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

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

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

BIOLOGY

Monday 7 June 2010

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 option which best completes each of the following:

(a) Genes are found in the

cell membrane **cell wall** **cytoplasm** **nucleus**

(b) A good source of protein is

butter **fish** **fruit** **water**

(c) The products of respiration are

carbon dioxide and glucose **carbon dioxide and water**

glucose and water **oxygen and glucose**

(d) Plant leaves are green because the cells contain

cellulose **chlorophyll** **glucose** **starch**

(e) A bat is a mammal because it

has fur **has wings** **is nocturnal** **lives on land**

(f) Herbivores are

primary consumers **predators**

producers **secondary consumers**

(g) Digested foods are absorbed into the

blood **brain** **heart** **bladder**

(h) Fertilisation usually occurs in the

cervix **ovary** **oviduct** **testis**

(i) Lack of vitamin C in the diet can cause

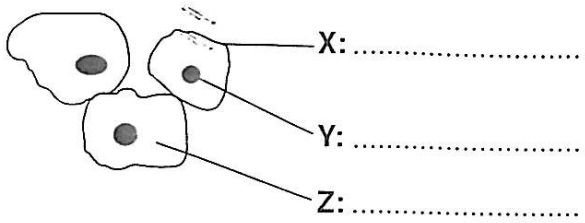
cancer **obesity** **rickets** **scurvy**

(j) Bones are pulled by the contraction of

cartilage **ligaments** **muscles** **tendons**

(10)

2. Anita wants to compare the differences between animal and plant cells.
She has already prepared and looked at a microscope slide of her cheek cells.
Here is a drawing of her observations:



(a) Label parts **X**, **Y** and **Z** on the diagram. (3)

(b) Describe, in detail, how she could prepare and observe some onion cells under the microscope.

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..... (3)

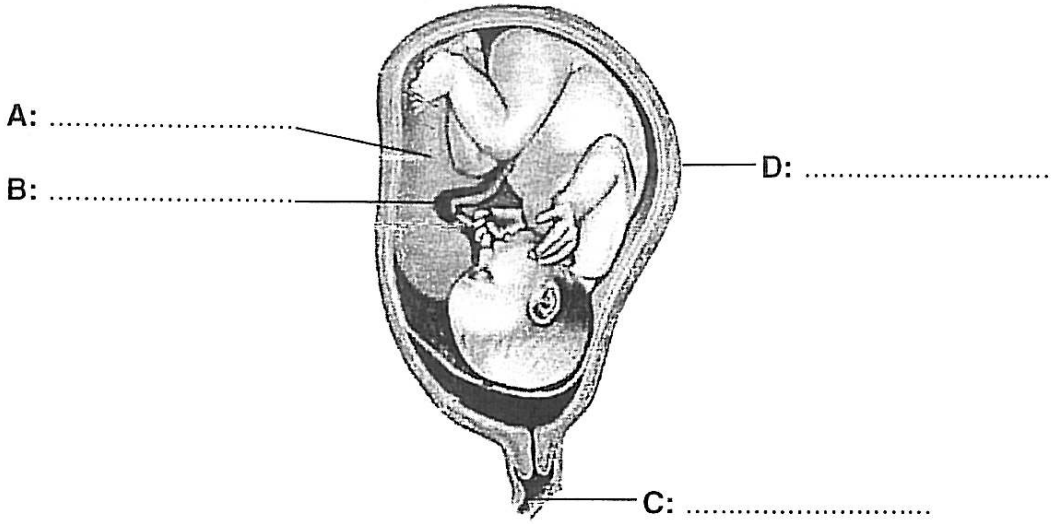
(c) Name a structure which she will see in the onion cells but not in the cheek cells.

..... (1)

(d) Complete the spaces in each of the following sentences with a suitable word.

Onion cells store glucose as ..... . We can test for this substance using iodine solution. Iodine solution turns from ..... to ..... if the substance is present. (3)

3. The diagram shows a fetus developing inside its mother's body.



(a) Label parts **A**, **B**, **C**, **D** on the diagram. (4)

(b) (i) Describe the function of part **B**.

.....

..... (1)

(ii) Name a substance which can pass from the mother to the fetus.

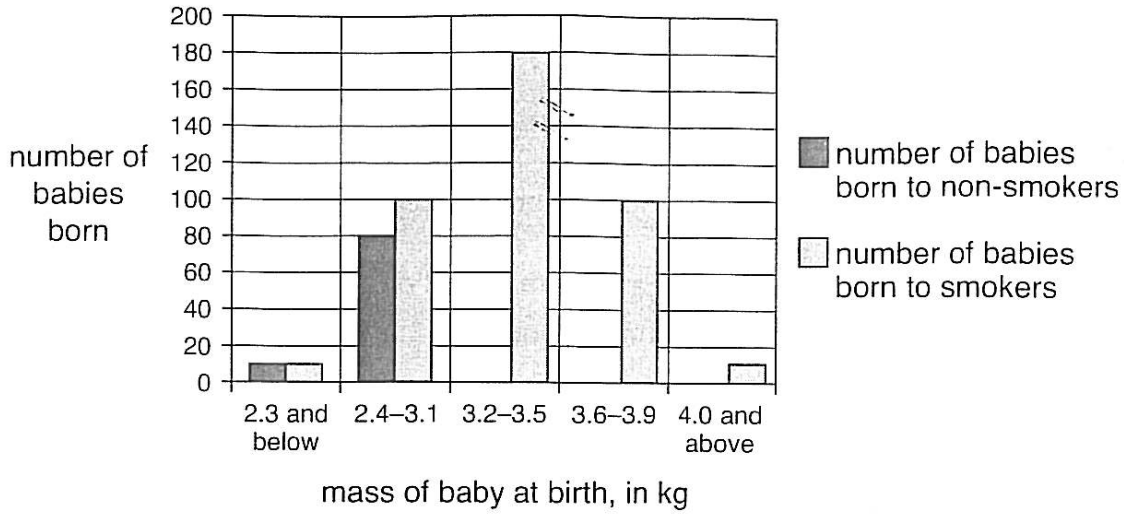
..... (1)

A survey was carried out on 400 mothers who smoked cigarettes and 400 mothers who did not smoke cigarettes.

The table below shows the birth weights of their babies.

mass of baby at birth, in kg	number of babies born to non-smokers	number of babies born to smokers
4.0 and above	60	10
3.6–3.9	110	100
3.2–3.5	140	180
2.4–3.1	80	100
2.3 and below	10	10

(c) Complete the bar chart below to show the number of babies born to non-smokers.



(3)

(d) How many non-smokers and smokers had babies heavier than 3.5 kg?

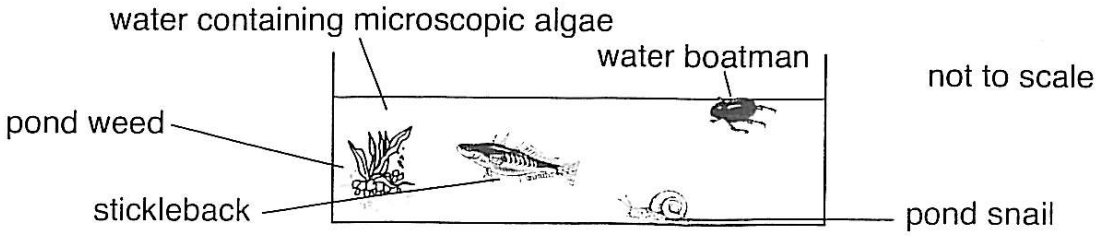
non-smokers: ..... smokers: ..... (2)

(e) Suggest what these results show about the effects of smoking on the mass of a baby at birth.

.....

..... (1)

4. Matthew is investigating some organisms which live in a pond.
He has set up a large fish tank in his laboratory to study the organisms more carefully.
The diagram below shows the organisms he has collected:



(a) Name two producers in the tank.

..... and ..... (2)

(b) Name the process which produces oxygen in the tank.

..... (1)

The pond snails, sticklebacks and water boatmen will all use up some of the oxygen produced in the tank and produce carbon dioxide.

(c) Name the biological process which is occurring in these organisms.

..... (1)

Matthew decides to measure the levels of carbon dioxide and oxygen present in the pond water.

He records the concentrations of each gas over a period of 24 hours.

He also uses a light meter to measure the light intensity.

(d) (i) Predict what will happen to the concentration of carbon dioxide in the pond water as the light intensity increases.

..... (1)

(ii) Predict what will happen to the concentration of oxygen in the water as the light intensity increases.

..... (1)

(iii) During the night, the concentration of carbon dioxide increases.

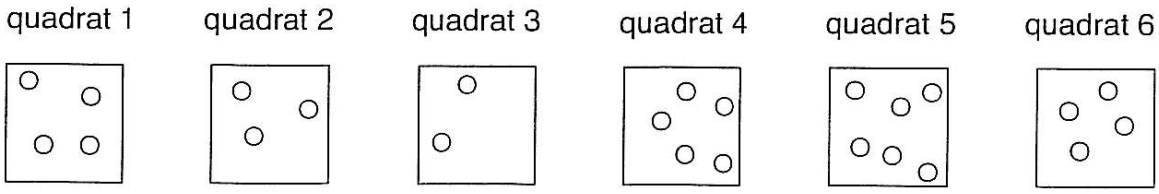
Predict what you think will happen to the concentration of oxygen.

..... (1)

5. A class wanted to investigate the number of daisy plants in a field.

They used 1 m^2 quadrats to count the number of daisy plants in six different areas of the field.

Their results are shown below:



○ = daisy plant

(a) Count the number of daisy plants in each of the quadrats and record your totals in the table below. *(The first one has been done for you.)* (2)

quadrat	1	2	3	4	5	6
number of daisy plants	4					

(b) Calculate the average number of daisy plants per m^2 for the six quadrats.
Show your working.

.....

..... (2)

(c) The area of the field is 1000 m^2.
Estimate how many daisy plants are in the field.
Show your working.

.....

..... (2)

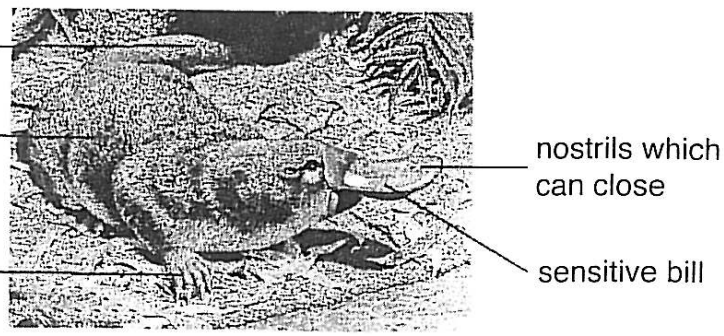
(d) Suggest three environmental factors which could affect the number of daisy plants present in the field.

factor 1: .....

factor 2: .....

factor 3: ..... (3)

6. The drawing below is of a duck-billed platypus.
Its body is covered in hair and it lays eggs.
It is a carnivore and hunts for its food by digging in the bottom of streams and rivers.



(a) Scientists have classified the duck-billed platypus as a mammal.
Suggest one characteristic which the animal shares with most other mammals.

..... (1)

(b) Name one characteristic of the duck-billed platypus which is not shared with most other mammals.

..... (1)

(c) Suggest how the duck-billed platypus is adapted to life in the water.

.....

.....

..... (3)

(d) Suggest two functions for its sensitive bill.

1: .....

2: ..... (2)

(e) Describe and explain one characteristic of the duck-billed platypus which helps it to survive in the cold highlands of Tasmania and the Australian Alps.

.....

.....

..... (2)

(f) Once it was thought that the duck-billed platypus was a reptile.
Name one reptile and list two features which all reptiles share in common.

name of reptile: .....

feature 1: .....

feature 2: ..... (3)

(Total marks: 60)