

Surname	Initial(s)
Signature	

Paper Reference(s)

5015 5027

Edexcel GCSE

Additional Science (5015)

Biology (5027)

B2 – Topics 1 to 4

Foundation and Higher Tier

Wednesday 4 March 2009 – 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.

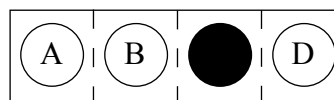
Before the test begins:

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.

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

The polar bear



Polar bears have long claws, thick fur and sharp teeth.
They can live in the harsh Arctic environment.

1. What name is given to features that allow the polar bear to live in the Arctic?

- A predations
- B organisms
- C adaptations
- D indicators

2. Polar bears catch and kill fish for food.
What name is given to an animal that feeds in this way?

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

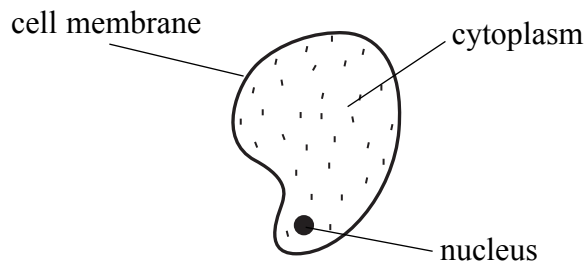
3. The ice caps where the polar bears live are melting.
The most likely cause of this is

- A conservation
- B reforestation
- C global warming
- D acid rain

4. The ice caps are getting smaller.
This is likely to cause

- A the polar bears to reproduce more
- B the number of polar bears to decrease
- C the number of polar bears to increase
- D no change in the number of polar bears

The mystery of life



The diagram shows a human cell.
Most human cells contain DNA.

5. Where in the cell is the DNA found?
- A cytoplasm
 - B cell membrane
 - C vacuole
 - D nucleus
6. A DNA molecule is composed of two strands forming a
- A double helix
 - B capillary
 - C ladder
 - D hexagon
7. DNA contains paired bases which are represented by letters.
One of these letters is **G**.
G stands for
- A genes
 - B glucose
 - C guanine
 - D gametes
8. Which diagram shows the correct pairing of bases for a DNA molecule?
- | | |
|---|---|
| A C C T T G

T G G A A C
A | A C C U U G

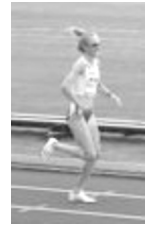
U G G A A C
B |
| A C C T T G

C A A G G T
C | A C C U U G

C A A G G U
D |

Marathon winner

Paula Radcliffe is a marathon runner who broke the world record for female marathon running.



9. When Paula runs she mainly uses aerobic respiration. The gas needed for aerobic respiration is
- A nitrogen
 - B oxygen
 - C carbon dioxide
 - D hydrogen
10. How does this gas get into Paula's bloodstream?
- A diffusion from the lungs to the blood
 - B diffusion from the heart to the blood
 - C osmosis from the lungs to the blood
 - D osmosis from the heart to the blood
11. When Paula is sprinting her muscles start to work anaerobically. Anaerobic respiration in the muscles produces
- A hydrochloric acid
 - B lactic acid
 - C glucose
 - D steroids
12. Before a race Paula eats a carbohydrate-rich meal. Carbohydrates can be broken down into smaller molecules needed for respiration. These are
- A cytosine molecules
 - B adenine molecules
 - C glucose molecules
 - D amino acid molecules

The growth of an embryo



Embryos that are left over from fertility treatment can be used to harvest stem cells.

Stem cells can be used to replace cells that have become damaged.

13. Why do some people consider the harvesting of stem cells to be unethical?
- A stem cells can cure disease
 - B stem cells can cause disease
 - C embryos die when stem cells are harvested
 - D embryos are mutated when used for IVF treatment
14. Stem cells can be useful in the treatment of conditions such as Parkinson's disease. This is because stem cells
- A can differentiate into any type of cell
 - B can change the DNA of other cells
 - C have a limit to the number of times they can divide
 - D are able to develop into tumour cells
15. In a laboratory, scientists measure the growth of the embryos. What is the best method of measuring the growth of embryos?
- A measuring the dry mass of embryos
 - B measuring the wet mass of embryos
 - C measuring the length of embryos
 - D measuring the width of embryos
16. The law allows the termination of a fetus up to 24 weeks into a pregnancy. The law allows this because
- A the fetus is not considered to be alive until then
 - B the fetus is unlikely to survive outside of the body before then
 - C the heart of the fetus does not start beating until this point
 - D none of the organs in the fetus is able to function before then

**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.**

Put an end to the cruelty of whaling

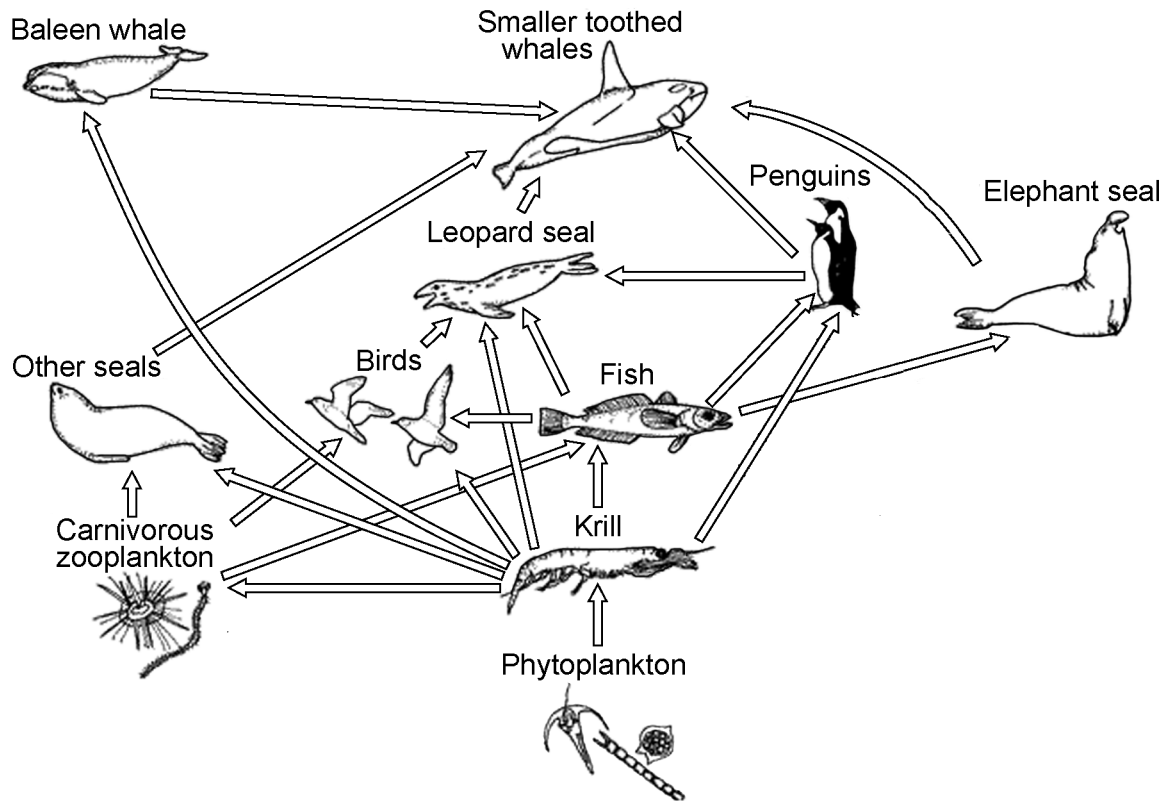
This article was written by the International Fund for Animal Welfare (IFAW).

Whales face more threats today than at any other time in history. Commercial whaling has been banned for more than twenty years – yet Japan, Iceland and Norway continue to kill whales. More than 30,000 whales have been killed for commercial purposes since the ban on whaling in 1986. And now the magnificent humpback whale is being targeted for whaling by the government of Japan.

17. What should you be aware of when reading articles written by pressure groups?
- A the article will not be well written
 - B the article will be informative and accurate
 - C the article will always misinform you
 - D the article may only give one side of an argument
18. What was the main reason for the ban on whaling in 1986?
- A to stop whales killing endangered populations
 - B to reduce the numbers of whales in the oceans
 - C to protect the world's natural whale population
 - D to protect the prey of the whale from being destroyed

A food web of the Antarctic

Use this food web to answer questions 19 and 20.



19. Baleen whales have a special filter feeding mechanism instead of teeth. This enables them to eat

- A krill
- B smaller toothed whales
- C krill and smaller toothed whales
- D phytoplankton

20. The producer in this food web is

- A krill
- B smaller toothed whales
- C phytoplankton
- D zooplankton

Plants have hormones too

Humans have hormones for growth, plants have hormones too.
Some plant hormones can help fruit to grow.



21. Which hormone is mainly responsible for plant growth?
- A insulin
 - B auxin
 - C chlorophyll
 - D cellulose
22. Other plant hormones are used to produce fruit without pips.
Why might growing fruit without pips cause a problem in the future?
- A too many hormones would be used
 - B less photosynthesis will take place
 - C the crop will not produce flowers
 - D there will be no seeds for future generations
23. For plants to grow they need to
- A respire during the night and photosynthesise all the time
 - B respire during the day and photosynthesise all the time
 - C photosynthesise during the day and respire all the time
 - D photosynthesise during the night and respire all the time
24. Which row of the table shows the reactants needed for photosynthesis and respiration?

	photosynthesis		respiration	
	water	glucose	oxygen	carbon dioxide
A	yes	no	yes	no
B	no	yes	yes	no
C	yes	no	no	yes
D	no	yes	no	yes

TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS

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

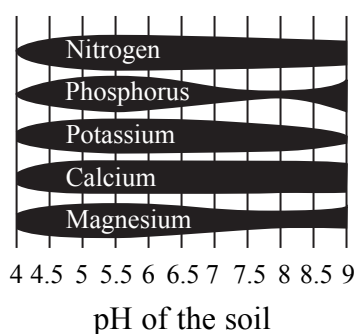
**Questions 25 to 40 must be answered by Higher tier candidates only.
Foundation tier candidates do not answer questions 25 to 40.**

Minerals and plant growth

Minerals are essential for plant growth.

The availability of mineral ions in the soil can be limited by the pH of the soil.

The chart shows the effect of pH on mineral availability. The thicker the line the more mineral ions are available.

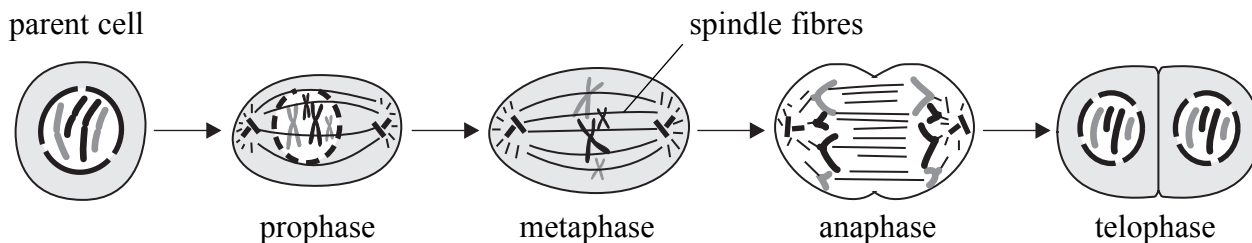


25. The availability of which mineral ion is most affected by a slightly alkaline soil?
- A nitrogen
 - B phosphorus
 - C potassium
 - D magnesium
26. At pH levels below 4, mineral ions are much less available for plant uptake. Which human activity is most likely to cause a reduction in the pH of the soil.
- A burning hydrogen gas to produce water
 - B production of methane from rice farming
 - C burning coal to produce sulphur dioxide gas
 - D using CFCs in refrigeration to reduce ozone
27. Mineral ions are taken into plants by
- A photosynthesis
 - B osmosis
 - C active transport
 - D transpiration
28. Nitrate ions are essential for the formation of
- A chlorophyll for photosynthesis
 - B protein for osmosis
 - C chlorophyll for growth
 - D protein for growth

Mitosis and meiosis

Mitosis and meiosis are types of nuclear division.
The diagram shows one of these types of nuclear division.

Use this diagram to answer questions 29 and 30.



29. This diagram shows
- A mitosis producing haploid nuclei
 - B mitosis producing diploid nuclei
 - C meiosis producing haploid nuclei
 - D meiosis producing diploid nuclei
30. What is occurring during anaphase in this type of nuclear division?
- A chromosomes line up at the cell membrane and are pulled to the centre
 - B chromosomes are pulled to the edge of the cell by spindle fibres
 - C spindle fibres push the chromosomes to the centre of the cell to line up
 - D the cell membrane breaks up to form chromosomes at the edge of the cell
31. In humans, meiosis produces
- A normal body cells that have 23 chromosomes
 - B normal body cells that have 23 pairs of chromosomes
 - C gametes that have 23 chromosomes
 - D gametes that have 23 pairs of chromosomes
32. Mitotic division occurs in stem cells.
Which row of the table shows why stem cells are important for scientific research?

	stem cells	
	have a Hayflick limit	can differentiate into any type of cell
A	yes	yes
B	yes	no
C	no	yes
D	no	no

An inconvenient truth

Recently Al Gore (an American statesman) produced a film to make the world aware of the problem of global warming.

33. What is the main cause of global warming?
- A an increase in the ozone layer
 - B the greenhouse effect
 - C a decrease in deforestation
 - D an increase in biodiversity
34. The impact that humans are having on the environment can be seen in organisms such as lichen and mussels.
These organisms are collectively known as
- A industrial conditions
 - B water pollutants
 - C living indicators
 - D non-living indicators
35. Recycling will reduce the impact that humans have on the environment.
Recycling involves
- A putting more waste into landfill sites
 - B using incinerators to reduce the amount of paper waste
 - C using existing products in a similar or different way
 - D using the residue from burning wood to make paper
36. Conservation methods can be used to improve the natural environment and increase biodiversity.
Which of the following is **not** a conservation method?
- A coppicing
 - B interdependence
 - C reforestation
 - D replacement planting

Protein formation

Proteins are necessary for humans to grow.
Proteins are produced in the cells.

37. What does mRNA bind to at the start of protein formation?

- A nuclear membrane
- B mitochondria
- C DNA
- D ribosomes

38. Bases form a translation code on tRNA.
This code is a

- A linked code
- B binary code
- C triplet code
- D transcription code

39. These are two statements on protein formation in the cell.

- 1 amino acids join together to form polypeptides
- 2 polypeptides can be joined together to form proteins

Which are true?

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

40. These are five statements about transcription

- 1 mRNA molecule forms next to the DNA molecule
- 2 the new molecule exits through the nuclear pore
- 3 DNA molecule reforms
- 4 the bases of the DNA coding strand are exposed
- 5 the DNA double helix unzips

The correct order for these statements is

- A 5 - 2 - 1 - 4 - 3
- B 5 - 1 - 4 - 2 - 3
- C 3 - 2 - 1 - 4 - 5
- D 5 - 4 - 1 - 2 - 3

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END