COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

BIOLOGY

Monday 24 January 2011

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

(a) If iodine solution were poured onto a piece of bacon, its colour would be
    blue/black  brown/orange  green  white

(b) Muscles work across a joint
    aggressively  alternately  amiably  antagonistically

(c) The food which contains the best source of protein is
    citrus fruit  potato  rice  salmon

(d) All living things
    breathe  eat  jump  respire

(e) The male gamete in humans is called the
    egg  ovary  sperm  testes

(f) A disease primarily caused by a poor diet is
    athlete’s foot  influenza  scurvy  tuberculosis

(g) The average length of the menstrual cycle in humans is approximately
    7 days  14 days  28 days  40 days

(h) In feeding relationships, herbivores are
    consumers  decomposers  predators  producers

(i) In order to germinate, all seeds need
    compost  fertiliser  sunlight  water

(9)
2. The following sentences are about nutrition.
Use the words below to fill in the spaces.
These words may be used once, more than once or not at all.

| carbohydrates | fats | fibre | minerals | proteins | vitamins | water |

We need to eat a balanced diet in order to be healthy.

Most of our energy comes from ..........................................

We need ........................................ for growth and repair.

Iron and calcium are examples of ........................................

A nutrient which we do not digest but which keeps our intestines healthy is

........................................

It is important to drink plenty of ........................................ to stay hydrated.  

(5)
3. The diagram below shows a root hair cell and a leaf cell of a plant.

(a) Name one feature which shows that these are both plant cells.

........................................................................................................................................ (1)

(b) State the function of the chloroplasts in a leaf cell.

........................................................................................................................................ (1)

(c) Suggest why chloroplasts are not found in root hair cells.

........................................................................................................................................ (1)

(d) Describe and explain how the root hair cell is adapted to its function.

........................................................................................................................................ (2)
4. Humans need to exchange gases with their surroundings in order to survive.
   (a) (i) Write down the name of the organ where gas exchange takes place in humans.

   (ii) Write down the name of the organ where gas exchange takes place in fish.

   (b) Humans absorb oxygen from the air which is needed for the process of respiration.
       (i) Where does the process of respiration take place in humans?

       (ii) Complete the word equation below for respiration.

       + → + + +

   The diagram below shows the gas exchange surfaces which are found inside mammals.

   thousands of tiny hollow air sacs called alveoli
   (singular: alveolus)

   tiny blood vessels surrounding the gas exchange surface

   (c) Suggest two ways in which the structure of alveoli helps gas exchange to take place efficiently.

   1: 

   2: 

   (2)
5. Molly decided that she wanted to grow tomatoes in her garden.

(a) Name the gas needed by plants for photosynthesis.

......................................................................................................................... (1)

(b) Name the gas which plants produce during photosynthesis.

......................................................................................................................... (1)

(c) Tomatoes turn from green to red as they ripen.
They also become sweeter in taste as sugar collects in the tomatoes.
Explain how sugar collects in the ripening tomatoes.

.........................................................................................................................
.........................................................................................................................
.........................................................................................................................
......................................................................................................................... (3)

(d) Molly found that her tomatoes did not ripen very well in her garden and so she decided to plant them in a greenhouse the following year.

Suggest two advantages of growing plants in a greenhouse rather than in the garden.

1: .........................................................................................................................

2: ......................................................................................................................... (2)
6. Vertebrates are classified using the five groups listed below.

| amphibians | birds | fish | mammals | reptiles |

(a) Describe two ways in which an amphibian differs from a reptile.

Difference 1:
An amphibian ................................................................. whereas a reptile.................................................................

Difference 2:
An amphibian ................................................................. whereas a reptile................................................................. (2)

(b) Name two features of a penguin which show that it is a bird.

1: ......................................................................................

2: ...................................................................................... (2)

(c) Name a mammal which lives entirely in water.

.................................................................................................. (1)

(d) Name a mammal which can fly.

.................................................................................................. (1)
7. A group of Year 8 pupils prepared and viewed some of their cheek cells using a microscope.

(a) Describe how you could prepare some of your own cheek cells so that they are ready to be viewed using a microscope.

..................................................................................................................................................
..................................................................................................................................................
..................................................................................................................................................
.................................................................................................................................................. (4)

(b) Explain how you would use the microscope to view the cheek cells which you have prepared.

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

8. Isabel and Frankie decided to investigate which small invertebrates lived near their school by setting pitfall traps.

They put half the traps under a hedge and half in a pine wood.

They left the traps overnight and then identified the invertebrates before returning them to their habitats.
They recorded their results as follows:

<table>
<thead>
<tr>
<th></th>
<th>woodlice</th>
<th>spiders</th>
<th>mites</th>
<th>centipedes</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>hedge</td>
<td>32</td>
<td>13.</td>
<td>15</td>
<td>5</td>
<td>65</td>
</tr>
<tr>
<td>pine wood</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Use the information in the table above to answer the following questions:

(a) Complete the table to show the total number of invertebrates found in the pine wood. (1)

(b) Name the most common invertebrate found in the hedge. (1)

(c) Name the least common invertebrate found in their investigation. (1)

(d) The table below shows the pH of the soil in the hedge and in the pine wood.

<table>
<thead>
<tr>
<th>soil location</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>hedge</td>
<td>7.2</td>
</tr>
<tr>
<td>pine wood</td>
<td>5.3</td>
</tr>
</tbody>
</table>

Suggest why there were fewer invertebrates in the pine wood than under the hedge. (1)

(e) Many invertebrates break down dead organisms.

Suggest why this process is so important for life on Earth to continue. (2)
9. The diagram below shows a food web for a coral reef in Indonesia.

(a) Suggest why the phytoplankton, green algae and seaweed are called producers.

(b) What do the arrows in the food web show?

(c) Name the organism which depends upon crabs for survival.

(d) Name an organism which is a secondary consumer.
The starfish are destroying large areas of coral reef.
They are preyed upon by tritons.
Triton shells are collected by tourists as ornaments.

(e) Suggest why the collection of tritons by tourists is leading to the destruction of the coral reefs.

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

(f) Suggest how we could protect coral reefs from further destruction.

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

(Total marks: 60)

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