

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

Thursday 22 November 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.

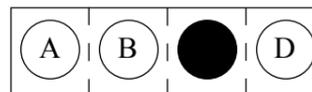
Before the test begins:

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.

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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.**

Can plants feed the whole world?

Scientists believe that if we used our land to grow only plants for food, instead of plants and animals, there would be enough food for the world's human population.

1. Plants make their own food but they need energy for this process.
Plants get this energy from
 - A water
 - B nutrients
 - C sunlight
 - D soil

2. Which part of a plant absorbs the most energy?
 - A roots
 - B leaves
 - C branches
 - D flowers

3. Plants make their own food by photosynthesis.
Other than energy, what is needed for photosynthesis to take place?
 - A carbon dioxide and water
 - B glucose and water
 - C glucose and oxygen
 - D carbon dioxide and oxygen

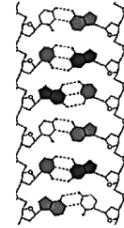
4. Growing plants and trees can be good for the environment.
The reason for this is that plants
 - A remove carbon dioxide from the atmosphere
 - B reduce oxygen levels in the atmosphere
 - C need fertilisers which are good for the environment
 - D remove nitrogen from the atmosphere

DNA

Inside the nucleus of every cell there is DNA which codes for characteristics.

5. What shape is a DNA molecule?

- A a ladder
- B a double helix
- C a hexagon
- D a pentagon



6. The strands of a DNA molecule are linked by pairs of bases. Which of these is a correct pair?

- A adenine with guanine
- B guanine with thymine
- C thymine with cytosine
- D cytosine with guanine

7. DNA controls the order in which amino acids in a cell are joined together. What is formed when amino acids are joined together?

- A carbohydrates
- B fats
- C proteins
- D vitamins

8. Human DNA can be inserted into microorganisms which then form useful products. These organisms are cultivated in a

- A fermenter
- B incubator
- C petri dish
- D test tube

Characteristics

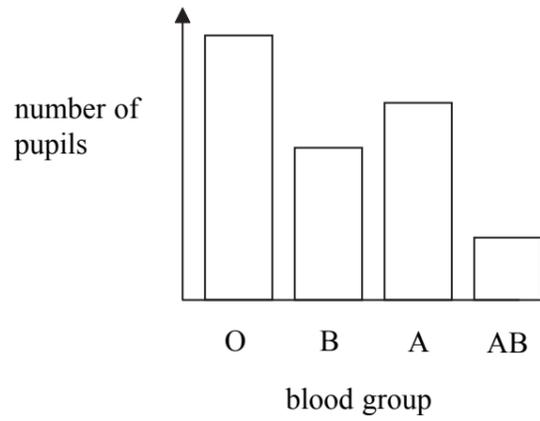
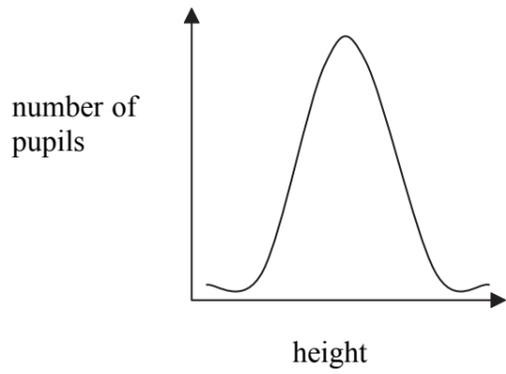
The picture shows some pupils from a class.



9. The pupils are not all the same height.
This is because they all have
- A different alleles and different diets
 - B different alleles and the same diet
 - C the same alleles and different diets
 - D the same alleles and the same diet
10. The best way to compare the size of pupils in a class would be by measuring their
- A wet mass
 - B dry mass
 - C cell number
 - D intelligence

Use the graphs to answer questions 11 and 12.

The graphs show the height and blood groups of 3000 pupils.



11. Which row of the table describes the characteristics?

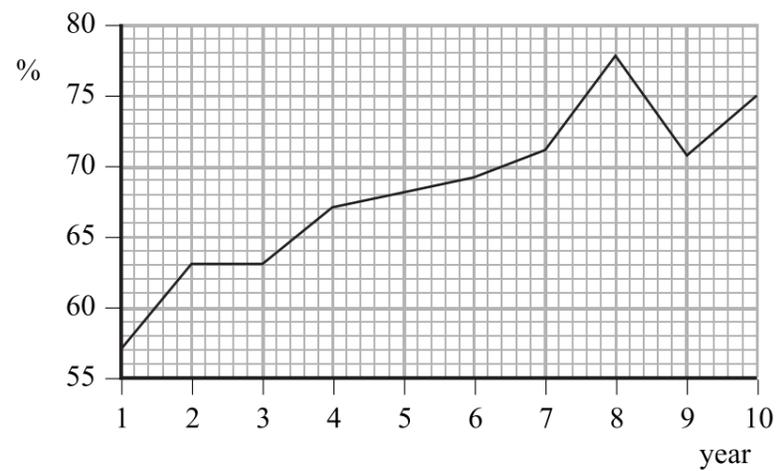
	height	blood group
A	continuous variation	continuous variation
B	continuous variation	discontinuous variation
C	discontinuous variation	continuous variation
D	discontinuous variation	discontinuous variation

12. The graphs suggest that most people

- A** are tall with blood group O
- B** are short with blood group AB
- C** are medium height with blood group B
- D** are medium height with blood group O

Recycling

The graph shows the percentage of newspapers being recycled during a ten year period.



13. What percentage of newspapers was recycled in year 5?

- A 64
- B 66
- C 68
- D 70

14. 40 million tons of newspapers were made in year 10.
How many tons were recycled?

- A 7.5 million
- B 30 million
- C 40 million
- D 75 million

15. Recycling of newspapers will

- A improve conservation of resources
- B increase pollution
- C improve the ozone layer
- D increase deforestation

16. Which of these substances **cannot** be recycled?

- A water
- B glass
- C metal
- D petrol

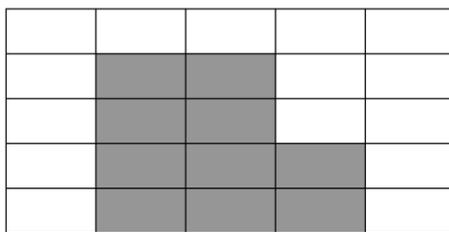
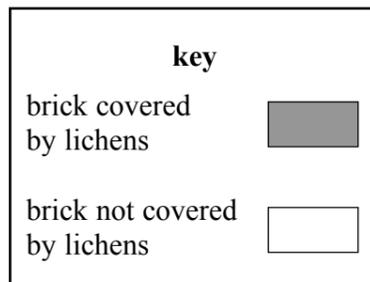
**Higher tier candidates start at question 17 and answer questions 17 to 40.
 Questions 17 to 24 must be answered by all candidates: Foundation tier and Higher tier.**

Sulphur dioxide

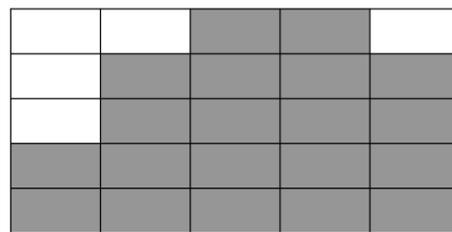
17. A factory produced sulphur dioxide gas as a waste product.
 This gas forms acid rain when it combines with

- A** carbon dioxide
- B** smoke
- C** acid
- D** water vapour

18. The diagrams show the distribution of lichens growing on two brick walls.
 One wall was near the factory. The other wall was further away from the factory.



near to factory

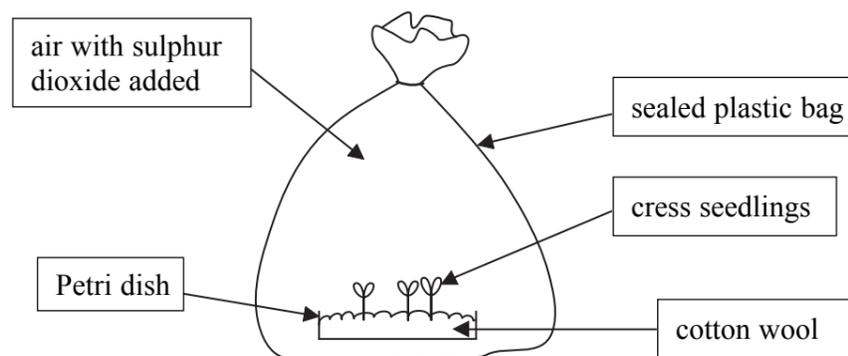


far from factory

Which row of the table gives the correct percentage distribution?

	percentage of near wall covered in lichen	percentage of far wall covered in lichen
A	20	40
B	40	20
C	40	80
D	80	40

Isaac wanted to find out if sulphur dioxide affected the growth of cress seedlings. The diagram shows the apparatus he set up.



19. The control for this experiment would be a plastic bag containing

- A cress seedlings and air with sulphur dioxide added
- B air with sulphur dioxide added but no cress seedlings
- C cress seedlings and air but no sulphur dioxide
- D air with no sulphur dioxide or cress seedlings

20. To obtain valid results, Isaac would **not** need to

- A add plant hormones to the Petri dish
- B shine light through the plastic bag
- C have air with carbon dioxide in the plastic bag
- D add water to the cotton wool

Disappearing rainforest

Kate read about rainforests in a magazine.

Rainforests are being cut down at an alarming rate. An area the size of a football pitch disappears every two seconds. Biodiversity is at risk.

21. If this article is true, what area of rainforest is cut down in one minute?

- A two football pitches
- B fifteen football pitches
- C thirty football pitches
- D sixty football pitches

22. Which row of the table shows that biodiversity is at risk in rainforests?

	variety of animals	variety of plants
A	increases	increases
B	increases	decreases
C	decreases	increases
D	decreases	decreases

23. Maintaining biodiversity is an example of conservation. Which is **not** an example of conservation?

- A deforestation
- B coppicing
- C planting hedgerows
- D reforestation

24. Which row of the table shows other effects of cutting down rainforests?

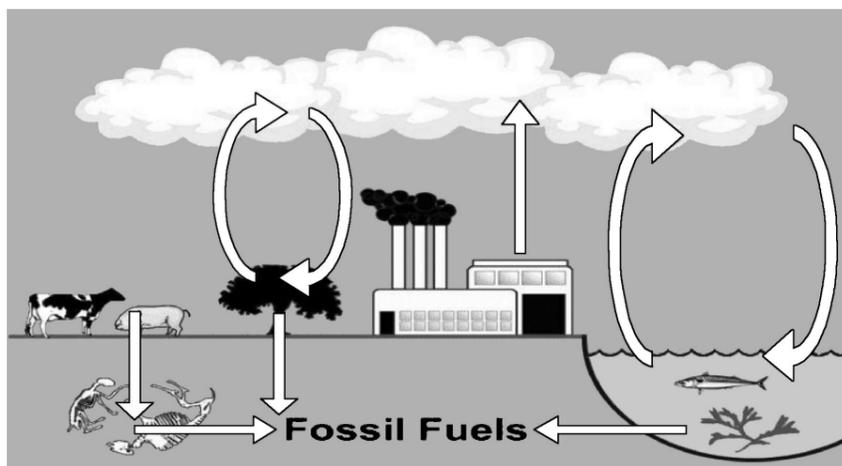
	oxygen concentration in the air	carbon dioxide concentration in the air	nitrate concentration in the soil
A	increases	decreases	increases
B	decreases	decreases	decreases
C	increases	increases	decreases
D	decreases	increases	increases

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.

The Carbon Cycle



25. Which part of the carbon cycle is **not** shown by an arrow?
- A respiration by land mammals
 - B respiration by plants
 - C combustion of fossil fuels
 - D photosynthesis by plants
26. Which greenhouse gas is released when fossil fuels are burned?
- A carbon dioxide
 - B carbon monoxide
 - C methane
 - D sulphur dioxide
27. Growing rice plants also release a greenhouse gas which contributes to global warming. What is the name of this gas?
- A oxygen
 - B nitrogen
 - C methane
 - D carbon monoxide
28. Microorganisms also contribute to the amount of carbon in the atmosphere. Microorganisms release carbon dioxide by
- A photosynthesis
 - B respiration
 - C denitrification
 - D combustion

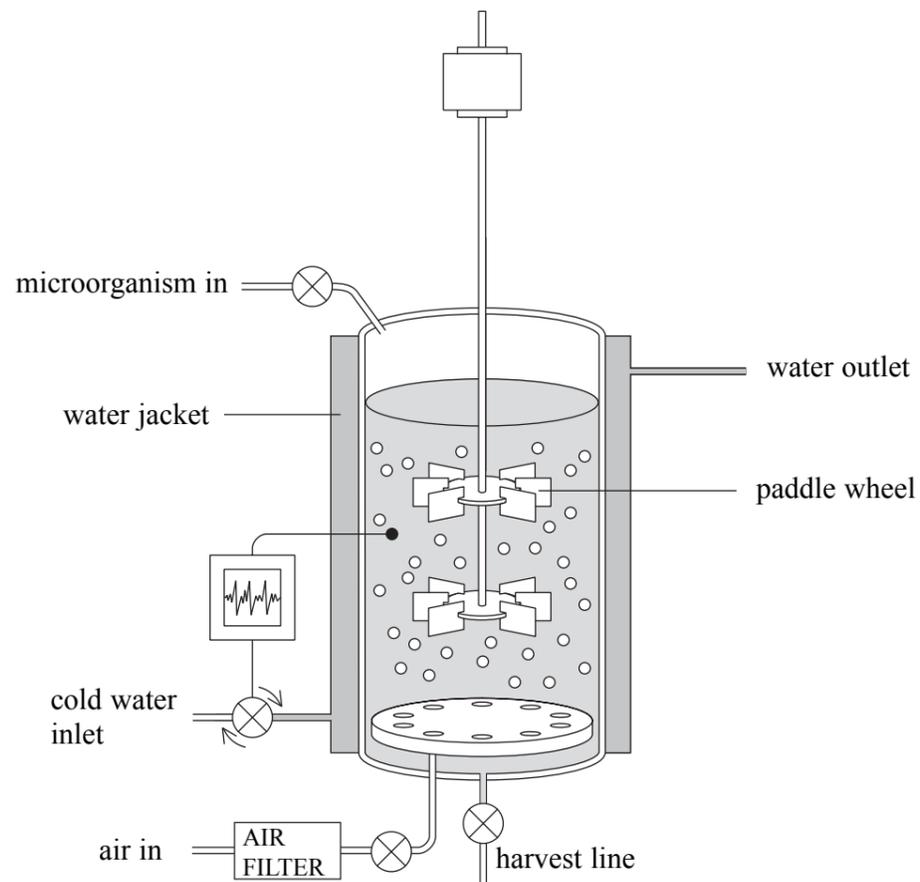
Brazilian rainforests

Brazil has lost 132,000 square kilometres of forest between May 2000 and the present day. A total of 600,000 square kilometres has been destroyed since 1970.

29. How much of the rainforest was destroyed between 1970 and May 2000?
- A 132,000 square kilometres
 - B 468,000 square kilometres
 - C 600,000 square kilometres
 - D 732,000 square kilometres
30. What is **not** a reason for the destruction of rainforests?
- A farming of cattle
 - B providing fuel
 - C reducing biodiversity
 - D clearing for building
31. Trees need minerals such as nitrates to grow effectively. How do trees obtain these minerals?
- A by osmosis using respiration
 - B by osmosis using photosynthesis
 - C by active transport using respiration
 - D by active transport using photosynthesis
32. These statements are about the use of nitrate fertilizers
- 1 The overuse of nitrate fertilizers can cause eutrophication.
 - 2 Leguminous vegetables can help fix nitrate fertilizer into the soil.
- Which of the statements are true?
- A 1 only
 - B 2 only
 - C both 1 and 2
 - D neither 1 nor 2

Fermenters

Mycoprotein is a food source which can be produced in a fermenter. Mycoprotein could be used to reduce famine and starvation.



33. What is the main purpose of the water jacket surrounding the fermenter?
- A to keep the fermenter warm
 - B to keep the fermenter cool
 - C to remove the waste products
 - D to maintain optimum pH
34. Why are aseptic conditions necessary when using microorganisms for food production?
- A to keep the microorganisms moving
 - B to ensure a continuing food supply
 - C to increase the amount of oxygen supplied
 - D to avoid contamination from other organisms

35. Which is **not** an advantage of using microorganisms for food production?

- A** microorganisms grow rapidly
- B** microorganisms can be manipulated easily
- C** the production is dependent on climate
- D** industrial waste products can be used

36. These statements are about the use of fermenters.

- 1 Optimum temperature and pH are necessary to ensure maximum production.
- 2 DNA containing genes for insulin can be cultured.

Which are correct?

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

John's new heart

John has a diseased heart. He hopes that stem cells may provide the chance of producing a new heart for him. Research suggests that stem cells could develop into healthy heart muscle cells if injected into the diseased part of a heart.

37. John knows that he would need to be given young stem cells. This is because young stem cells have
- A the ability to develop into many types of tissue
 - B the ability to develop into heart muscle only
 - C a lower rate of mitosis
 - D a low Hayflick limit

Use this information to answer question 38, 39 and 40.

The procedure to obtain stem cells for John involves creating a cloned embryo. The stages in this procedure are listed below.

- 1 A nucleus is taken from one of John's body cells.
- 2 A donor egg cell is enucleated.
- 3 John's nucleus is inserted into the enucleated egg cell.
- 4 An embryo develops.
- 5 Stem cells are removed from the embryo and stimulated to make heart tissue.

38. Electric shock treatment is used between two of these stages. The two stages are

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

39. The nucleus in stage 1 is

- A diploid and genetically identical to the nuclei in the cells of John's diseased heart
- B diploid and genetically different from the nuclei in the cells of John's diseased heart
- C haploid and genetically identical to the nuclei in the cells of John's diseased heart
- D haploid and genetically different from the nuclei in the cells of John's diseased heart

40. Some people have ethical objections to stem cell research because they believe

- A** embryo production is expensive
- B** embryos have a right to live
- C** embryos should be used in other ways
- D** embryo development is unnatural

TOTAL FOR HIGHER TIER PAPER: 24 MARKS

END