Surname	Initial(s)
Signature	

Paper Reference(s)

5005 5025

Edexcel GCSE

Science (5005)

Biology (5025)

B1a – Topics 1 and 2

Foundation and Higher Tier

Thursday 22 November 2007 – Morning

Time: 20 minutes

Materials required for examination	**Items included with question papers**
Multiple Choice Answer Sheet HB pencil, eraser and calculator	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.

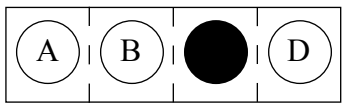
Foundation tier candidates: answer questions 1 – 24.
Higher tier candidates: answer questions 17 – 40.
All candidates are to answer questions 17 – 24.

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.

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Turn over

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

Chimpanzees

99.5% of genes in humans are identical to the genes in chimpanzees.

1. The classification system puts humans and chimpanzees into the order primates.
What class do they both belong to?

A amphibians
B mammals
C reptiles
D animals

2. Chimpanzees may all seem to look alike but there are small differences between individuals.
Scientists call these differences

A features
B alterations
C variations
D changes

3. What is the best way of classifying organisms?

A by their colour
B by when they are active
C by how big they grow
D by their structural features

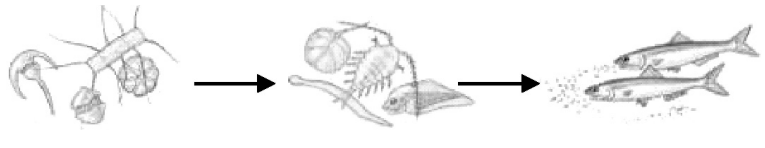
4. Chimpanzees, like most humans, eat both meat and plants.
Organisms that eat both meat and plants are called

A herbivores
B carnivores
C producers
D omnivores

Food chains in the sea

In the Mediterranean Sea some stocks of fish are running very low, caused by over-fishing by people.

Use this food chain to answer questions 5 to 8.



Phytoplankton → Zooplankton → Carnivore

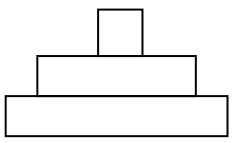
5. What effect would over-fishing have on this food chain?

A The numbers of fish will increase
B The numbers of zooplankton will increase
C The numbers of phytoplankton will increase
D There will be no effect on the food chain

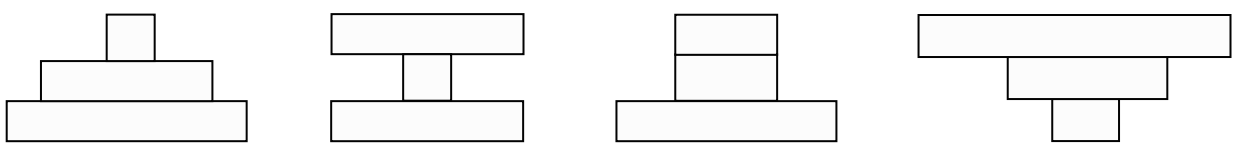
6. Phytoplankton are organisms that use sunlight to make food.
These organisms are known as

A consumers
B decomposers
C herbivores
D producers

7. The pyramid of numbers for this food chain looks like this.



Which is the pyramid of biomass for this food chain?



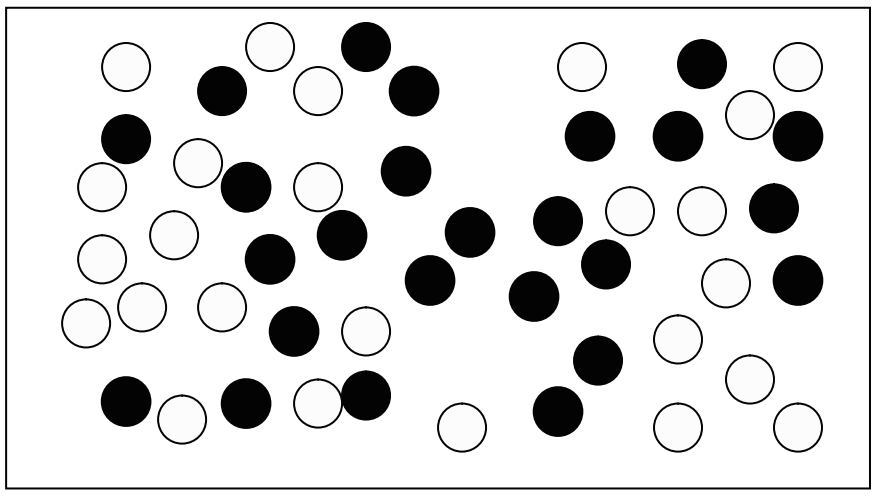
A **B** **C** **D**

8. At each level, energy is lost from the food chain.
Most of this energy is lost by

A growth and respiration
B respiration and excretion
C excretion and photosynthesis
D photosynthesis and growth

Modelling natural selection

In an experiment to model natural selection, John spread 25 white paper discs and 25 black paper discs on a table, as shown in the diagram. The surface of the table was white.



John picked up as many discs as possible, one at a time, in 30 seconds. He then counted how many white discs and how many black discs he had picked up. Three of his friends repeated the experiment using the same white and black discs.
The table shows their results.

student	number of white discs collected	number of black discs collected
John	12	16
Mary	10	12
Fred	12	14
Jane	7	7

9. What was the total number of discs needed for the experiment?

A 41
B 50
C 51
D 92

10. Which student had an anomalous result?

A John
B Mary
C Fred
D Jane

11. This experiment models natural selection because

A more white discs were selected
B more black discs were selected
C the same number of white and black discs were selected
D natural selection occurs quickly

12. Which is an example of natural selection?

A the cultivation of flowers with a particular colour
B putting DNA into bacteria
C the development of long necks in giraffes
D breeding cows that produce lots of milk

Human embryos

A single celled zygote divides to form a ball of cells called an embryo.

13. A zygote is produced by

A fertilisation
B variation
C mutation
D selection

14. All cells of this embryo contain

A identical DNA and identical chromosomes
B different DNA but identical chromosomes
C different DNA and different chromosomes
D identical DNA but different chromosomes

15. A cell from this embryo was analysed to see if it had the allele for cystic fibrosis.
This allele would be present because of

A the environment
B genetic engineering
C inheritance
D selective breeding

16. Some people object to removing cells from embryos for research.
They are most likely to be concerned about

A the cost of the research
B the ethics of using embryos
C the current laws of the country
D the use of technology

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.

Sheep

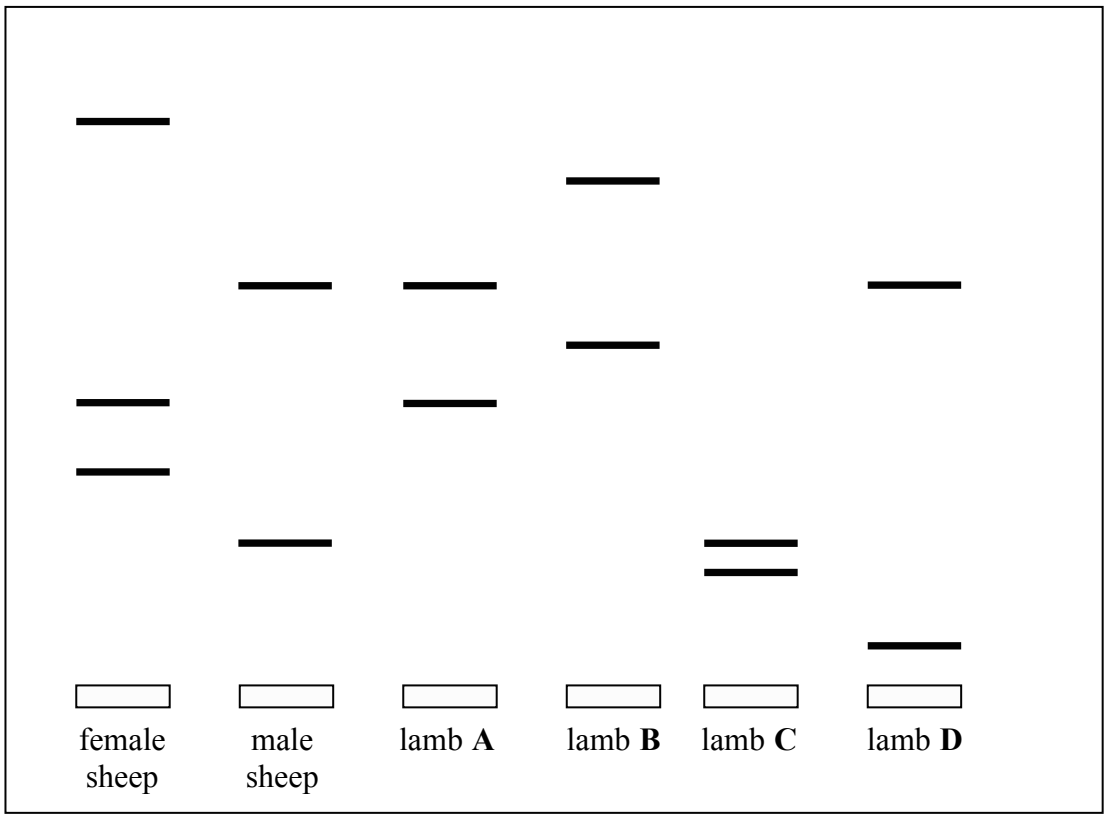
17. A sheep farmer selected two sheep for breeding.
Breeding two organisms together to produce offspring is

A asexual reproduction
B sexual reproduction
C cloning
D natural selection

18. The female sheep produced four lambs. One of the lambs looked very different from the others. The farmer asked for genetic fingerprints from each of the four lambs.
Genetic fingerprints will show the lambs' characteristics.
These are found on the

A gametes
B chromosomes
C alleles
D DNA

19. The diagram shows the genetic fingerprint of the two original sheep and the four lambs.
Which lamb is **not** related to the male sheep?



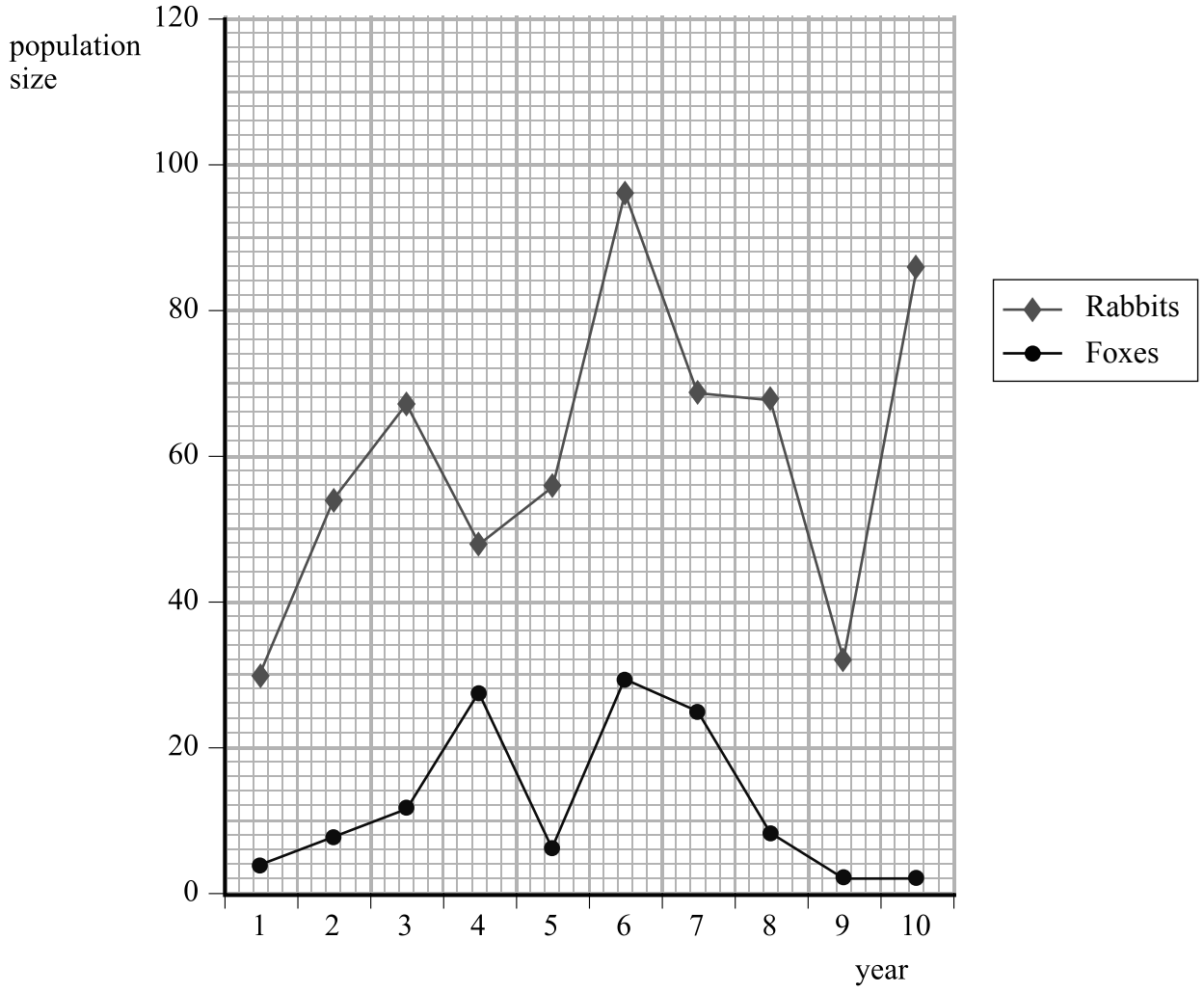
20. Which is **not** true?

A Genes are made from DNA
B Genes are made from chromosomes
C Genes are found in the nucleus
D Genes control cell activity

Population explosion

Rabbits are very enthusiastic when it comes to breeding.
A pair of rabbits can produce a colony of over 100 in just three years.
Foxes eat rabbits.
The graph shows how the rabbit and fox population changed over a period of several years.

Use the graph to answer the questions 21 to 24.



21. Which statement is correct about the relationship between rabbits and foxes?

A Rabbits are producers and foxes are consumers
B Rabbits are consumers and foxes are prey
C Foxes are consumers and rabbits are predators
D Foxes are predators and rabbits are prey

22. What was the highest number of rabbits during the 10 year cycle?

A 6
B 30
C 96
D 120

23. The size of the fox population is dependent on the size of the rabbit population. How does the graph show this relationship?

A As the rabbit population increases the fox population always increases
B The rabbit population is always higher than the fox population
C The fox and rabbit population show the same general trends
D The number of foxes decreases by more than the number of rabbits

24. Ermine are predators of rabbits. They are not predators or prey of foxes.
Several ermine escaped from a farm near to the rabbits' habitat.
What effect will the ermine have on the rabbit and fox population?

A Fox population will be unaffected but rabbit population will decrease
B Fox population will increase but rabbit population will decrease
C Fox population will decrease but rabbit population will increase
D Fox and rabbit populations will both decrease

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

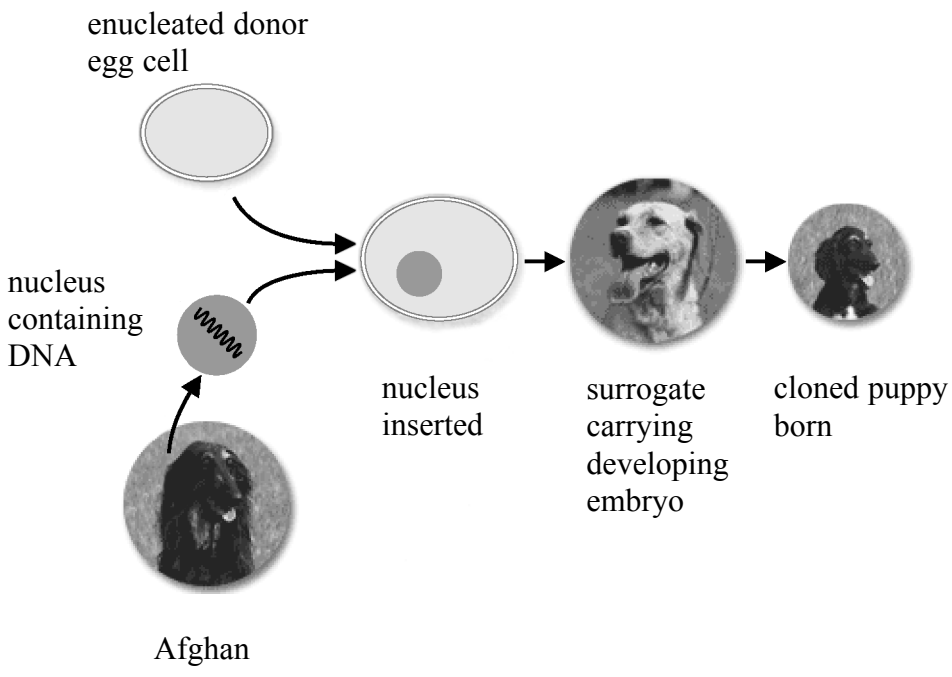
Foundation tier candidates do not answer any more questions after question 24.

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

Snuppy: the first cloned dog

Snuppy was the first dog to be cloned. He was cloned by a team of scientists in South Korea.

The diagram shows how Snuppy was cloned.



25. The nucleus used to make Snuppy was from

A the Afghan's sperm cell
B the puppy's stem cell
C the Afghan's skin cell
D the donor egg cell

26. Which statement is true?

A Snuppy is genetically identical to the Labrador
B Snuppy is genetically identical to the donor of the enucleated egg cell
C Snuppy is genetically identical to the Afghan
D Snuppy is not genetically identical to the Afghan or the Labrador

27. Many other animals have been successfully cloned but it is extremely difficult to clone dogs. The South Korean scientists transferred 1000 embryos into 123 surrogate mothers, which resulted in only three pregnancies. Snuppy was the only live birth.
The success rate of live births from the embryos was

A 0.1%
B 0.3%
C 12.3%
D 33.3%

28. These statements are about cloning.

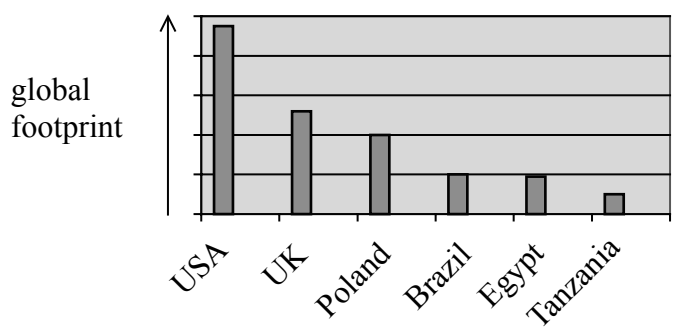
1 Cloning could help preserve endangered species
2 Cloning could help to produce better farm animals
3 Cloning could risk the lives of both mother and clone
4 Cloning might produce offspring with physical and mental problems

Which of these statements raise ethical concerns?

A 1 and 2
B 2 and 3
C 3 and 4
D 4 and 1

Global footprints

Global footprints allow people to compare the impact on Earth of lifestyles in different countries.
The country with the largest global footprint is the one which does most harm to the environment.
The bar chart shows the global footprints of six countries.



29. Which statement about the graph is true?

A Poland causes half the damage of the USA
B The UK causes twice the damage of Brazil
C Tanzania does no harm to the environment
D Poland and Brazil combined have less environmental impact than the USA

30. Which would have the largest negative impact on the environment?

A An industrial country using only renewable energy resources
B A developing country using only organic farming techniques
C An industrial country using mainly fossil fuels for energy
D A developing country using mainly renewable energy resources

31. World population increases are predicted using computer models.
Which statement about computer models is **not** true?

A Computer models can predict a variety of outcomes
B Computer models are always reliable
C Computer models are able to predict changes relatively quickly
D Computer models can be used when real data would be difficult to obtain

Feed the world

The Earth would be capable of sustaining the world human population if farmland was used to grow vegetable and cereal crops only.

32. Why can vegetable and cereal crops feed more people than farming cattle for beef?

A Cattle need more room than plants to grow
B Cattle need to use some energy to keep them warm
C Plants take more time to grow than cattle
D Plants can be genetically modified but cattle cannot

33. Crops can be genetically modified to contain vitamins.
A concern about this is that GM crops

A need special conditions in which to grow
B will be more easily destroyed by insect pests
C may have a detrimental effect on the food chain
D have no benefit to humans or animals

34. The following two statements are about genetically modified crops

1 Genetically modified crops are produced using the process of natural selection.
2 Selective breeding of crop plants has the same effect as genetically modifying crop plants.

Which of the statements are true?

A 1 only
B 2 only
C both 1 and 2
D neither 1 nor 2

35. The offspring of plants produced by genetic modification are clones if the offspring are:

A produced by sexual reproduction
B modified by natural selection
C produced organically
D replicated using asexual reproduction

Cystic fibrosis (CF)

Cystic fibrosis (CF) is a genetic disorder that affects approximately one in 2000 people in Britain. People with CF can be treated genetically to help reduce the symptoms.

36. Genetic treatment of people with CF would help

A decrease lung infections
B decrease risk of lung cancer
C increase the need for physiotherapy
D increase the use of antibiotics

37. Genetic treatment involves spraying droplets containing DNA into the lungs. Which row of the table shows what the scientists should do to find out if the treatment is reliable?

	DNA sprayed into lungs of	**water sprayed into lungs of**
A	one person with CF	one person with CF
B	one person with CF	one person without CF
C	500 people with CF	500 people without CF
D	500 people with CF	500 people with CF

38. The treatment only relieves the symptoms for a few weeks.
This is because

A lung cells destroy DNA
B lung cells are always being replaced
C the liposome vectors dissolve
D physiotherapy fails to work

Use this information to answer questions 39 and 40.

CF is caused by recessive alleles.

39. The table shows the phenotype of 400 children born from parents who were both heterozygous.

number of children without CF	number of children with CF
300	100

How many of the 400 children would you expect to be heterozygous?

A 100
B 200
C 300
D 400

40. The table shows the number of alleles for CF that are present in different sets of parents. Which row of the table shows the parents whose child would definitely **not** have CF?

	mother number of dominant alleles	father number of recessive alleles
A	2	0
B	0	2
C	1	1
D	0	1

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END