

Surname	Initial(s)
Signature	

Paper Reference(s)

5005 5025

Edexcel GCSE

Science (5005)

Biology (5025)

B1a – Topics 1 and 2

Foundation and Higher Tier

Wednesday 5 March 2008 – 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.

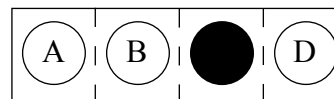
Before the test begins:

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.

Printer's Log. No.

H32986A



W850/R1536/57570 6/6/3/2/3/1

This publication may be reproduced only in accordance with Edexcel Limited copyright policy. ©2008 Edexcel Limited.

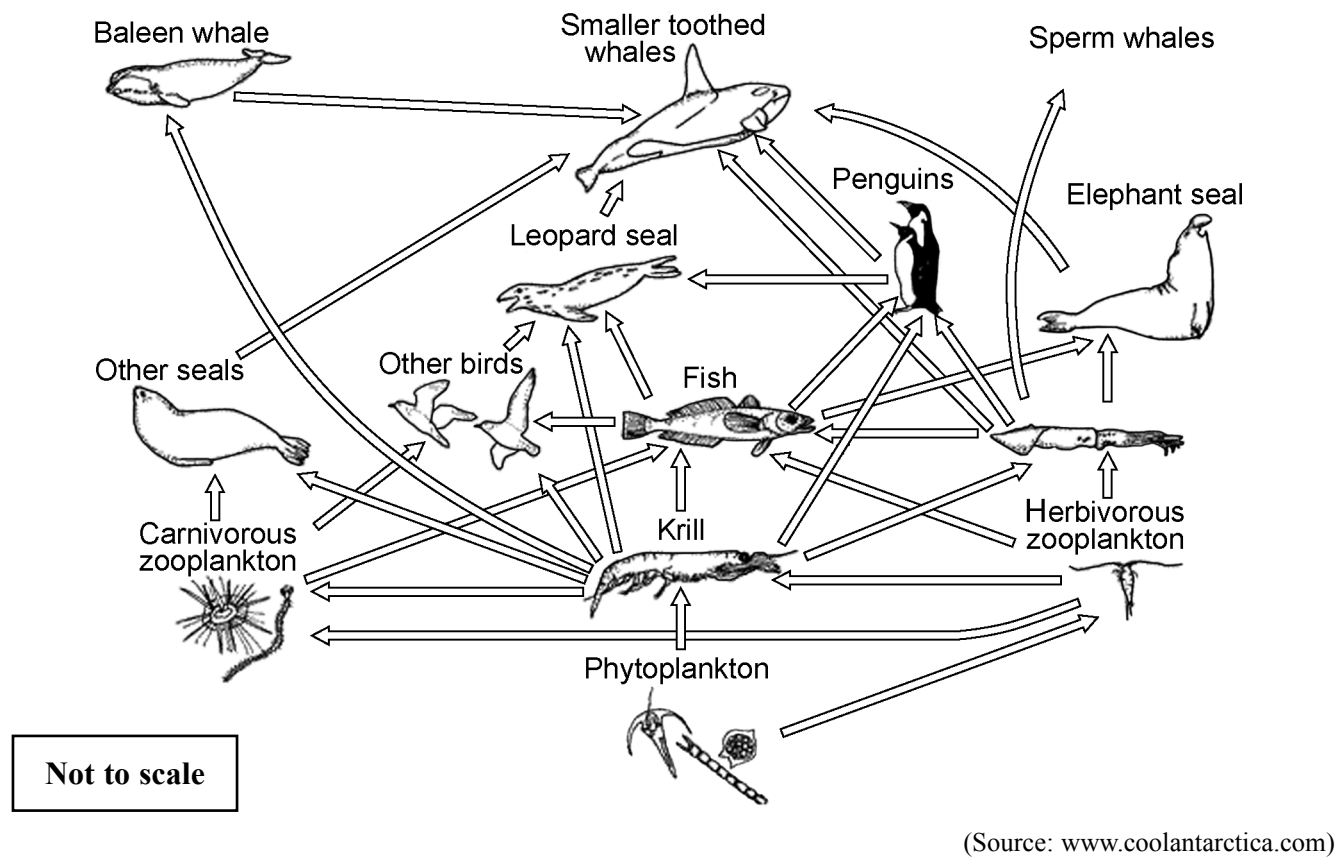
Turn over

edexcel 
advancing learning, changing lives

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

Antarctica

The food web shows the relationships between different species in the Antarctic.



1. In this food web, what is the food of the Baleen whale?

- A Krill
- B Penguins
- C Seals
- D Smaller toothed whales






2. Name the producer in this food web

- A Fish
- B Phytoplankton
- C Smaller toothed whales
- D Zooplankton

3. In this food web how many organisms are herbivores only?
- A 1
B 2
C 3
D 4
4. Scientists are using computer models to study the effect of rising world temperature on the Antarctic environment.
Why are computer models used in this study?
- A Results can be seen very quickly
B Computer models are always accurate
C Conditions cannot always be modelled effectively
D Computer models stop future events from occurring

The evolution of the horse

These pictures show how the horse (including the bones in its lower leg) has evolved over the past 60 million years.

60 million years ago	40 million years ago	30 million years ago	10 million years ago	1 million years ago
 <p>Eohippus Height: 0.4 m</p>	 <p>Mesohippus Height: 0.6 m</p>	 <p>Merychippus Height: 1.0 m</p>	 <p>Pliohippus Height: 1.0 m</p>	 <p>modern horse Height: 1.8 m</p>

5. What have been the main changes in the horse over time?
- A The horse has decreased in size and the number of its toes has increased
B The horse has decreased in size and the number of its toes has decreased
C The horse has increased in size and the number of its toes has decreased
D The horse has increased in size and the number of its toes has increased
6. Scientists collect evidence to help them explain how organisms change over time.
This evidence comes from
- A photographs
B fossils
C experiments
D computer simulations

7. Horses have adapted to changes in the environment so that only the best adapted horse survived.
What is the name of this process?

A natural selection
B selective breeding
C genetic engineering
D cloning

8. As the environment changes some types of horse will become **less** well adapted.
These types of horse are likely to

A increase in number
B reproduce asexually
C reproduce more often
D become extinct

The hydra



The hydra is an organism that reproduces by developing a bud. This bud breaks off and lives an independent life as a new hydra.
The new hydra is genetically identical to its parent.

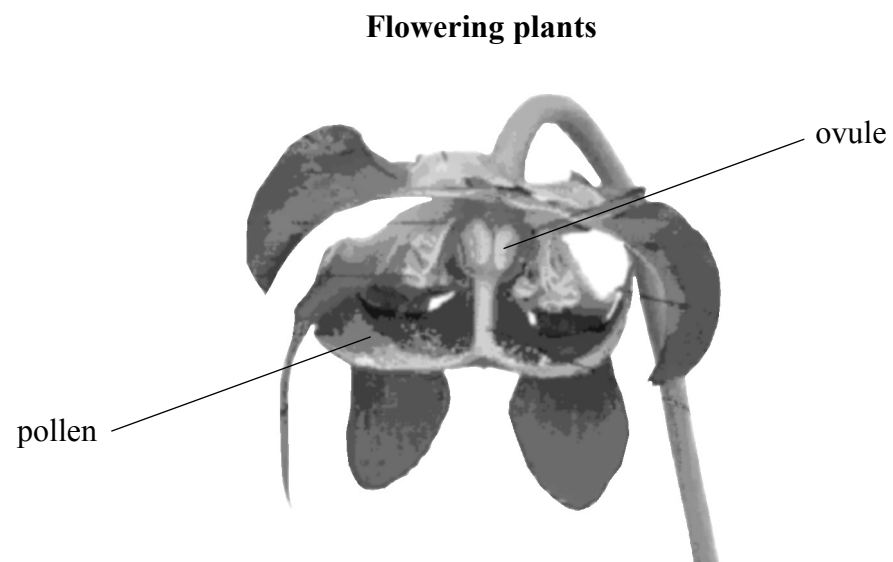
9. The name for this type of reproduction is

A sexual reproduction
B selective breeding
C *in vitro* fertilisation
D cloning

10. Which species also produce offspring genetically identical to the parent?

A spider plants (*Chlorophyta*)
B sheep (*Ovis*)
C humans (*Homo sapiens*)
D fish (*Rutilus rutilus*)

11. The genes of the hydra are found on chromosomes in the
- A cell membrane
 - B cytoplasm
 - C nucleus
 - D chloroplasts
12. Genes carry instructions for the characteristics of the hydra. What is a gene?
- A an alternative form of an allele
 - B a unit of inheritance
 - C a complete DNA molecule
 - D an energy giving molecule



The pollen of a flower contains the male sex cell. The ovule contains the female sex cell. Both are needed to produce offspring.

13. What is the name given to the joining of the male and female sex cell?
- A modification
 - B implantation
 - C ovulation
 - D fertilisation
14. In sexual reproduction the offspring inherit chromosomes
- A in equal numbers from the male ovule and the female pollen
 - B in equal numbers from the male pollen and the female ovule
 - C from the ovule only
 - D from the pollen only

15. The chromosomes are made from

- A HGP
- B DNA
- C cells
- D nuclei

16. What is the male sex cell in animals called?

- A embryo
- B ovum
- C sperm
- D zygote

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.

The great bird watch

The table shows the average number of birds counted in English gardens during January 2006.

rank order	species	average number per garden
1	house sparrow	4.31
2	starling	3.59
3	blackbird	3.03
4	blue tit	2.67
5	chaffinch	1.90
6	woodpigeon	1.63
7	greenfinch	1.61
8	collared dove	1.60
9	great tit	1.37
10	robin	1.33

17. Based on the results of the survey, which bird is most likely to be seen in a garden in England?
- A** robin
B house sparrow
C starling
D great tit
18. To complete the survey 500 000 people observed the birds in their garden for one hour on either 27th or 28th January.
What was the total number of collared doves observed in this survey?
- A** 160 000
B 500 000
C 660 000
D 800 000

19. The average number of house sparrows per garden has dropped from 10.00 in 1979 to 4.31 in 2006.
What is the most likely cause for this decrease?
- A more people feeding garden birds
 - B an increase in the number of nesting sites
 - C more competition for resources
 - D less competition for resources
20. Birds all belong to the class Aves. They are warm blooded with wings, feathers and hollow bones.
What phylum do they belong to?
- A Animalia
 - B Arthropoda
 - C Chordata
 - D Mollusca

World pollution

city	population in millions	sulphur dioxide levels (mg m ³)	nitrogen dioxide levels (mg m ³)
Athens	3.1	34	64
Beijing	11.3	90	122
Bombay	15.1	33	39
Dublin	0.9	20	24
London	7.6	25	77
Mexico City	16.6	74	66
New York	16.3	26	42
Sydney	3.6	28	30

The table shows the population of various cities around the world and the levels of two types of pollution in these cities. The recommended maximum level of both sulphur dioxide and nitrogen dioxide in the air is 50 mg m³

21. How many cities exceed the recommended levels for both pollutants?
- A 1
 - B 2
 - C 3
 - D 4

22. Based on the evidence in the table, which statement is true?
- A The larger the population, the greater the levels of nitrogen dioxide
 - B The larger the population, the greater the levels of sulphur dioxide
 - C The larger the population, the greater the levels of both pollutants
 - D There is no correlation between population and the levels of both pollutants
23. The main source of nitrogen dioxide pollution is from vehicle exhausts. Which city is likely to use the most vehicles?
- A Beijing
 - B London
 - C Mexico City
 - D New York
24. Nitrogen dioxide levels are measured using diffusion tubes. These tubes may be inaccurate and give readings up to 30% too high. To allow for this 30% inaccuracy, what should the recommended maximum level for nitrogen dioxide be adjusted to?
- A 15 mg m³
 - B 35 mg m³
 - C 50 mg m³
 - D 65 mg m³

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.**

Genetically modified (GM) maize

Despite having consumed GM maize in their cookies and apple pies for a decade, most Americans still do not know they are routinely eating GM food. A poll of 1000 Americans published on 6th December 2006 revealed that 60% had no idea what was in the food that they were eating, whereas 25% knew that they were eating GM foods. The remainder had some idea of what was in their food but not that it was genetically modified.

(Source: *New Scientist*, Dec 2006)

25. What percentage of Americans are aware of what is in their diet but do not realise it is genetically modified?

- A 15%
- B 25%
- C 60%
- D 85%

26. These three statements are about GM food.

- 1 Most Americans are unaware of the contents of the food they eat
- 2 Most Americans have a good understanding of how GM foods are produced
- 3 Most Americans object to GM foods

Using information only from the article above, which statement(s) are true.

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

27. To genetically modify crops, the desired gene is removed from a selected plant and inserted into the DNA of the crop plant.
Which row of the table is correct for this process?

	gene is removed from a plant using	gene is inserted into a crop plant using
A	enzymes	enzymes
B	enzymes	hormones
C	hormones	hormones
D	hormones	enzymes

28. Which one of the following is **not** a reason to genetically modify crops?
- A to extend shelf life
 - B to increase crop yield
 - C to improve resistance to pests
 - D to speed up natural selection

Gene therapy for breast cancer

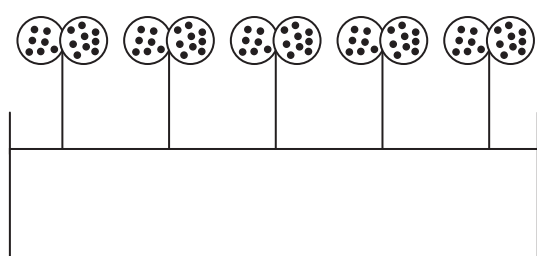
Scientists have isolated a mini-gene (a fragment of a virus which is genetically modified). This mini-gene may be very successful in stopping the spread of cancer. The mini-gene interferes with the ability of the cancer cells to move about the body, so it stops the cancer spreading from one area to another.

29. What is the most likely benefit to a cancer sufferer of this type of treatment?
- A The cancer would be cured
 - B The cancer would be stopped from forming initially
 - C The cancer sufferer would be less likely to get secondary cancers
 - D The cancer would be reduced in size.
30. The mini-gene is a new breakthrough in the treatment of cancer and is currently being trialled.
What would be the best way to carry out a trial on this treatment?
- A Test 100 cancer patients only
 - B Test 100 cancer patients and 10 non-cancer patients
 - C Test 10 cancer patients and 100 non-cancer patients
 - D Test on 100 cancer patients and 100 non-cancer patients
31. This new treatment has been made possible because of the human genome project.
What was the aim of the human genome project?
- A To find cures for all genetic diseases
 - B To locate and identify all human genes
 - C To find cures for cancer in humans
 - D To obtain the genetic fingerprint of all criminals
32. Which is **not** a use of the human genome project?
- A genetic fingerprinting
 - B research into genetic diseases
 - C cloning of 'Dolly' the sheep
 - D identification of genetic diseases in embryos

Minerals and plants

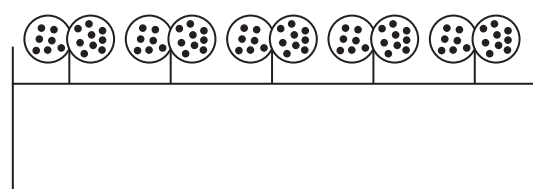
A scientist wanted to find the effect of phosphate and nitrate fertilisers on plants. She took 20 cuttings from a single plant and grew them in trays in a greenhouse with plenty of sunlight and water.

33. Which diagram shows the control for this experiment?



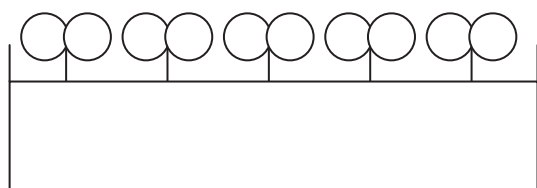
with nitrate fertiliser only

A



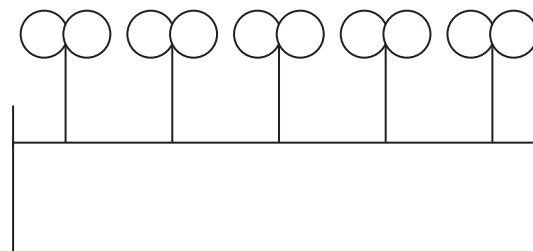
no phosphate or nitrate fertiliser

B



with phosphate fertiliser only

C



with nitrate and phosphate fertiliser

D

34. What effect did the lack of nitrate fertiliser have on the plants?

- A** stunted growth only
- B** tall growth and speckled appearance
- C** stunted growth and speckled appearance
- D** speckled appearance only

35. The variation in these plants is due to

- A** inheritance only
- B** environment only
- C** inheritance and environment
- D** neither inheritance nor environment

36. The plant is a tall variety which contains the alleles GG. A dwarf variety of plant contains the alleles gg.
If the tall plant is crossed with the dwarf plant what is the percentage chance that the offspring will be a dwarf variety?
- A 0%
 - B 25%
 - C 50%
 - D 100%

IVF discount for women giving eggs for research

New rules allow women to donate their eggs for stem cell research in exchange for a discount on the cost of their own fertility treatment. Scientists use the eggs to create cloned embryos from which they then extract the stem cells. Stem cells can become any of 200 cell types such as nerve cells or bone cells.

37. In the past it was not considered acceptable to produce embryos for the production of stem cells. Now this is acceptable practice.
What is the most likely reason for this change in practice?
- A Women no longer need their eggs for IVF treatment
 - B Society can now see more benefits than drawbacks to treatments using stem cells
 - C Stem cell research is now accepted practice throughout the world
 - D Treatment for infertility is more expensive now
38. More work on stem cells may enable people to produce designer babies.
What are designer babies?
- A babies who are always free from disease and disability
 - B babies who have been genetically modified to produced desired characteristics
 - C babies who have been produced by IVF using donor eggs
 - D babies who do not inherit any characteristics from either genetic parent
39. Two parents are both heterozygous for eye colour.
If the allele for brown eyes is dominant to the allele for blue eyes what is the percentage chance that their children would have blue eyes?
- A 25%
 - B 50%
 - C 75%
 - D 100%

40. The two statements are about genetic modification and designer babies.

- 1 Designer babies can be created without using IVF.
- 2 Genetic modification may help to alleviate the symptoms of certain diseases such as cystic fibrosis.

Which are true?

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

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END

BLANK PAGE

BLANK PAGE

