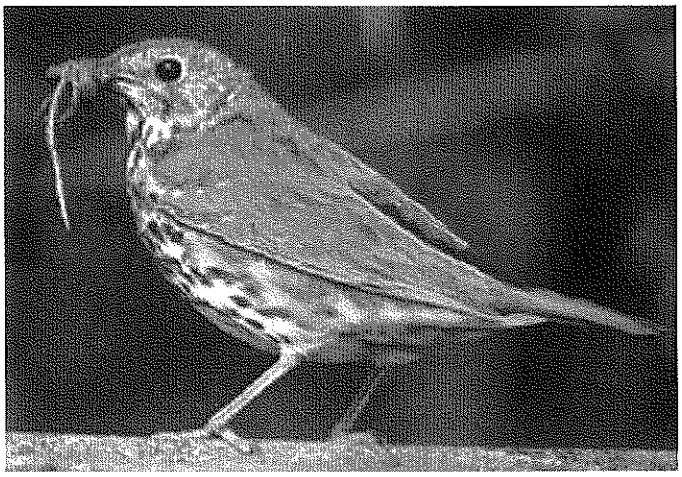
(9)

2. Below are listed some of the important components of a balanced diet. Draw a line linking each component with its function in a healthy body.

component of diet	function in healthy body
carbohydrate	prevents constipation
protein	insulates the body
fat	provides glucose for respiration
water	repairs and builds new cells
fibre	prevents dehydration

(5)

3. The photograph below shows a song thrush. Scientists have observed that the number of song thrushes living in towns has fallen dramatically during the last thirty years.



Scientists blame homeowners who have replaced their lawns and gardens with paving stones and wooden decking.

(a) Suggest two reasons why the loss of lawns and gardens might affect the numbers of song thrushes.

1: .....

.....

2: .....

..... (2)

(b) Suggest two ways in which song thrushes could be conserved in modern gardens.

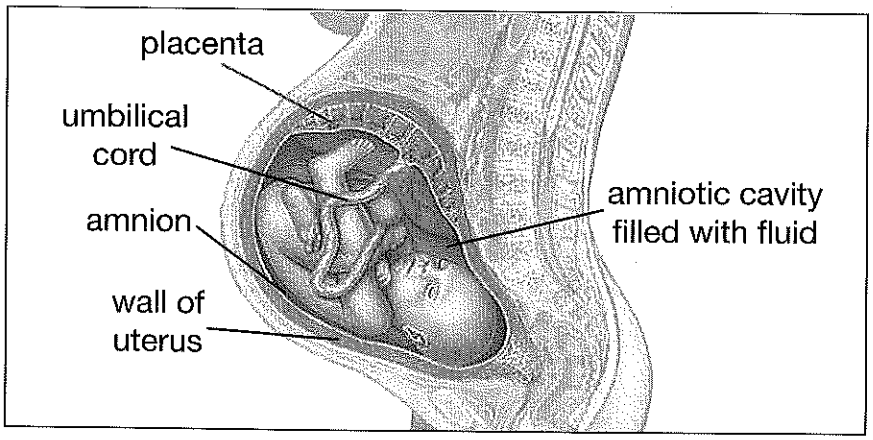
1: .....

.....

2: .....

..... (2)

4. The diagram below shows a human fetus inside the uterus.



The amnion is a membrane which surrounds the fetus. The fetus grows inside the amnion which is filled with a liquid called *amniotic fluid*.

(a) Suggest how the amniotic fluid helps the fetus to survive.

.....

.....

..... (2)

In the placenta, blood vessels from the mother run next to blood vessels from the fetus.

(b) Explain how the fetus receives food substances (such as glucose) from its mother.

.....

.....

.....

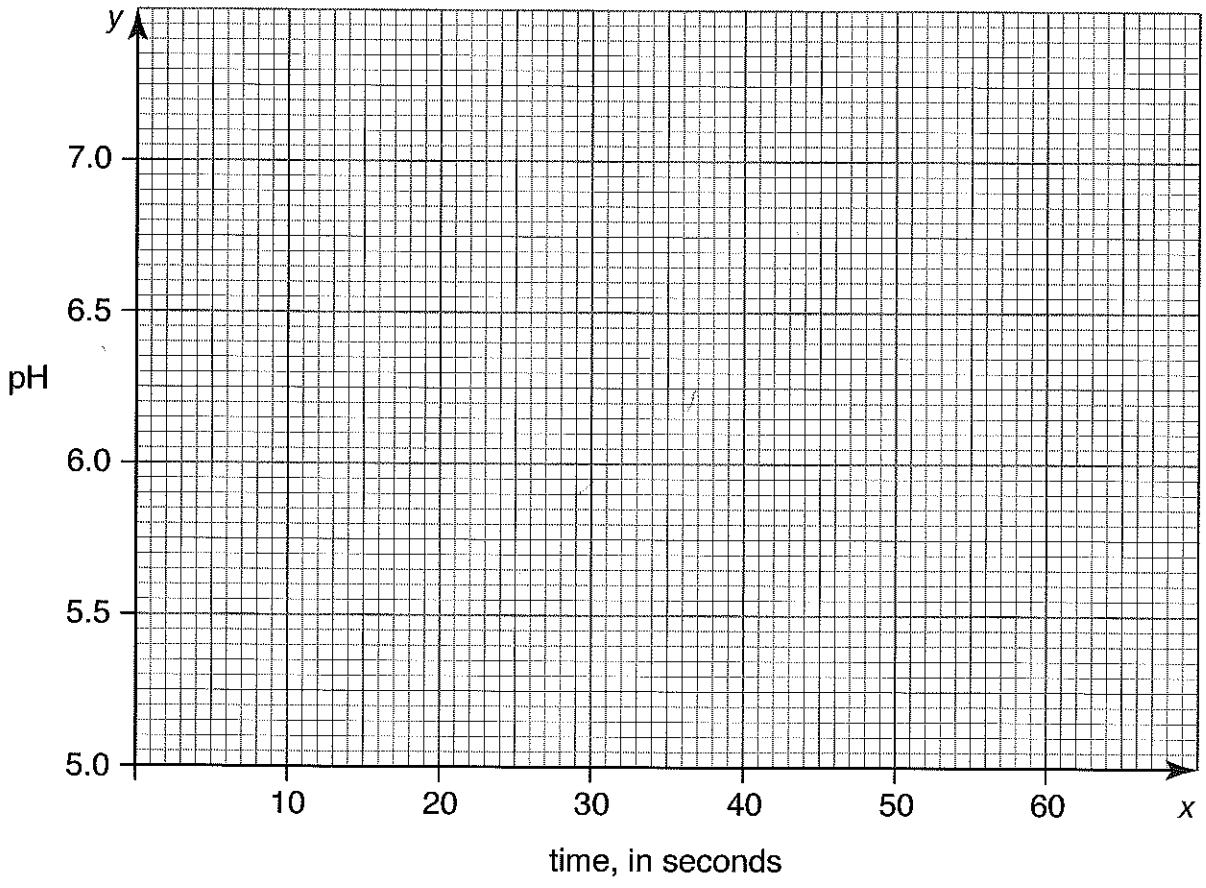
.....

..... (4)

5. John breathed out into a small beaker of water using a drinking straw. A meter connected to a computer recorded the pH of the water. The results are below:

time, in seconds	pH
0	7.0
5	6.8
10	6.4
15	5.9
20	5.7
25	5.5
30	5.4
35	5.3
40	5.2
45	5.1
50	5.0
55	5.0
60	5.0

(a) Plot these results on the grid below. Draw a smooth curve of best fit through the points. (4)



(b) Describe the results of this experiment.

.....

.....

..... (2)

(c) Suggest a suitable control for John's experiment to make it a fair test.

.....

.....

..... (2)

Emily thought that the results could be caused by carbon dioxide in John's breath.

(d) Describe a test you could carry out to show that John's breath contains carbon dioxide, including what you would expect to see if the test result were positive.

test: .....

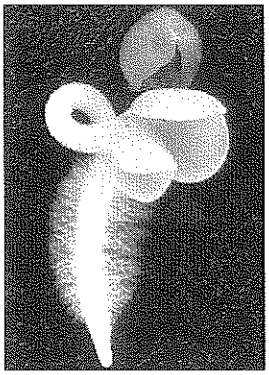
.....

.....

result: .....

..... (2)

6. The photograph below shows a seedling which has grown from a germinated pea seed.



The root is growing downwards and has many root hairs.

(a) Suggest why it is an advantage for plant roots to

grow downwards: .....

..... (1)

have root hairs: .....

..... (1)

The shoot is growing upwards and will make leaves.

(b) Suggest why it is an advantage for plant shoots to

grow upwards: .....

..... (1)

make leaves: .....

..... (1)

7. (a) (i) Name the only group of animals which have hair on their bodies.

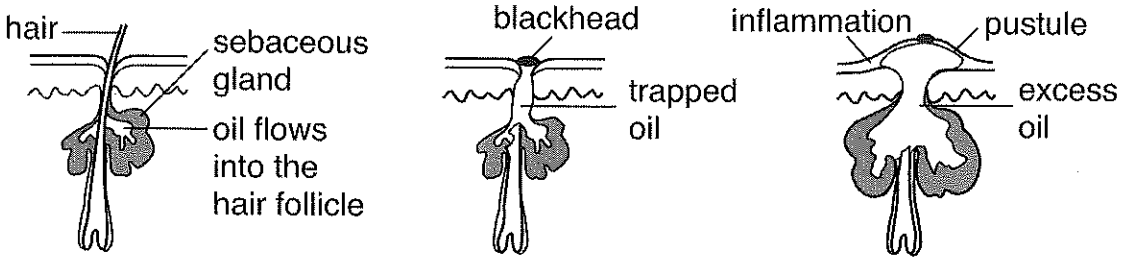
..... (1)

(ii) Suggest how body hair helps these animals to survive.

.....

..... (2)

The diagram below shows how an acne spot forms on the surface of the skin.



normal hair follicle

a blackhead forms when the oil which reaches the surface of the follicle hardens to form a crust which blocks the follicle

infected follicle

Spots form round the pits (follicles), round which hairs grow.

(b) Use the diagram above to name the glands which produce oil in the hair follicle.

.....

(1)

(c) Use the diagram above to describe how a blackhead forms.

.....

.....

.....

(2)

Bacteria called *Propionibacterium acnes*, which normally live on the skin, grow in the oil trapped inside the blocked follicle and cause inflammation of the surrounding area. This is called an acne spot.

People with acne should wash their faces at least twice a day in warm water with some gentle, medicated soap which contains antiseptic.

(d) Using the information in the question, explain how each of these precautions can help to prevent acne spots.

.....

.....

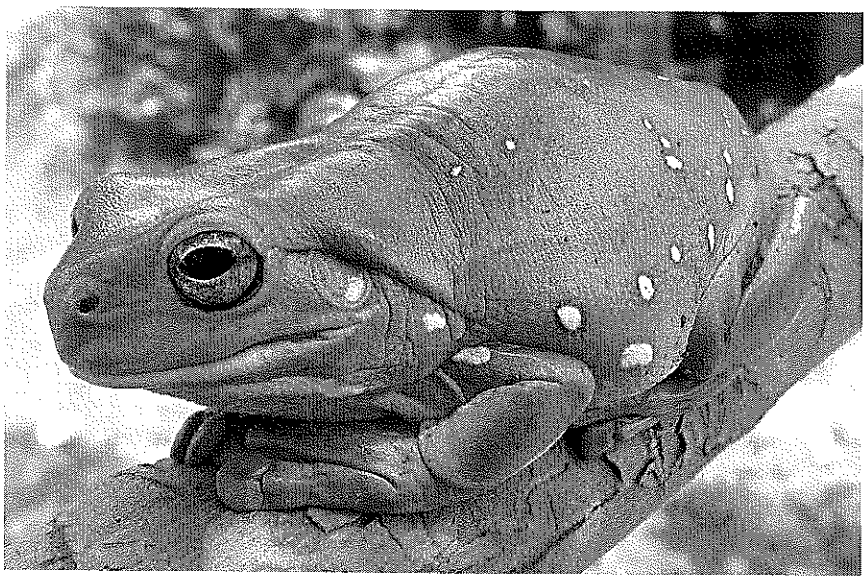
.....

.....

.....

(2)

8. The photograph below shows a tree frog from Australia. Frogs are amphibians.



Amphibians are vertebrates.

(a) (i) Name one characteristic which is shared by all vertebrates.

..... (1)

(ii) Which one of the following is also a vertebrate? Underline your answer.

earthworm **house fly** **snake** **spider** (1)

The skin of amphibians is very thin and lets water pass through it.

(b) Suggest why the tree frog is found in the forests and not in the desert areas of Australia.

.....

.....

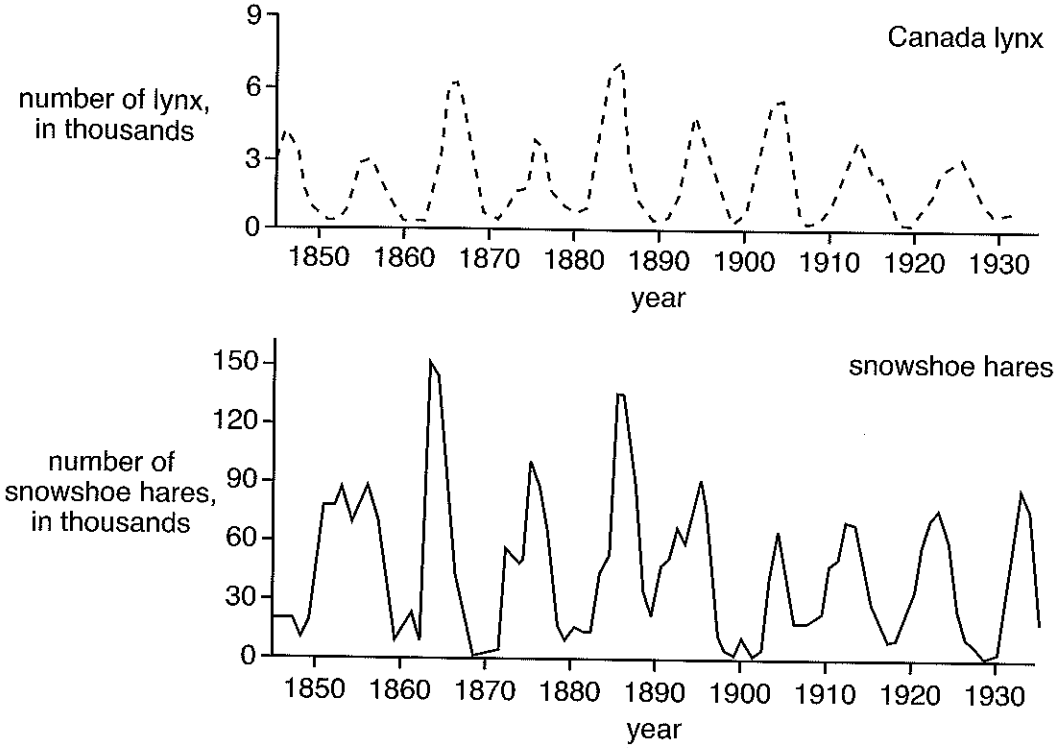
..... (3)

(c) Explain why frogs need to find water before they can reproduce.

.....

..... (2)

9. The graph below shows the numbers of a predator (Canada lynx) and its prey (snowshoe hares) for the years 1845 to 1935.



(a) (i) State the year when the number of snowshoe hares was at its maximum.

..... (1)

(ii) Describe the size of the predator population during this year and suggest an explanation for these observations.

size of predator population: ..... (1)

explanation: .....

.....

..... (2)

(b) Describe the sizes of the predator and prey populations in 1880 and suggest an explanation for these observations.

size of the populations: ..... (1)

explanation: .....

.....

..... (2)

(Total marks: 60)