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

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

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

BIOLOGY

Monday 2 June 2008

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) The villi in the human gut

absorb digested food **break down starch**

expel undigested wastes **push the food through the gut**

(b) The process which releases energy from carbohydrates is

digestion **excretion** **perspiration** **respiration**

(c) The place where two bones meet is called a

joint **ligament** **muscle** **tendon**

(d) Root hair cells have a large surface area to

absorb from the soil **photosynthesise effectively**

release pollen **store starch**

(e) A human egg is released at

evolution **menopause** **menstruation** **ovulation**

(f) Cigarette smoke is dangerous because it

causes cancer **causes scurvy** **is alkaline** **is antisocial**

(g) The best reagent to test for carbon dioxide in exhaled air is

iodine solution **limewater** **methylene blue** **universal indicator**

(h) In plants, the process which increases biomass is

flowering **fruit ripening** **photosynthesis** **respiration**

(i) In plants, light is needed to make

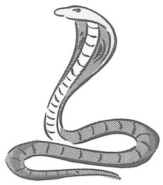
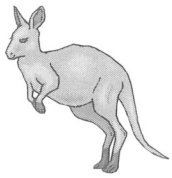
fats **proteins** **starch** **vitamins**

(j) Insects are arthropods because they

can fly **have an external skeleton** **lay eggs** **pollinate flowers**

(10)

2. (a) The drawings below show examples of four different groups of vertebrates. There are also four different characteristics describing each of the animals. Draw a straight line to link each vertebrate with its special characteristic. (4)

fish	reptile	bird	mammal
			
has fur and makes milk	breathes with gills	has dry, scaly skin	lays eggs with hard shell

There is one group of vertebrates missing from the diagram.

(b) (i) Name the group of vertebrates missing from the diagram.

..... (1)

(ii) Name one example of this group of vertebrates and describe one of its special characteristics.

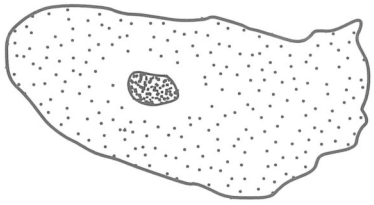
name: .....

special characteristic: ..... (2)

3. (a) The drawing below shows a human cheek cell.

contains genes

controls which substances enter and leave the cell



is where respiration occurs in the cell

On the left side of the drawing there is a description of three different parts of this cell. Identify the correct part of the cell and draw a straight line linking it to the description. (3)

(b) Describe in detail how you could make a stained microscope slide of a cell, such as a cheek cell. Make sure you work safely.

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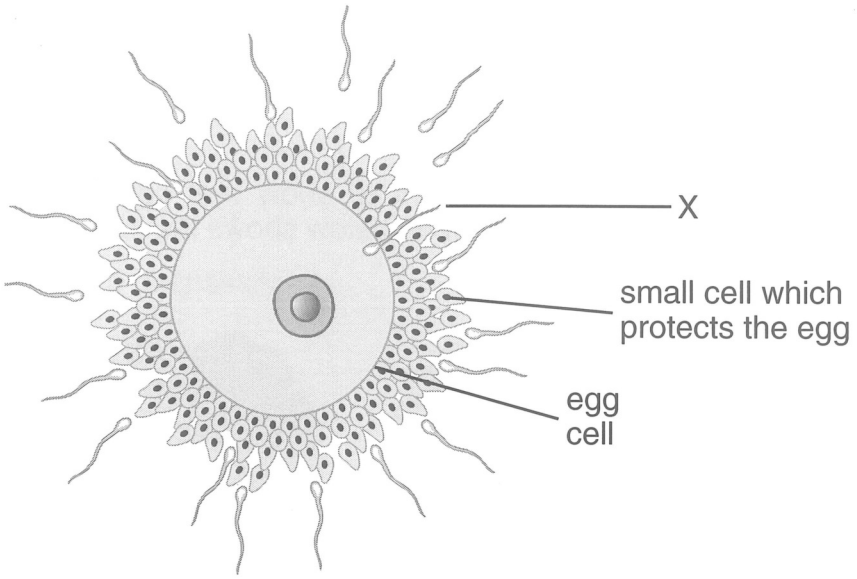
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..... (4)

4. The diagram below shows a human egg cell surrounded by many smaller cells which protect it. The human egg cell is travelling towards the uterus, and has met some sperm cells.



(a) (i) Name the part of the human body where fertilisation takes place.

..... (1)

(ii) Suggest how the small cells might be protecting the egg cell as it travels towards the uterus.

.....

..... (1)

(b) Describe what is happening to sperm X.

.....

.....

..... (2)

When a sperm fertilises an egg, genes from both parents are brought together.

(c) (i) State where the genes are found in the sperm and in the egg cell.

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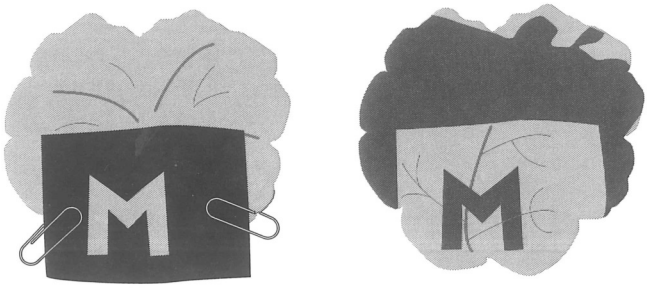
..... (2)

(ii) Suggest how the genes from the sperm and egg are brought together.

.....

..... (2)

5. Three pupils carried out an experiment to show that light was needed for starch production by a potted plant. The drawing below shows the leaf which they used in their experiment.



(a) Explain why the starch is found in the shape of a letter M.

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..... (4)

(b) Suggest a reason why it was necessary to keep the plant in a darkened cupboard for three days before carrying out the experiment.

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.....

..... (3)

(c) (i) Describe the control experiment which they should carry out in order to be certain that it is the light which is causing the production of starch.

.....

.....

..... (2)

(ii) Explain why it is necessary.

.....

.....

..... (1)

The pupils had to be careful to carry out this experiment safely.

(d) Suggest one safety precaution which they should carry out and explain why it is important.

safety precaution: ..... (1)

explanation: .....

..... (1)

6. A sample of 580 children was assessed for their eye colour and hair colour. The results are in the table below:

eye colour	hair colour				
	black	brown	red	blond	total
brown	68	119	16	7	210
blue	12	92	12	92	208
hazel	15	60	13	10	98
green	5	29	14	16	.....
total	100	.....	55	125	580

(a) (i) Complete the table above by filling in the two missing values. (1)

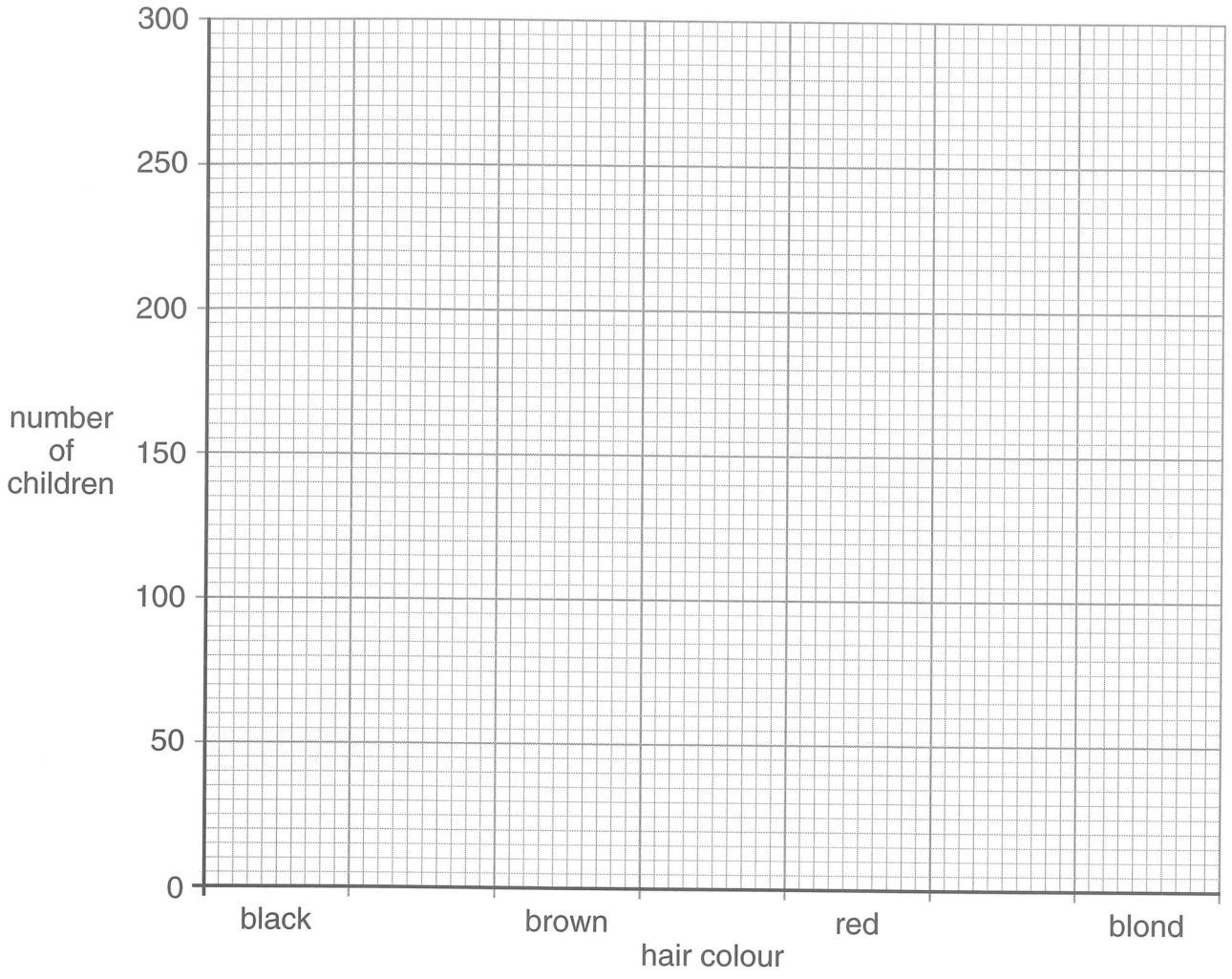
(ii) State which combination of eye colour and hair colour is the most common in the sample.

..... (1)

(iii) State which eye colour is the least common in the sample.

..... (1)

(b) Plot a bar chart showing the total numbers of the different hair colours.



(3)

7. This photograph shows a dormouse which is one of the rarest animals in Britain. It is a small animal, with a body length of about 80 mm.



Dormice feed on blackberries and honeysuckle fruit which grow close to the floor of hazel woodlands. This affects the food supplies of the dormouse.

(a) Explain why the number of dormice falls when the hazel forest becomes overgrown.

.....

.....

.....

..... (3)

Owls are the main predators of dormice. Owls hunt at night.



(b) Suggest two features which enable the owl to hunt at night.

1: .....

2: ..... (2)

(c) Draw a food chain involving dormice.

(1)

In Wales there are people who are trying to increase the number of dormice.

(d) Suggest two things which could be done to increase the number of dormice. Explain how your ideas would work.

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..... (4)

(Total marks: 60)

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SCIENCE

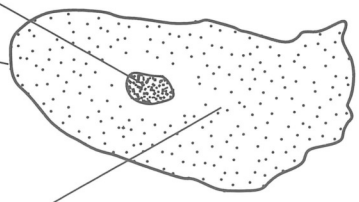
BIOLOGY

MARK SCHEME

This is a suggested, not a prescriptive, mark scheme.

Monday 2 June 2008

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Q.	Answer	Mark	Additional Guidance
1. (a)	absorb digested food	**10**	
(b)	respiration		
(c)	joint		
(d)	absorb soil water		
(e)	ovulation		
(f)	causes cancer		
(g)	limewater		
(h)	photosynthesis		
(i)	starch		
(j)	have an external skeleton		
2. (a)	fish: breathes with gills reptile: has dry, scaly skin bird: lays eggs with hard shell mammal: has fur and makes milk	**4**	1 mark for each correct answer
(b) (i)	amphibians	**1**	
(ii)	frog *any one of:* soft, moist skin returns to water to breed tadpole stage	**2**	credit suitable answers
3. (a)	contains genes controls which substances enter and leave the cell is where respiration occurs in the cell 	**3**	

Q.	Answer	Mark	Additional Guidance
(b)	gently scrape the inside of your cheek with a sterile cotton bud (or equivalent) rub the cells onto a clean dry microscope slide dispose of the cotton bud in disinfectant add two drops of stain (e.g. methylene blue stain) gently lower a coverslip onto the stained part of the slide making sure you do not trap any air bubbles put the slide on a microscope and focus the microscope	**4**	3 marks for any three suitable points + 1 mark for valid safety point
4. (a) (i)	fallopian tube / oviduct	**1**	
(ii)	the small cells might protect the egg from being damaged by hitting the walls of the fallopian tube / uterus as it moves	**1**	accept other possible answers
(b)	the sperm has swum to the egg the sperm has burrowed between the cells surrounding the egg the sperm is penetrating the cell surface membrane of the egg this is fertilisation	**2**	any two suitable ideas
(c) (i)	the nucleus of the egg cell the head of the sperm	**2**	
(ii)	the head of the sperm penetrates the egg and carries the genes to the genes of the egg	**2**	

Q.	Answer	Mark	Additional Guidance
5. (a)	the paper masks the leaf, so the only light which reaches the leaf has been shaped into a letter M the light causes starch to be made in only this part of the leaf no starch is made in the dark areas starch accumulates in this part of the leaf so a starch test shows that starch is only found in the illuminated part of the leaf, shaped by the letter M	**4**	any four suitable ideas
(b)	the plant breaks down starch to glucose and uses it in respiration keeping the plant in the dark will ensure that the plant does not contain starch before the experiment any starch present must have been made during the experiment	**3**	accept 'destarching'
(c) (i)	take an identical plant treat it exactly the same way, but keep it in the dark it should contain no starch	**2**	
(ii)	this shows that the starch has been made because of the light	**1**	
(d)	*safety precaution:* do not have boiling alcohol next to naked flames / switch off Bunsen burner / wear safety spectacles *explanation:* alcohol is inflammable and can easily be set alight / hot alcohol splashes can burn	**1** **1**	accept other suitable answers

Q.	Answer	Mark	Additional Guidance
6. (a) (i)	*correct addition of totals:* *brown hair:* 300 *green eyes:* 64	1	
(ii)	brown eyes, brown hair	1	
(iii)	green eyes	1	
(b)	*bar chart*	3	3 marks for all four bars correct 2 marks for three bars correct 1 mark for two bars correct
7. (a)	an overgrown wood lets little light onto the floor of the wood the dormouse food plants do not grow very well less food for the dormice, so their numbers fall	3	credit other suitable answers
(b)	good hearing eyes which can see in dim light / darkness	2	
(c)	blackberries / honeysuckle → dormice → owls	1	
(d)	woods need to be cleared of small trees / bushes which prevent the dormouse food plants from growing properly also remove very large / old trees which prevent light from getting onto the floor of the wood provide places for the dormice to live which the owl cannot see	4	
Total		**60**	