

Surname	Initial(s)
Signature	

Paper Reference(s)

5005

Edexcel GCSE

Science

Biology B1a

Topic 1: Environment

Topic 2: Genes

Foundation and Higher Tiers

Thursday 9 November 2006 – Morning

Time: 20 minutes

Materials required for examination

Multiple Choice Answer Sheet
HB pencil, eraser and calculator

Items included with question papers

Nil

Instructions to Candidates

Use an HB pencil. Do not open this booklet until you are told to do so.
Mark your answers on the separate answer sheet.

Foundation tier candidates: answer questions 1 – 24.

Higher tier candidates: answer questions 17 – 40.

All candidates are to answer questions 17 – 24.

Before the test begins:

Check that the answer sheet is for the correct test and that it contains your candidate details.

How to answer the test:

For each question, choose the right answer, A, B, C or D
and mark it in HB pencil on the answer sheet.

For example, the answer C would be marked as shown.



Mark only **one** answer for each question. If you change your mind about an answer, rub out the first mark **thoroughly**, then mark your new answer.

Do any necessary calculations and rough work in this booklet. You may use a calculator if you wish.

You must not take this booklet or the answer sheet out of the examination room.

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Questions 1 to 16 must be answered by Foundation-tier candidates only.
Higher-tier candidates start at question 17.

Fishing

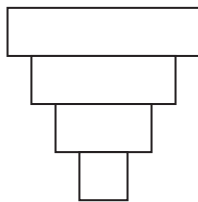
Philip likes to go fishing in a lake near his home.
He writes out a food chain for the organisms in the lake.



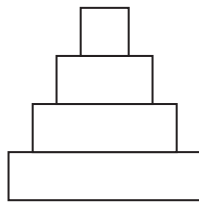
1. Which organism is the producer in this food chain?

- A algae
- B daphnia
- C minnow
- D pike

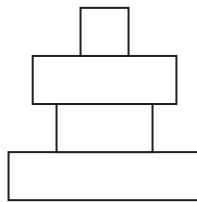
2. Which is the pyramid of biomass for this food chain?



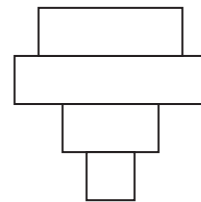
A



B



C



D

3. The pike hunts and kills the minnow for food.
What is the name for an animal that hunts and kills another animal for food?

- A prey
- B fossil
- C predator
- D herbivore

4. A new species of fish, the roach, was put into the lake. The roach only eats daphnia.
What effect will the roach have on the food chain?

- A The number of daphnia will increase
- B The number of daphnia will decrease
- C The number of daphnia will stay the same
- D The number of minnows will increase

A ball of cells

The picture shows a ball of cells formed at an early stage of mammal development.



5. Which row of the table shows where chromosomes are found in each cell?

	in the cytoplasm	in the nucleus
A	no	no
B	no	yes
C	yes	no
D	yes	yes

6. The ball of cells is called

- A** a human
- B** an egg
- C** a baby
- D** an embryo

7. Clones could be produced from the ball of cells if the cells were

- A** killed
- B** separated
- C** stained
- D** counted

8. One of the cells from the ball is removed and tested to see if it contains an allele that causes a disease.

An allele is an alternative form of

- A** the same gene
- B** a different gene
- C** the same chromosome
- D** a different chromosome

Organic food



9. Many supermarkets are selling more organic food. Organic food has become popular because people think it
- A is more expensive
 - B needs artificial fertilisers
 - C is sprayed to kill insects
 - D does not contain additives
10. Organic vegetables often cost more because
- A there may be only a small yield due to pests
 - B the pesticides used are expensive
 - C natural predators are used which eat the vegetables
 - D they are genetically modified

Use this food chain to answer questions 11 and 12.

organic wheat → field mice → grass snakes → eagles

11. In the food chain, which contains the most energy?
- A organic wheat
 - B field mice
 - C grass snakes
 - D eagles
12. What could the farmer do to increase the yield of organic wheat?
- A increase the number of eagles
 - B increase the number of grass snakes
 - C kill the grass snakes
 - D spray the wheat with pesticide

Spider plants



13. The young spider plants have been produced by
- A fertilisation
 - B sexual reproduction
 - C evolution
 - D asexual reproduction
14. The young spider plants have
- A no genes from the parent
 - B different genes from the parent
 - C the same genes as each other
 - D different genes from each other
15. Genes are made from
- A cells
 - B chromosomes
 - C energy
 - D DNA
16. An experiment was carried out to find out if nitrate fertiliser affects the number of young spider plants produced.
- The best method for this experiment is to add nitrate fertiliser to
- A one parent plant
 - B one parent plant and to add water to another parent plant
 - C five parent plants
 - D five parent plants and to add water to another five parent plants

**Higher-tier candidates start at question 17 and answer questions 17 to 40.
Questions 17 to 24 must be answered by all candidates: Foundation-tier and Higher-tier.**

Ammonites



The picture shows a common type of fossil called an ammonite. Ammonites lived in the oceans. There are many different sizes and shapes of this fossil.

17. Fossils are

- A rocks with pictures drawn on them
- B the preserved remains of plants only
- C the preserved remains of animals only
- D the preserved remains of plants and animals

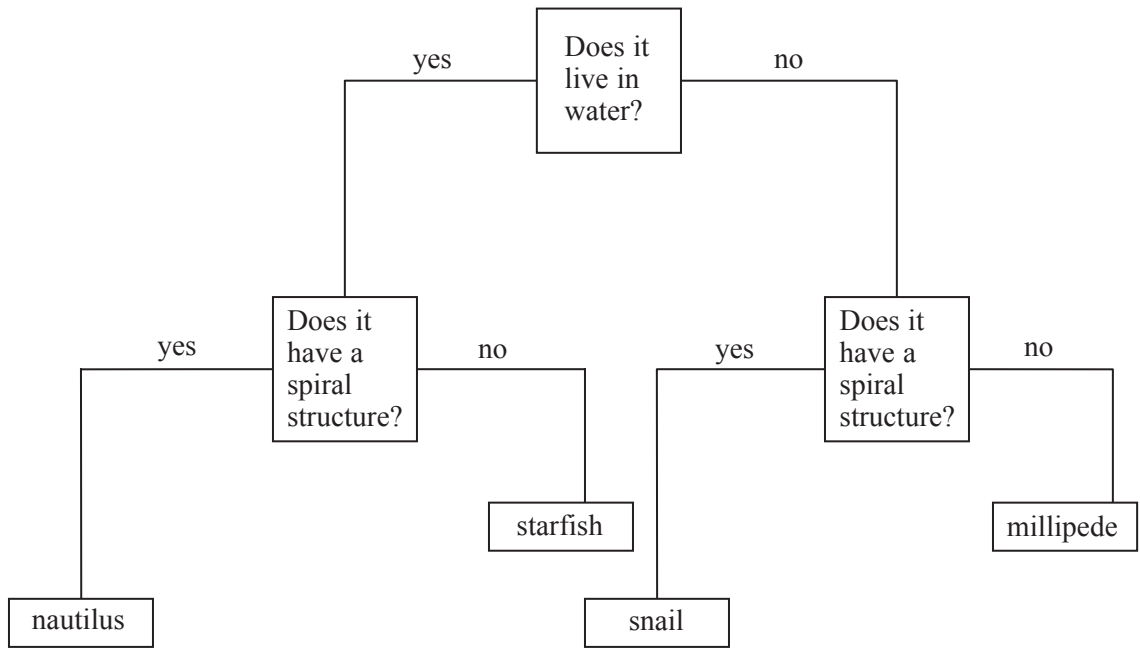
18. Ammonites provide evidence for

- A genetic engineering
- B selective breeding
- C food chains
- D evolution

19. Which row of the table shows the most likely reasons for the changes in the size and shape of the ammonites over time?

	changes in the environment	changes in selective breeding
A	yes	yes
B	yes	no
C	no	yes
D	no	no

20. There are organisms living today that have the same characteristics as the ammonite. Use the key to identify the organism most closely related to the ammonite.

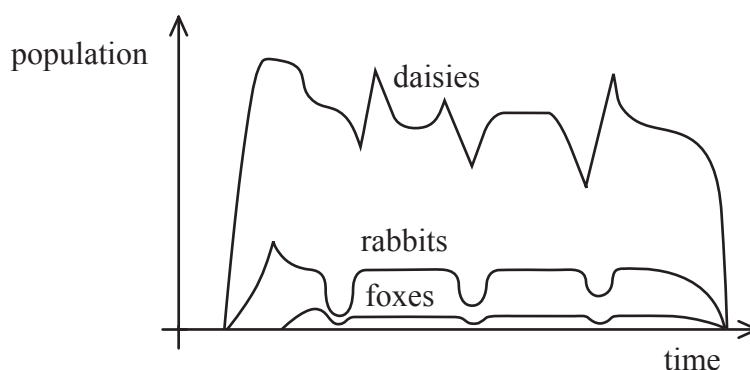


- A nautilus
- B starfish
- C snail
- D millipede

Computer model

A scientist called Lovelock designed a computer model to show how organisms interact together in an environment with no external factors affecting it. He called it 'Daisyworld'.

'Daisyworld' only has populations of foxes, rabbits and daisies. The graph below shows how the population of these organisms changed over a certain period of time.



21. What does this graph show?
- A The rabbits are dependent on the daisies
 - B Rabbits can survive without daisies
 - C The foxes are prey
 - D The rabbits are predators
22. The graph produced by 'Daisyworld' suggests that
- A there were more rabbits than daisies
 - B the population of rabbits remained constant
 - C in the end everything died
 - D the foxes were always present
23. Carrying out a real experiment to show these population changes is more difficult than using a computer model.
This is because
- A the rabbits would have to be trained
 - B the experiment would be too fast
 - C other factors can affect reliability
 - D daisies do not grow where there are rabbits
24. Computer modelling
- A is never wrong
 - B can harm living organisms
 - C allows you to see results quickly
 - D always produces results identical to real experiments

TOTAL FOR FOUNDATION-TIER PAPER: 24 MARKS

Foundation-tier candidates do not answer any more questions after question 24.

**Questions 25 to 40 must be answered by Higher-tier candidates only.
Foundation-tier candidates do not answer questions 25 to 40.**

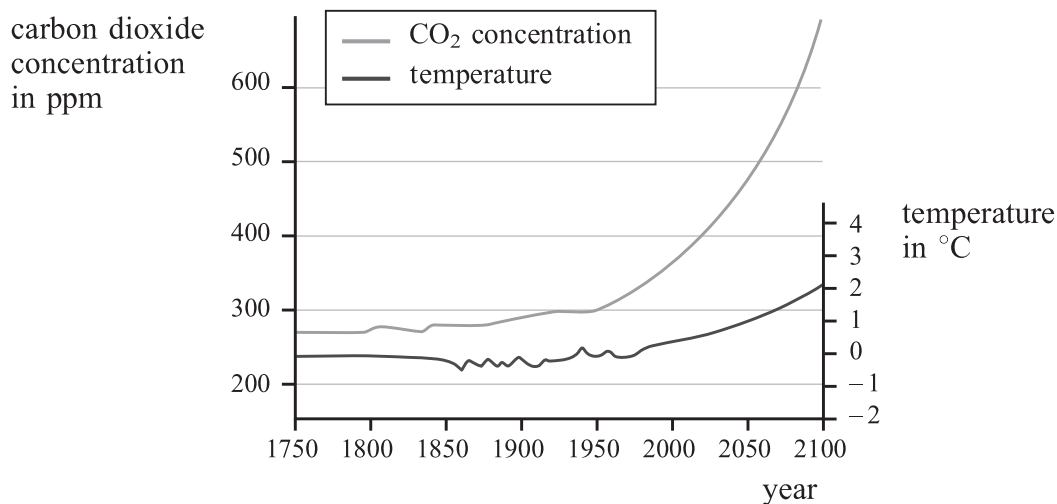
HGP

Scientists have used the HGP to identify all the genes in human DNA.

25. What do the initials HGP stand for?
- A Human Genetic Project
 - B Human Genome Project
 - C Human Genotype Project
 - D Human Gene Project
26. The information about all the genes in human DNA can be used in medicine. Which of the following would **not** be used in medicine?
- A treating diseases
 - B spreading diseases
 - C preventing diseases
 - D curing diseases
27. As a result of HGP your medical information might be seen by other people. Which group of people are you likely to be **least** worried about?
- A insurers
 - B doctors
 - C bankers
 - D employers
28. A senior police officer said that there are benefits in keeping a record of people's DNA. Here are some statements about the use of DNA in criminal investigations.
- DNA evidence can prevent some innocent people being jailed.
 - Half a million DNA samples are still waiting to be processed.
 - DNA evidence from other criminal cases can be compared with an arrested person's DNA.
- How many of these statements are benefits?
- A none
 - B one
 - C two
 - D three

Carbon dioxide

The graph shows estimated global carbon dioxide concentration and change in air temperature over a period of 350 years.



29. What was the concentration of carbon dioxide in the year 2000?
- A 250 ppm
 - B 290 ppm
 - C 370 ppm
 - D 600 ppm
30. Many scientists believe there is a link between carbon dioxide concentration and change in air temperature.
How does the graph support this?
- A Carbon dioxide concentration is increasing as air temperature is decreasing
 - B Carbon dioxide concentration is decreasing as air temperature is increasing
 - C Both carbon dioxide concentration and air temperature are decreasing
 - D Both carbon dioxide concentration and air temperature are increasing
31. Which is **not** involved in increasing the carbon dioxide concentration in the atmosphere?
- A increase in deforestation
 - B increase in human population
 - C increase in use of wind power
 - D increase in industrialisation
32. Rainforests are being destroyed at a rate of two football fields every second.
Which of the following is **not** a reason for this destruction?
- A building of houses
 - B farming of cattle
 - C making of furniture
 - D extinction of species

Sisters

These two sisters are identical twins.



33. The reason why they look alike is because they have
- A the same alleles and a similar diet
 - B the same alleles and a different diet
 - C different alleles and a similar diet
 - D different alleles and a different diet
34. The sisters found out that all their features were controlled by
- A dominant alleles only
 - B recessive alleles only
 - C dominant and recessive alleles
 - D neither dominant nor recessive alleles
35. The sisters have a brother with cystic fibrosis.
This meant he often had
- A skin infections
 - B lung infections
 - C eye infections
 - D throat infections
36. Their brother decided that he would not have any children of his own because the probability of him passing on the allele for cystic fibrosis was
- A 100%
 - B 75%
 - C 50%
 - D 25%

Charles Darwin

Charles Darwin wrote his book *The Origin of Species* following a journey to the Galapagos islands. On the islands he discovered many varieties of finch with different beak shapes.



37. The different beak shapes are thought to be the result of
- A natural selection
 - B cloning
 - C selective breeding
 - D genetic engineering
38. The statements are about Darwin's theory. Which of the statements are true?
- 1 Darwin's theory was accepted by scientists because it agreed with the religious beliefs at the time.
 - 2 Darwin's theory was based on experimental data which can easily be reproduced.
- A 1 only
 - B 2 only
 - C both 1 and 2
 - D neither

GM crops

British people are deeply concerned about the possibility of growing GM crops in the UK

(Newspaper headline)

39. Which of the following is **not** a reason for genetically modifying crops?
- A increased yield
 - B increased shelf life
 - C increased resistance to pests
 - D increased resistance to pesticides
40. The statements are about genetically modified crops.
- 1 Genetically modified crops may cause damage to the environment in which they are grown.
 - 2 Genetically modified crops always have lower nutritional value than traditionally grown crops.

Which of the statements are valid concerns regarding the use of GM crops?

- A 1 only
- B 2 only
- C both 1 and 2
- D neither

TOTAL FOR HIGHER-TIER PAPER: 24 MARKS

END