SURNAME ..... FIRST NAME .....
(Block capitals, please)
JUNIOR SCHOOL ..... SENIOR SCHOOL .....

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

BIOLOGY

Monday 27 February 2006

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.

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1. Underline the word or phrase which best completes each of the following sentences.

(a) Respiration releases

energy glucose oxygen starch.

(b) An example of a human organ is

blood a nerve cell a sperm the heart.

(c) The disease which is caused by lack of calcium is

cold rickets scurvy tuberculosis.

(d) In digestion, enzymes

break down large food molecules kill bacteria

cause the intestine walls to contract make the gut acidic.

(e) The nutrients used for growth and repair are

carbohydrates fats proteins vitamins.

(f) A green plant is an example of a

carnivore consumer predator producer.

(g) In plant cells, most DNA is found in the

cell membrane cell wall cytoplasm nucleus.

(h) Animals

photosynthesise have cellulose cell walls

move around reproduce with seeds.

(i) Plants absorb light energy with

cellulose chlorophyll glucose starch.

(j) Oxygen moves from the lungs to the blood across the

alveoli **diaphragm** **nostril** **windpipe.**

(10)

2. When Maurice runs, his muscle cells need energy to contract.

(a) How do Maurice's muscle cells get the energy they need to contract?

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..... (3)

(b) A good supply of blood flows past Maurice's muscle cells. Explain how this helps Maurice's muscles to contract.

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..... (3)

(c) Maurice's muscles make carbon dioxide when they contract. Describe what happens to the carbon dioxide.

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..... (3)

(d) In Maurice's legs, muscles are arranged in antagonistic pairs. Explain how antagonistic muscles help Maurice to run.

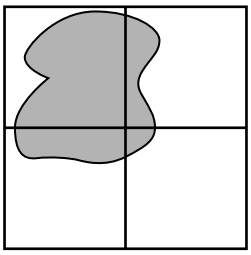
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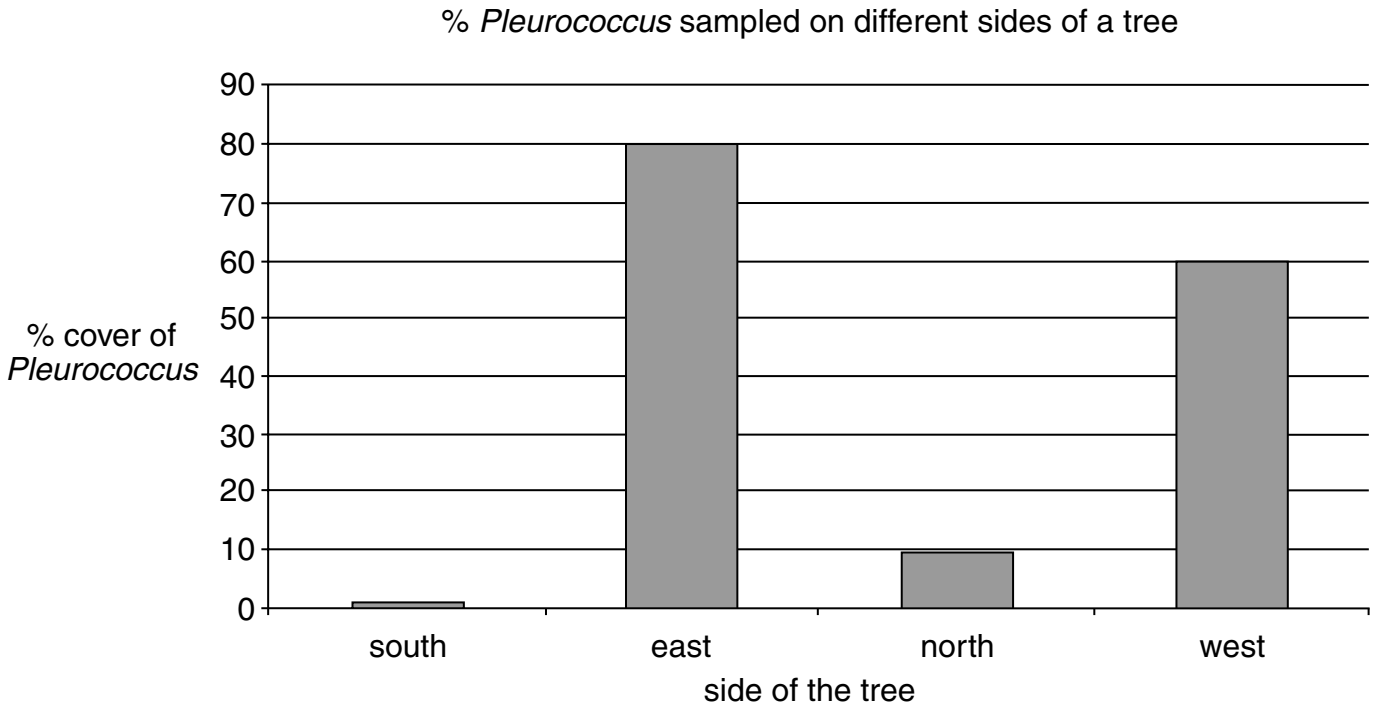
3. Ali and Thomas decided to study the growth of a green organism called *Pleurococcus* which grows on the surfaces of trees. They placed a small plastic quadrat on the tree at different heights and estimated the percentage of the quadrat covered by *Pleurococcus*.



(a) Estimate the % of the quadrat covered by *Pleurococcus*.

..... (1)

Ali and Thomas did this on the four sides of the tree. They used a compass to determine which direction each of the sides was facing.



(b) Describe how the distribution of *Pleurococcus* varies with direction.

.....

..... (2)

Ali and Thomas also collected measurements of the amount of rainwater running off each surface of the tree and the intensity of light falling on each surface of the tree. Their results are shown below.

direction	rainwater running off tree in cm^3/week	light intensity in light intensity units
south	0.5	100
east	3.0	90
north	0.5	90
west	2.0	85

Pleurococcus is a small single-celled plant which does not have roots or leaves.

(c) Which one of the two factors, water availability or light intensity, is likely to have the bigger influence on the growth of the *Pleurococcus*? Explain your answer.

factor: ..... (1)

explanation: .....

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..... (3)

Pleurococcus contains chlorophyll.

(d) Explain how *Pleurococcus* feeds.

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..... (3)

4. White bread contains a lot of starch.

(a) Describe carefully how you could show that the bread contains starch.

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..... (3)

Robert chews a piece of white bread for a few minutes without swallowing it. He says that after a while it becomes wet and starts to taste sweet.

(b) Explain what is happening to the bread in Robert's mouth.

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..... (3)

Wholemeal bread, which is made from all of the wheat grain, is thought to be healthier than white bread because it provides fibre for the diet.

(c) Explain why fibre is an essential part of our diet.

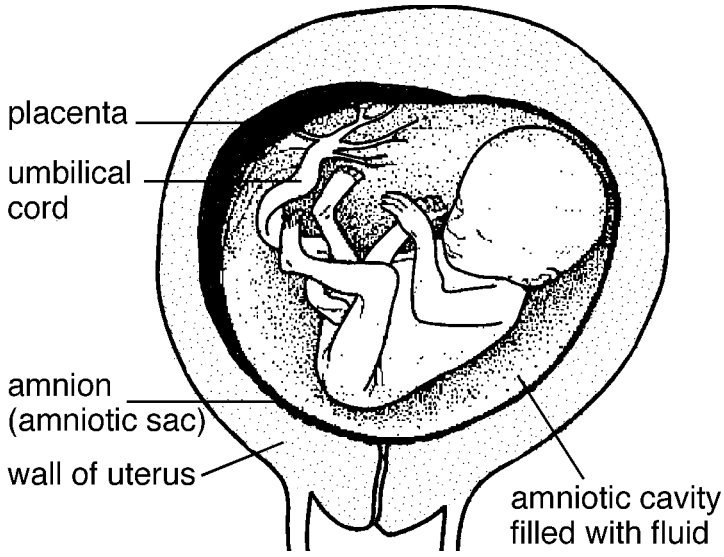
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..... (3)

5. The picture shows how a fetus is protected and nourished whilst in the uterus.



The fetus is surrounded by a liquid called **amniotic fluid**.

(a) Explain how amniotic fluid protects the fetus during development.

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..... (2)

Just before a baby is born, the amnion breaks and the amniotic fluid is forced out of the vagina. This is called the **breaking of the waters**.

(b) What causes the amnion to break?

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..... (2)

The baby is connected to the placenta by the umbilical cord.

(c) Describe and explain how the placenta nourishes the fetus during its time in the uterus.

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..... (4)

(d) What does the midwife or doctor do to the umbilical cord as soon as the baby is born? Suggest a reason for this.

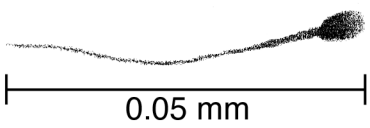
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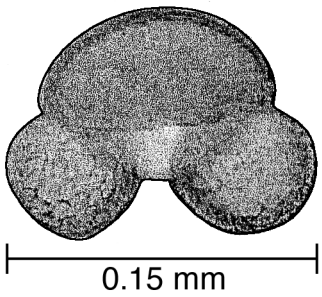
..... (2)

6. The diagram below shows a sperm cell and a pollen grain.

sperm cell



pollen grain



(a) Which is the larger structure?

..... (1)

(b) Below is a table showing some characteristics of sperm cells and pollen grains. Some characteristics are shared by both sperm cells and pollen grains. Write 'sperm', or 'pollen' or 'both' next to each of the characteristics.

characteristic	sperm, pollen or both
contains genes and DNA	
swims to the egg	
produces a tube	
contains cytoplasm	

(4)

7. Kevin eats his breakfast cereal with a spoon which has just been used by his brother. He then strokes his pet hamster, Boris, at the same time as he eats a jam sandwich. He then goes to the lavatory and leaves for school without cleaning his teeth or washing his hands. On his way to school he sneezes in the bus, but he does not have a handkerchief.

   Explain to Kevin how he can live a healthier life. Give reasons for your suggestions.

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   ..... (4)

(Total marks: 60)