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 24 June 2010 – Afternoon

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.

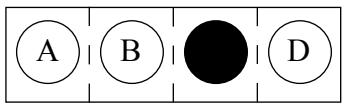
Foundation tier candidates: answer questions 1 – 24.
Higher tier candidates: answer questions 17 – 40.
All candidates are to answer questions 17 – 24.

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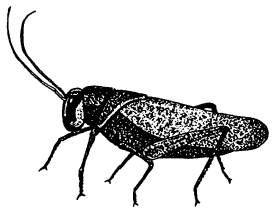
Questions 1 to 16 must be answered by Foundation tier candidates only.
Higher tier candidates start at question 17.

Crickets

A cricket is a small insect which makes a chirping noise.
The more a cricket eats, the faster it makes the chirping noise.
The faster a male cricket makes the chirping noise, the more attractive he is to females.



1. Crickets are not vertebrates.
This is because they do **not** have

A a heart
B a backbone
C lungs
D scales

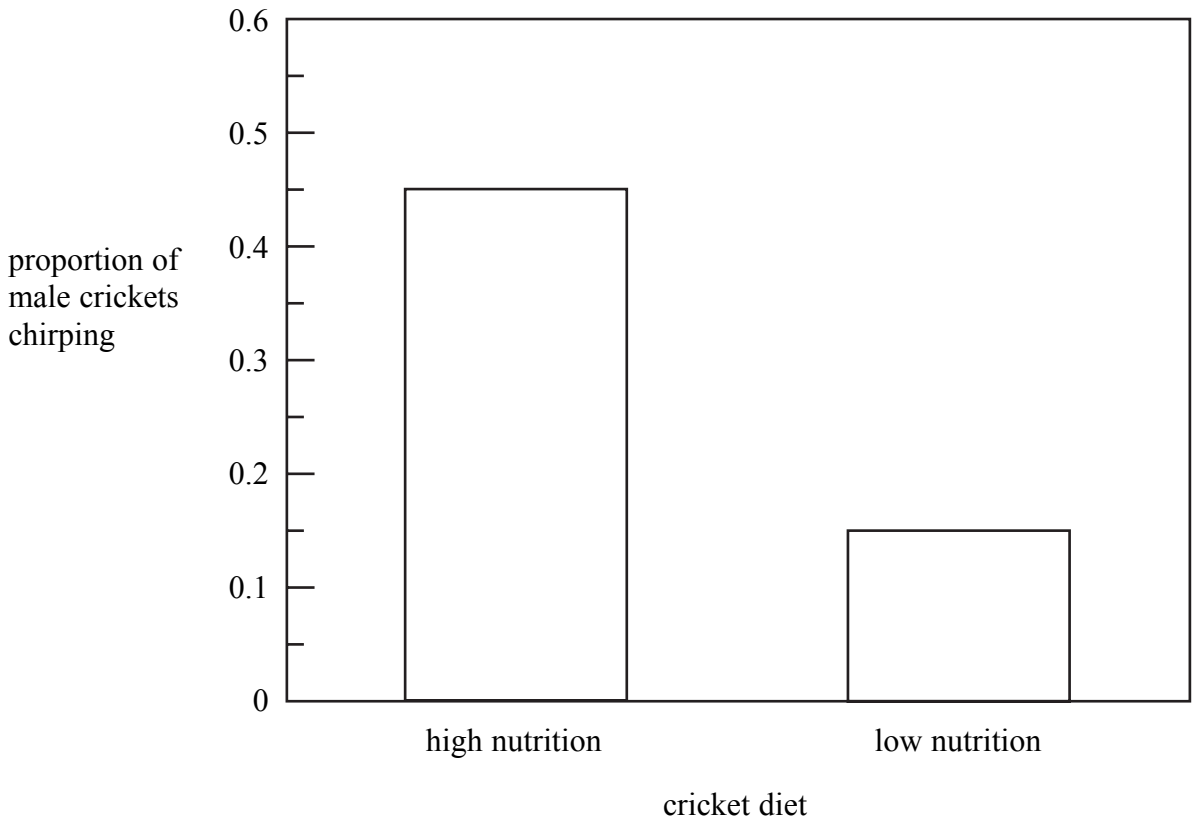
2. The effect of eating more food on a cricket's ability to make chirping noises is

A an environmental influence only
B a genetic influence only
C both environmental and genetic influences
D neither environmental nor genetic influences

3. Male crickets compete with each other to attract female crickets.
This is an example of

A adaptation
B interdependence
C intra-species competition
D selective breeding

The bar chart shows the results of an investigation into how diet affects cricket chirping.



4. What conclusion can you make based only on the information in the bar chart?

A twice as many crickets chirped when on a high nutrition diet
B three times more crickets chirped when on a low nutrition diet
C three times more crickets chirped when on a high nutrition diet
D twice as many crickets chirped when on a low nutrition diet

Hummingbirds are faster than fighter jets

Hummingbirds are the fastest animals on Earth relative to their body size.

5. Flying fast helps hummingbirds to compete successfully within their environment.
This is an example of

A genetic modification
B natural selection
C classification
D extinction

6. Hummingbirds feed on the nectar from flowers.
The predators of hummingbirds are hawks, frogs and spiders.
Which of these food chains is correct?

A hummingbird → frog → spider
B flower → hummingbird → hawk
C flower → frog → hummingbird
D hawk → hummingbird → flower

7. In one area, the number of spiders and hawks increased.
What effect would this have on the food chain?

A the number of hummingbirds would increase
B the number of frogs would increase
C the number of hummingbirds would decrease
D there would be no effect on the food chain

8. Some hummingbirds have a long pointed beak which they put into flowers to help them suck up nectar.
This beak shape is an example of

A competition
B adaptation
C selective breeding
D predation

Chromosome numbers

Use the table to help you answer questions 9 and 10.

The table shows information about four mammals.

common name	biological name	diploid chromosome number
Buffalo	*Bison bison*	60
Domestic cat	*Felis catus*	38
European cattle	*Bos taurus*	60
Dog	*Canis familiaris*	78

9. Which one of the following is a correct conclusion based on this data?

A The smaller the mammal the smaller the diploid chromosome number
B The cat's diploid chromosome number is half that of the dog
C Buffalo and cattle are identical species
D The diploid chromosome number does not affect the size of the mammal

10. The haploid chromosome number is half the diploid chromosome number.
What is the haploid chromosome number of the dog?

A 38
B 39
C 78
D 156

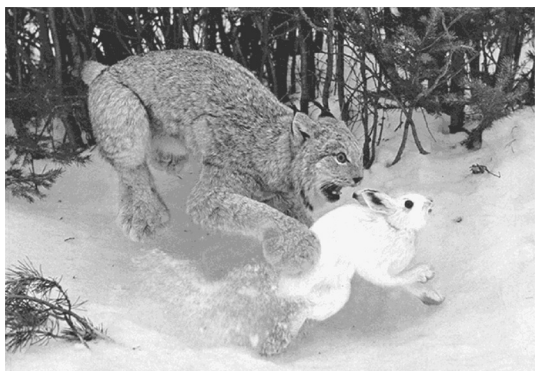
11. Chromosomes are most commonly found in the

A cytoplasm
B cell membrane
C nucleus
D cell wall

12. Chromosomes contain

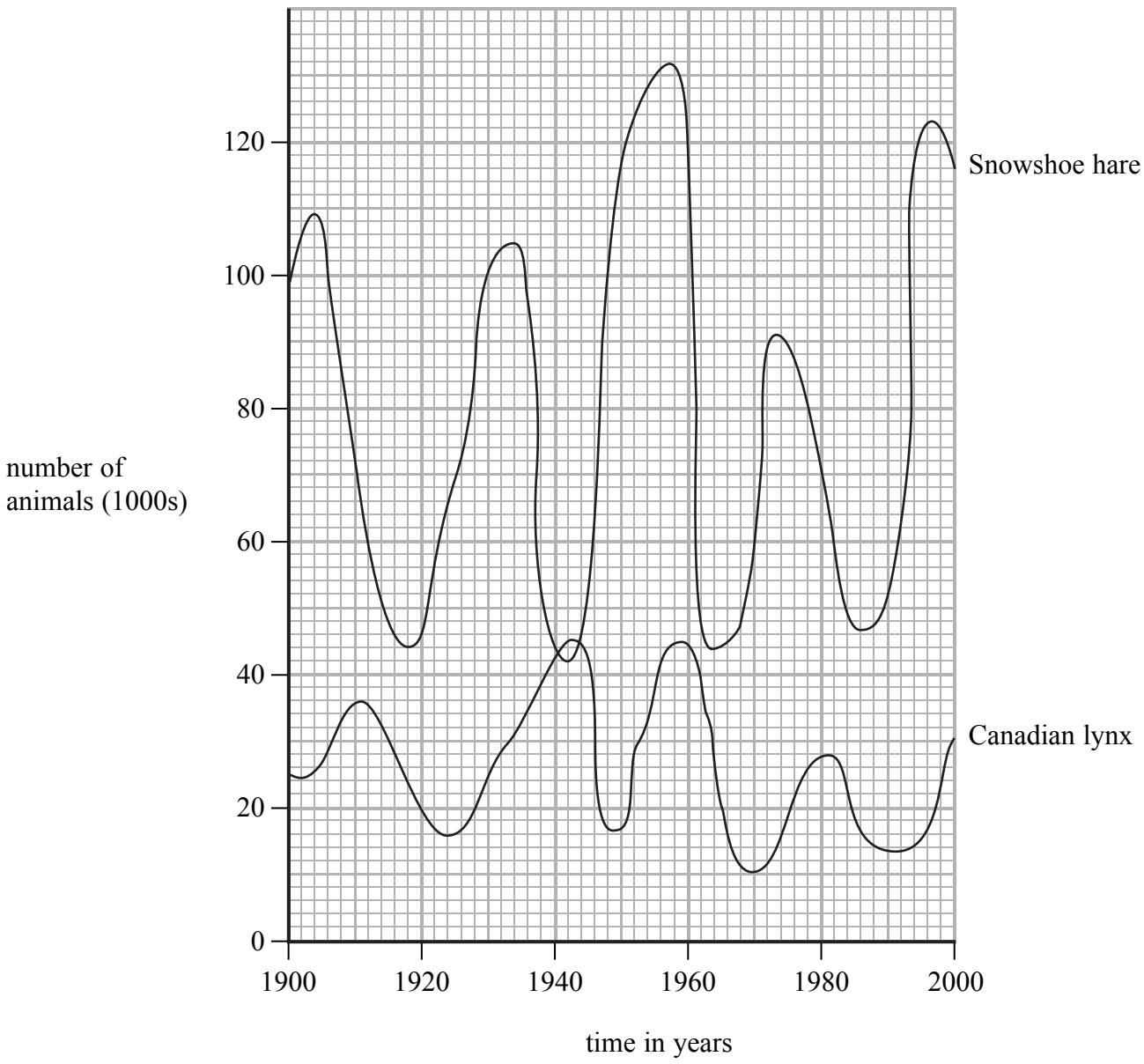
A DNA
B gametes
C cells
D cytoplasm

Compete or die



Use the graph to help you answer questions 13 and 14.

This is an example of a predator-prey graph for the Canadian lynx and Snowshoe hare.



13. Based on the information in the graph, which statement is correct?

A the predators always outnumber the prey
B the prey always outnumber the predators
C the pattern for predator numbers peaks after prey numbers
D the pattern for prey numbers is identical to predator numbers

14. If a disease caused the Snowshoe hares to die out then the number of Canadian lynx would be most likely to

A decrease as they have a reduced food supply
B decrease as they have an increased food supply
C increase as they have no food supply
D increase as they have an increased food supply

15. The survival and future natural selection of the Canadian lynx depend on

A the Canadian lynx surviving long enough to become extinct
B the Canadian lynx surviving long enough to successfully reproduce
C the Snowshoe hare becoming extinct
D the Snowshoe hare adapting to a changing environment

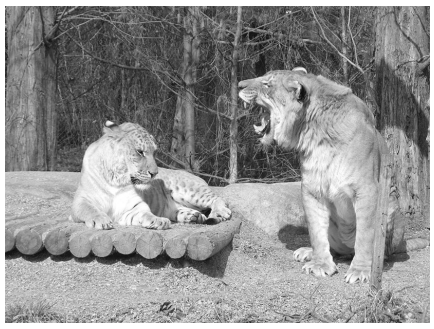
16. Fossilised remains of ancestors of the lynx have been found in Canada. These fossils are

A the decayed bones and flesh of animals
B whole animals preserved in ice
C cave paintings of extinct animals
D the mineralised remains of the hard parts of animals

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.

Hybrids

An example of a hybrid is the liger.
A liger is a cross between a male lion (*Panthera leo)* and a female tiger (*Panthera tigris)*.



17. Both lions and tigers belong to the phylum

A Animalia
B Reptilia
C Chordata
D Mammalia

18. Which row of the table shows the genus and species of the lion?

	genus	**species**
A	*Panthera*	*leo*
B	*Panthera*	*tigris*
C	*leo*	*Panthera*
D	*tigris*	*Panthera*

19. Ligers appear to look alike, but there are small differences between individuals.
Scientists refer to these differences as

A features
B alterations
C variations
D changes

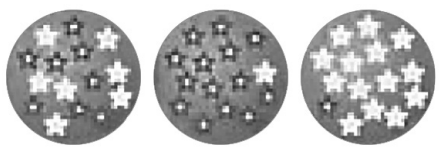
20. Ligers are not able to reproduce with other ligers.
Lions and tigers can reproduce by

A asexual reproduction involving cloning
B sexual reproduction involving cloning
C asexual reproduction involving fertilisation
D sexual reproduction involving fertilisation

Daisyworld – The Gaia hypothesis

A scientist named James Lovelock developed a computer program to model the effect of different coloured daisies on the temperature of a planet.
In the model, when the planet was covered in black daisies, the planet got hotter.
In the model, when the planet was covered in white daisies, the planet got cooler.

These are some images from the computer program.



21. Why was a computer used to model this rather than carrying out the experiment?

A it would be quicker to obtain experimental data
B experimental data is always unreliable
C results could be obtained faster using a computer
D computers produce more accurate and reliable results

22. On the model of Daisyworld, when the temperature gets too high, the black daisies start to die off and are not able to reproduce.
The white daisies increase in number and are able to reproduce more successfully.
This is an example of

A predation
B selective breeding
C evolution
D survival of the fittest

23. Black daisies have the genotype **Bb** or **BB** and white daisies have the genotype **bb**.
White daisies are

A homozygous dominant
B homozygous recessive
C heterozygous dominant
D heterozygous recessive

24. A cross between black daisies with the genotype **Bb** and white daisies with the genotype **bb** would result in

A 100% black daisies
B 25% black daises and 75% white daisies
C 50% black daisies and 50% white daisies
D 75% black daisies and 25% white daisies

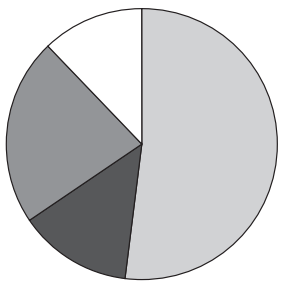
TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

25. The pie chart shows the number of farms growing only organic crops in Canada during 2001.



Key

crop	number
field crops	1442
fruit and vegetables	614
livestock or animal-based products	381
other	340

Using information in the chart, which statement is correct?

A More farms in Canada grew organic crops in 2001 than in 2000
B More land was used to grow organic field crops than any other crops
C The number of organic farms in Canada in 2001 was 2777
D Less organic fruit and vegetables were grown than any other crops

26. Which row of the table only shows organic farming methods?

	crop rotation	**GM crops**	**biological control**
A	yes	no	yes
B	yes	no	no
C	no	yes	yes
D	no	yes	no

27. Organically grown crops are more expensive to buy.
What is a reason for this?

A the increased use of pesticide is expensive
B the development of GM food is expensive
C the yields of organic crops are often lower
D organic foods always contain a higher nutrient content

28. GM crops can be developed to contain higher levels of vitamin B.
The gene for the production of vitamin B in the GM crop is inserted by using

A hormones
B enzymes
C gametes
D clones

Huntington's disease

Huntington's disease is caused by a dominant allele on chromosome 4.

29. What is an allele?

A an alternative chromosome
B a broken DNA strand
C an alternative form of the same gene
D a disease causing gene

30. Which row of the table shows the number of chromosomes in a human body cell and in a human gamete?

	number of chromosomes in a human body cell	**number of chromosomes in a human gamete**
A	23	23
B	46	46
C	23	46
D	46	23

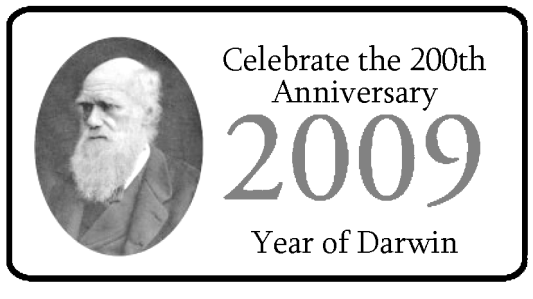
31. Greg's father has one dominant allele for Huntington's disease but his mother has none. What is the percentage chance that Greg will have the allele for this disease?

A 25%
B 50%
C 75%
D 100%

32. Our knowledge of the location of each allele on each chromosome is as a result of

A the human DNA project
B the human chromosome project
C the human genome project
D the human allele project

The theory of evolution



33. 2009 was the 200th anniversary of the birth of the naturalist Charles Darwin.
Darwin set out in his book the fundamental principles that are now accepted as the theory of evolution.

Which of these statements made it difficult for Charles Darwin to get his theory of evolution accepted by the scientific community?

1 the theory of evolution was based on collected evidence and theoretical knowledge
2 species such as the finches on the Galapagos Islands provided evidence for the theory
3 the theory of evolution was at odds with the current religious thinking of the day

A 3 only
B 1 and 3 only
C 2 and 3 only
D 1, 2 and 3

34. Which of these three statements about natural selection are true?

1 survival of the fittest is dependent on successful reproduction
2 successful changes in a species can be due to mutations which make the species less well adapted to its environment
3 in an unchanging environment, well-adapted species will become extinct

A 1 only
B 1 and 2 only
C 1 and 3 only
D 1, 2 and 3

35. Which row of the table is correct for a mutation in a species?

	mutations are always harmful	**mutations can be a change in a gene**
A	yes	yes
B	yes	no
C	no	yes
D	no	no

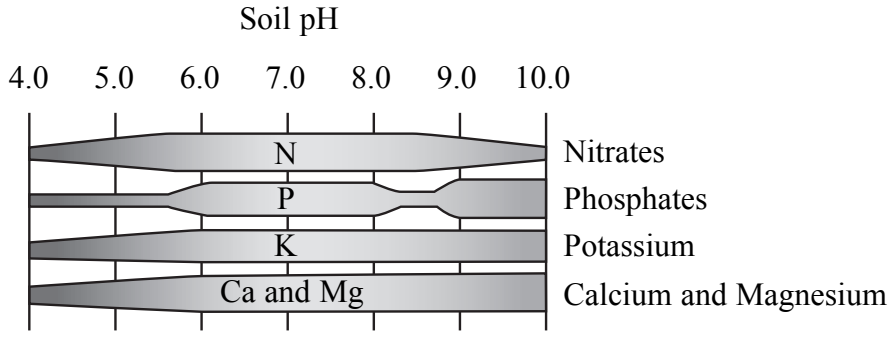
36. Scientists can now modify the DNA of a cow to carry human genes and produce new, useful products in their milk.
These animals are

A designer offspring that produce cloned offspring
B designer offspring that produce human antibodies
C transgenic organisms that produce cloned offspring
D transgenic organisms that produce human antibodies

The importance of minerals in plant growth

Use the information in the diagram to help you answer questions 37 and 38.

This diagram shows the effects of pH on the mineral concentrations in soil.
The thicker the line, the higher the concentration of mineral in the soil.



A low pH indicates more acidic soil and a high pH indicates more alkaline soil.
pH 7.0 is neutral.

37. Which minerals are **most** limited in both strong acid and strong alkali conditions?

A nitrates
B phosphates
C potassium
D calcium and magnesium

38. Which pH range would give the highest total concentration of minerals?

A pH 4 – pH 5
B pH 5 – pH 6
C pH 7 – pH 8
D pH 9 – pH 10

39. Plants need minerals for different purposes.
Which mineral is most needed for chlorophyll production?

A nitrate
B phosphate
C potassium
D magnesium

40. Plants can be genetically modified to produce their own minerals.
Which of these three statements about the genetic modification of plants are true?

1 plant DNA is cut using enzymes and linked back together using hormones
2 genetically modified plants may have an adverse effect on the environment due to cross fertilisation with other species
3 plants can be genetically modified to be resistant to weedkiller

A 1 and 2 only
B 1 and 3 only
C 2 and 3 only
D 1, 2 and 3

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

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