

Surname	Initial(s)
Signature	

Paper Reference(s)

5005

Edexcel GCSE

Science

Biology B1a

Topic 1: Environment

Topic 2: Genes

Foundation and Higher Tiers

Monday 12 March 2007 – 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.

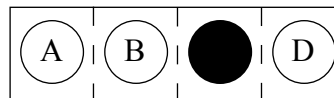
Before the test begins:

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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Turn over

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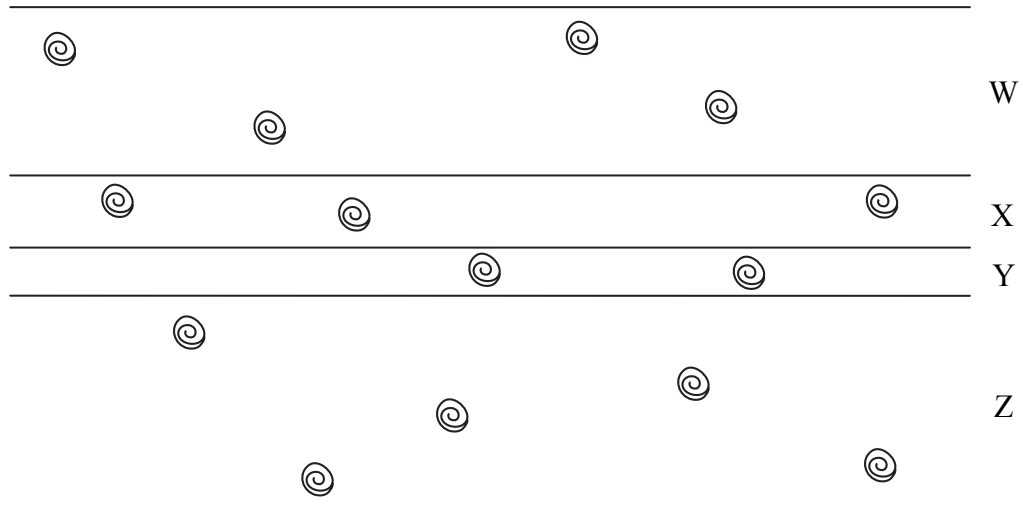
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**Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.**

Fossils

The diagram shows four layers of rock. Each layer contains fossils.



1. Which layer of rock contains the most fossils?

- A W
- B X
- C Y
- D Z

2. Which layer contains the oldest fossils?

- A W
- B X
- C Y
- D Z

3. Fossils are

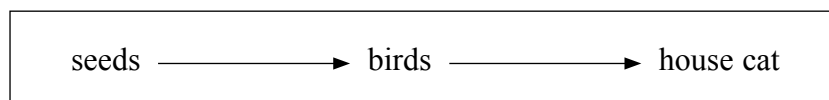
- A living animals
- B living plants
- C remains of dead animals and plants
- D pieces of broken pots

4. Fossils provide evidence for

- A evolution
- B predation
- C competition
- D reproduction

Cats

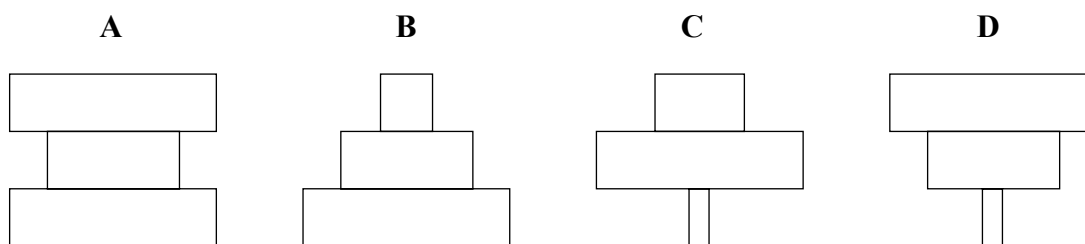
Scientists have calculated that house cats kill 39 million garden birds each year. The food chain below is from a garden.



5. In this food chain the prey is the

- A birds
- B house cat
- C gardener
- D seeds

6. Which pyramid of biomass represents this food chain?



7. 39 million birds are killed by house cats each year. Scientists are able to calculate this because they

- A know how many people own cats
- B count every bird that is killed
- C know how many seeds are eaten
- D count the birds killed in a sample

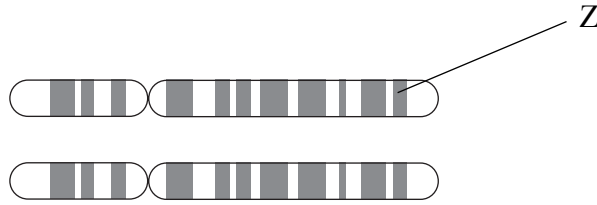
8. If the scientists are correct, the number of birds killed by house cats in 10 years would be

- A 3.9 million
- B 39 million
- C 390 million
- D 3900 million

Cystic fibrosis

Dorothy has cystic fibrosis.

The pair of chromosomes below were taken from one of her cells.



9. Chromosomes are made up of smaller units which give us our characteristics. Z labels one of these units. Z is a
- A cell
 - B gene
 - C nucleus
 - D DNA molecule
10. Which part of the cell contains chromosomes?
- A cytoplasm
 - B cell membrane
 - C nucleus
 - D plasma
11. The Human Genome Project has located the gene which causes cystic fibrosis. Gene therapy can now be used to treat cystic fibrosis. What effect would this have on Dorothy's life?
- A There would be no risk of her children having cystic fibrosis
 - B The symptoms of her cystic fibrosis would be reduced
 - C She would be completely cured of cystic fibrosis
 - D She would no longer carry the cystic fibrosis gene
12. Cystic fibrosis is carried on an alternative form of a gene. An alternative form of a gene is
- A an allele
 - B a clone
 - C DNA
 - D a genome

Dolly the sheep

Dolly the sheep became a scientific sensation when her birth was announced in 1997. She was the first mammal to be successfully cloned. However, she only lived for six years.



13. Which photograph shows a clone of Dolly?



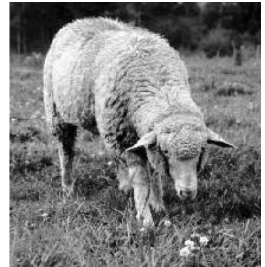
A



B



C



D

14. Some people had ethical concerns with the cloning of Dolly. This is because she had

- A a healthier life than normal
- B a shorter life than normal
- C different genes from her parents
- D the same genes as her parents

15. Cloning is a form of

- A sexual reproduction
- B asexual reproduction
- C selective breeding
- D evolution

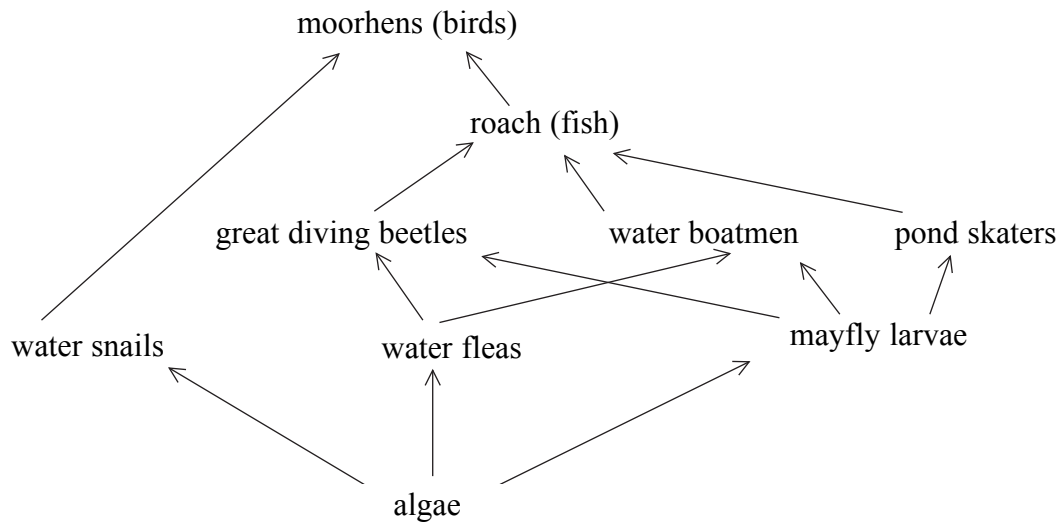
16. A strawberry plant sends out runners which form clones. The clones will contain

- A half the number of chromosomes as the parent plant
- B twice the number of chromosomes as the parent plant
- C the same number of chromosomes as the parent plant
- D half the number of alleles as the parent plant

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

Polluted pond

The diagram shows a food web in a pond.



17. The producer in this food web is the
- A moorhens
 - B roach
 - C sunlight
 - D algae
18. How many predators are shown in this food web?
- A one
 - B three
 - C five
 - D eight
19. The water fleas were killed by a chemical that polluted the pond. This resulted in more competition for food between the great diving beetles and the
- A water snails
 - B mayfly larvae
 - C water boatmen
 - D roach
20. The scientific name for water fleas is *Daphnia pulex*. This means that water fleas belong to the
- A genus *Daphnia pulex*
 - B genus *Daphnia* and species *pulex*
 - C species *Daphnia pulex*
 - D species *Daphnia* and genus *pulex*

Forensic Science

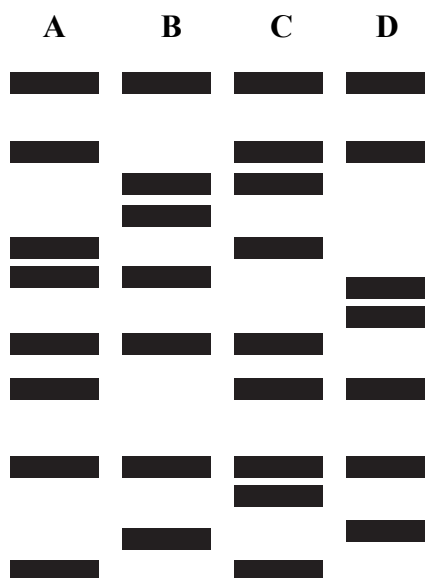
Police officers can gain information about criminals by collecting samples of blood from the crime scene. The information is analysed and compared with data they have on computer.

21. Where is DNA found in a blood sample?
- A plasma
 - B platelets
 - C red blood cells
 - D white blood cells
22. Forensic scientists cut the DNA into small pieces to produce a genetic fingerprint. What is used to cut the DNA?
- A acid
 - B enzymes
 - C hormones
 - D scissors
23. This is the genetic fingerprint of a bloodstain from a crime scene. Which suspect was at the crime scene?

genetic fingerprint
from crime scene



genetic fingerprints from suspects



24. Genetic fingerprinting could also be used to
- A identify genetic disorders in embryos
 - B cure genetic disorders in embryos
 - C modify stem cells in embryos
 - D produce designer babies

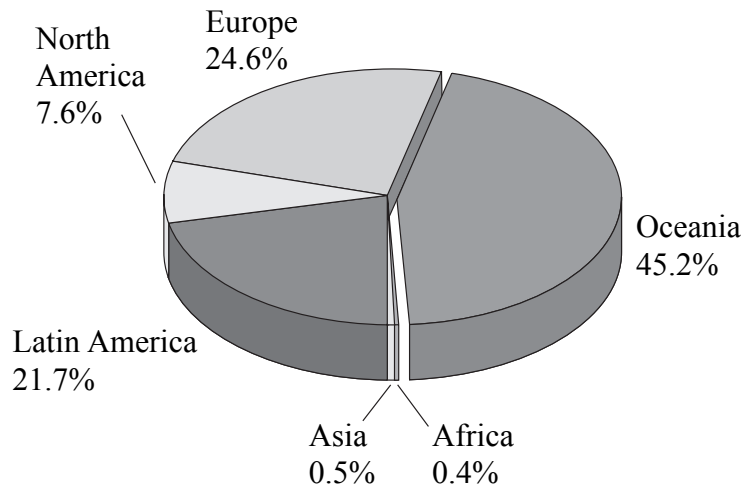
TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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.**

Organic farming

A student produced a pie chart. It shows the percentage of agricultural land used for organic farming in different parts of the world.



25. The student correctly stated that
- A Oceania uses more land than the rest of the world for organic farming
 - B Asia uses 10% more land than Africa for organic farming
 - C it is not possible to tell which part of the world produces the highest organic crop yield
 - D there is an increase in land use for organic farming in Europe
26. Some people prefer to buy organic food. This is because organic farming uses
- A chemical fertilisers only
 - B chemical pesticides only
 - C chemical fertilisers and chemical pesticides
 - D neither chemical fertilisers nor chemical pesticides
27. Food produced by organic farming is expensive because
- A crops grow too fast
 - B crops need more water
 - C crop yields are smaller
 - D crops need to be genetically modified
28. Organic farmers sometimes use natural predators to kill pests. This process is called
- A biological control
 - B crop control
 - C pest control
 - D predator control

The Origin of Species

In 1859 a book was published called *The Origin of Species*. The book explained how a process called natural selection could lead to the development of new species.

29. The book was written by

- A Darwin
- B Huxley
- C Mendel
- D Wallace

30. Some people did **not** believe what was written in the book. Which row of the table shows the beliefs of these people?

	believed in natural selection	believed in evolution
A	yes	yes
B	yes	no
C	no	yes
D	no	no

31. Natural selection in animals is a process over

- A a few generations which produces changes within the species
- B many generations which produces changes within the species
- C a few generations which produces no change within the species
- D many generations which produces no change within the species

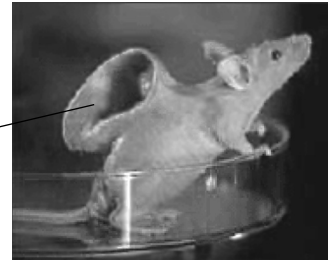
32. Organisms of the same species have been classified on the basis of their

- A structural similarities
- B structural differences
- C behavioural similarities
- D behavioural differences

Animal modifications

It is now possible to grow human organs on other animals, using stem cell technology.

human ear growing on back of mouse



33. There are concerns about the use of stem cells in this type of research. This is because stem cells
- A are collected from human embryos
 - B are always genetically modified
 - C always cause mutation
 - D are collected from mouse embryos
34. Cows can be modified to produce designer milk. Designer milk contains
- A low cholesterol and antibodies
 - B high cholesterol and antibodies
 - C low cholesterol and stem cells
 - D high cholesterol and stem cells
35. The cows producing this designer milk are known as
- A designer animals
 - B transgenic animals
 - C dominant animals
 - D recessive animals
36. These statements are about the production of designer milk
- 1 Human DNA is inserted into the cells that produce milk, using enzymes.
 - 2 Human DNA is cut out of human cells, using enzymes.
- Which are correct?
- A 1 only
 - B 2 only
 - C both 1 and 2
 - D neither

Dog breeds

A computer was used to model how changing the temperature of the environment affected the population size of different breeds of dog after 100 generations.

breed of dog	population size		
	at start	after 100 generations in colder environment	after 100 generations in hotter environment
Greyhound	2	0	1025
Bulldog	43	0	4596
Huskie	45	45 057	0
St Bernard	9	38	0

37. The data suggests that these different breeds of dog are well adapted to

- A hot environments only
- B cold environments only
- C either hot or cold environments
- D neither hot nor cold environments

38. The data suggests that

- A well adapted dogs become extinct
- B the population size of well adapted dogs decreases
- C the environment has an influence on survival
- D the environment has no influence on natural selection

39. Which row of the table most likely describes the characteristics of a St Bernard dog?

	amount of fur	body mass	surface area to volume ratio
A	lots	small	high
B	little	small	low
C	lots	large	low
D	little	large	high

40. Which row of the table shows accurate information about the use of computer models?

	results are always reliable	results can be obtained quickly
A	yes	yes
B	no	yes
C	yes	no
D	no	no

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END