

Surname	Initial(s)
Signature	

Paper Reference(s)

**5005 5025**

# Edexcel GCSE

## Science (5005)

## Biology (5025)

### B1a – Topics 1 and 2

### Foundation and Higher Tier

Friday 4 March 2011 – 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.

### Orang-utans

Use the information to answer questions 1, 2 and 3.

Orang-utans live in the jungle and eat ants and termites as well as fruit such as mangoes.



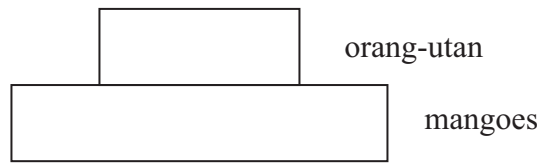
orang-utan



mango tree

1. The orang-utan is a
  - A consumer and the mango tree is a producer
  - B producer and the mango tree is a consumer
  - C consumer and the mango tree is a consumer
  - D producer and the mango tree is a producer
  
2. Orang-utans are primates.  
Which vertebrate group do orang-utans belong to?
  - A birds
  - B reptiles
  - C mammals
  - D amphibians

3. This is a pyramid of biomass showing the trophic (feeding) levels for orang-utans and mangoes.



The biomass at the trophic level for the orang-utan is smaller than the biomass at the trophic level for the mangoes because

- A energy is increased at each trophic level
  - B energy is lost at each trophic level
  - C there are more orang-utans than mangoes
  - D each mango has a greater biomass than each orang-utan
4. Sumatran tigers hunt and kill orang-utans for food.  
Which row of the table is correct for Sumatran tigers and orang-utans?

	<b>Sumatran tigers</b>	<b>orang-utans</b>
<b>A</b>	predators of orang-utans	predators of Sumatran tigers
<b>B</b>	prey of orang-utans	predators of Sumatran tigers
<b>C</b>	predators of orang-utans	prey of Sumatran tigers
<b>D</b>	prey of orang-utans	prey of Sumatran tigers

## Bananas



5. Scientists know that 50% of human genes are identical to those in a banana because of the work done on

- A genetic engineering
- B gene therapy
- C the human genome project
- D the production of transgenic organisms

6. Genes are parts of structures called

- A chromosomes
- B cell membranes
- C antibodies
- D phenotypes

7. Almost all bananas are clones.  
Which statement correctly describes clones?

- A genetically identical organisms produced by sexual reproduction
- B genetically different organisms produced by asexual reproduction
- C genetically identical organisms produced by asexual reproduction
- D genetically different organisms produced by sexual reproduction

8. Crops can be grown using organic farming methods.  
Which row of the table shows the processes often used in organic farming?

	<b>crop rotation</b>	<b>biological control</b>
<b>A</b>	no	yes
<b>B</b>	yes	yes
<b>C</b>	yes	no
<b>D</b>	no	no

## Dinosaurs

9. Dinosaurs became extinct over 65 million years ago.  
The main evidence that dinosaurs lived on Earth is found in
- A Darwin's theory of evolution
  - B the fossil record
  - C computer models
  - D the human genome project
10. Some scientists think that dinosaurs became extinct because a large meteorite collided with Earth. This collision caused a cloud of dust and ash. Most of the sunlight was blocked for several years.  
Why would this result in the extinction of dinosaurs?
- A dinosaurs needed sunlight to photosynthesise
  - B there was less competition for resources between species
  - C dinosaurs were unable to adapt to the changing environment
  - D dinosaurs were able to adapt to the changing environment
11. Scientists think that some mammals managed to live and reproduce during the years after the meteorite collision.  
What is the name given to the ability to live and reproduce in a changing environment?
- A intra-specific competition
  - B interdependence
  - C selective breeding
  - D survival of the fittest
12. Dinosaur populations can be studied using computer modelling.  
Which row of the table shows what computer modelling involves?

	using a set of rules	inputting past data	predicting outcomes
A	yes	yes	yes
B	yes	yes	no
C	no	yes	yes
D	yes	no	yes

## Seahorses



13. To reproduce, a female sea horse deposits egg cells into the pouch of a male. The male fertilises the egg cells with sperm. The male carries the fertilised egg cells until they hatch.

This behaviour of the seahorse is an example of

- A asexual reproduction
  - B animal cloning
  - C selective breeding
  - D sexual reproduction
14. Sperm and egg cells are examples of
- A haploid gametes
  - B diploid gametes
  - C haploid characteristics
  - D diploid characteristics

15. Fertilisation of an egg cell by a sperm leads to
- A variation in genetically identical offspring
  - B variation in genetically different offspring
  - C cloning in genetically identical offspring
  - D cloning in genetically different offspring

16. Three types of seahorse are

*Hippocampus hippocampus*  
*Hippocampus brevis*  
*Hippocampus fuscus*

These seahorses belong to

- A the same genus only
- B the same species only
- C the same genus and species
- D neither the same genus nor species

**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.**

### **DNA**

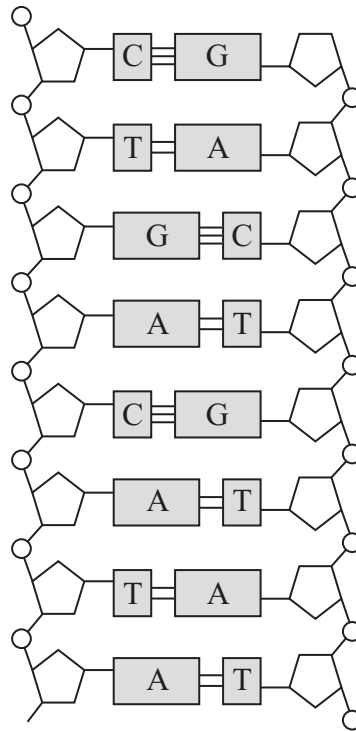
- 17.** Rosalind Franklin helped discover the structure of DNA.  
She delayed publishing her results until she had repeated the experimental research many times and obtained the same results.

Why do scientists, like Rosalind Franklin, repeat experiments before publishing their results?

- A** to make sure their results are reliable
  - B** to delay publishing their results
  - C** to make new discoveries
  - D** to help other scientists make new discoveries
- 18.** Which part of a cell contains most DNA?
- A** cell membrane
  - B** cytoplasm
  - C** nucleus
  - D** vacuole
- 19.** A section of a DNA molecule which codes for a single unit of inheritance is called a
- A** clone
  - B** gamete
  - C** gene
  - D** phenotype



20. This diagram of a DNA molecule shows how the bases C, G, A and T pair together. What is a correct statement based on the information in the diagram?

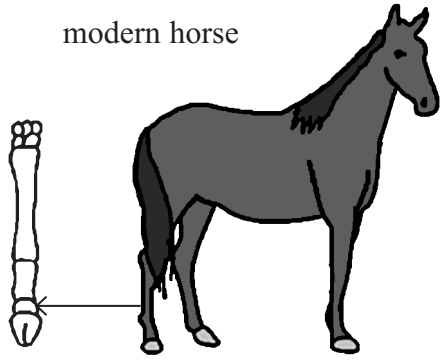
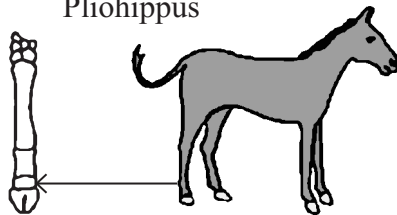
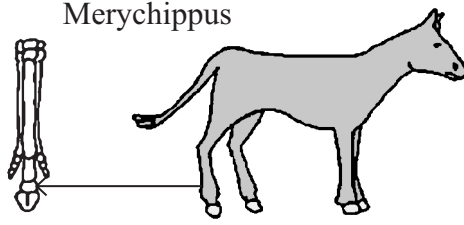
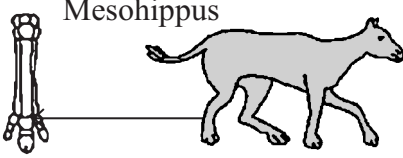
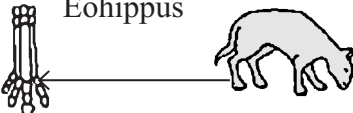


- A** A always pairs with C
- B** T always pairs with G
- C** C always pairs with T
- D** G always pairs with C

## The evolution of the horse

*Use the information in the diagram to help you answer questions 21 and 22.*

Horses have changed over the past 60 million years.

1 million years ago	<p>modern horse</p> 	Height 1.6 m
10 million years ago	<p>Pliohippus</p> 	Height 1.0 m
30 million years ago	<p>Merychippus</p> 	Height 1.0 m
40 million years ago	<p>Mesohippus</p> 	Height 0.6 m
60 million years ago	<p>Eohippus</p> 	Height 0.4 m

21. What are the main changes in the horse over the last 60 million years?

- A an increase in height and increase in the number of toes
- B an increase in height and decrease in the number of toes
- C a decrease in height and increase in the number of toes
- D a decrease in height and decrease in the number of toes

22. Eohippus lived 60 million years ago.  
Which feature of Eohippus would be most likely to enable it to live in wet marshy areas?
- A a single toe which decreases the surface area of the foot
  - B several toes which increases the surface area of the foot
  - C a single toe which increases the surface area of the foot
  - D several toes which decreases the surface area of the foot
23. The evolutionary changes in the characteristics of the horse over time are known as
- A adaptations
  - B genetic modifications
  - C selective breeding techniques
  - D classifications
24. The horse evolved due to a change in its DNA sequence.  
What is the name given to a random change in an organism's DNA sequence?
- A genotype
  - B phenotype
  - C mutation
  - D variation

**TOTAL FOR FOUNDATION TIER PAPER: 24 MARKS**

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**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.

### Punnett squares

Use the information to help you answer questions 25 and 26.

Punnett squares are drawn to show how characteristics can be inherited.

This Punnett square shows the inheritance of eye colour.

**B** represents the dominant allele for brown eyes.

**b** represents the recessive allele for blue eyes

		female gametes	
		<b>B</b>	<b>b</b>
male gametes	<b>b</b>	Bb	bb
	<b>b</b>	Bb	<b>L</b>

25. Which of the following is missing from box **L** in the diagram?

- A BB
- B Bb
- C bb
- D bB

26. What is the phenotype of the female parent?

- A Bb
- B bb
- C blue eyes
- D brown eyes

27. A different set of parents were both heterozygous for eye colour.  
What would be the percentage chance of their offspring having blue eyes?

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

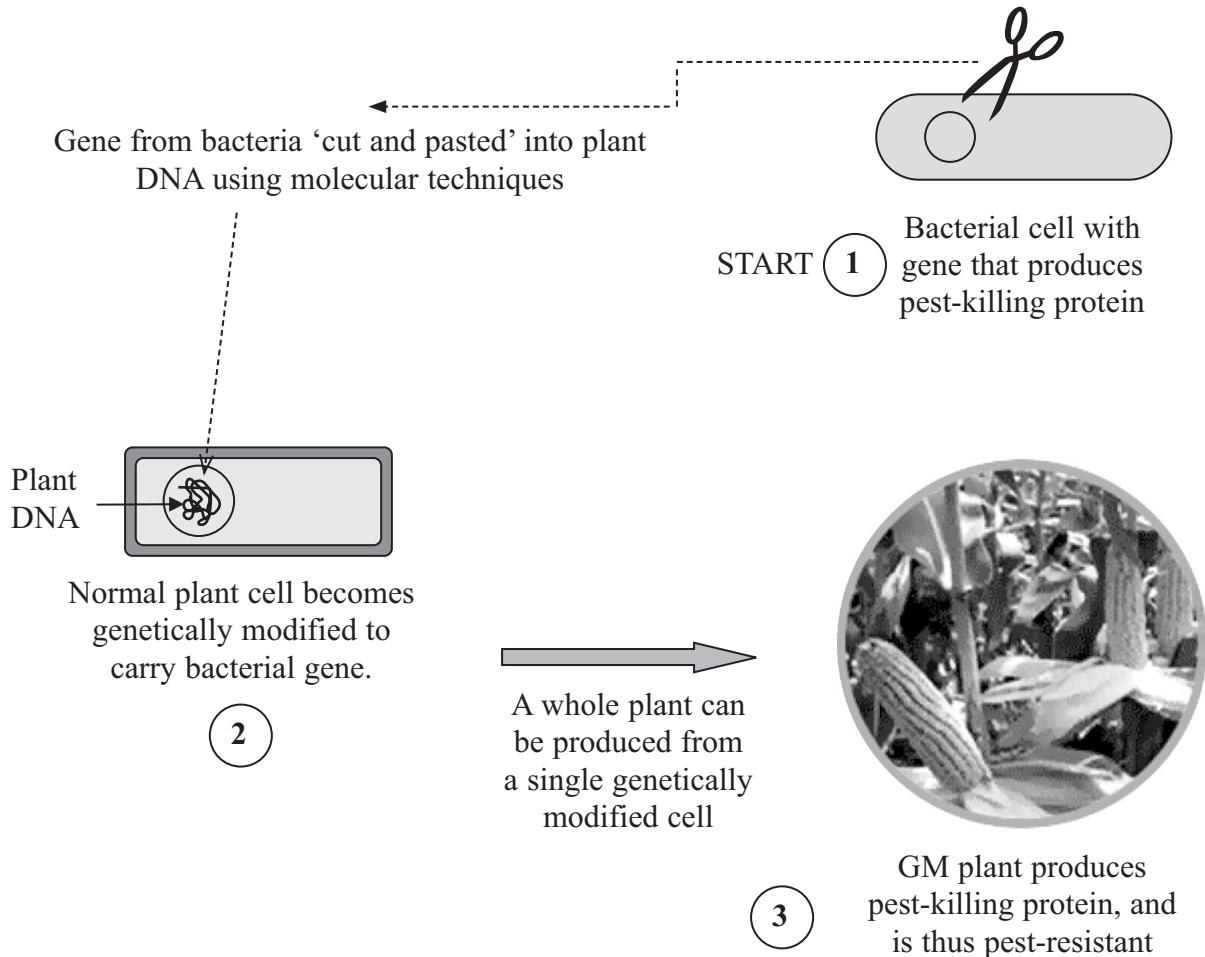
28. What is an allele?

- A an alternative form of a chromosome
- B an alternative form of the same gene
- C a diploid gene
- D a haploid gene

## Genetic modification (GM) of plants

Use the diagram to help you to answer questions 29, 30 and 31.

The diagram shows the method used to genetically modify a plant cell.



29. The bacterial cell in stage 1 is used because it
- A reproduces rapidly
  - B contains plant genes
  - C contains the required gene
  - D reproduces asexually
30. How does this GM plant grow from the single cell?
- A by sexual reproduction of plant cells
  - B by asexual reproduction of plant cells
  - C by sexual reproduction of bacterial cells
  - D by asexual reproduction of bacterial cells

**31.** Why is it beneficial for a farmer to grow this plant rather than a non-GM plant?

- A** it can be grown in areas where there is a lack of water
- B** it contains a higher amount of vitamins than a non-GM plant
- C** the crops do not need to be sprayed with pesticides
- D** GM crop seeds are always cheaper to purchase than non-GM seeds

**32.** Which of these statements about GM plants are true?

- 1 GM plants cause some concerns because they may affect other plants in the environment by cross fertilisation
- 2 GM plants can only be grown in secure areas where they cannot affect the environment

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

## Changes in organisms

33. Which row of the table matches the processes with its correct description?

- 1 how individuals within a species have characteristics that promote more successful reproduction
- 2 when humans put the most successful male and female organisms together to produce better offspring
- 3 when a whole organism is replicated to produce identical offspring without the need for sexual reproduction

				<b>processes</b>		
				<b>selective breeding</b>	<b>cloning</b>	<b>natural selection</b>
<b>A</b>	1	2	3			
<b>B</b>	2	3	1			
<b>C</b>	1	3	2			
<b>D</b>	3	2	1			

34. Which statement is correct for the reproduction of organisms with diploid body cells?

- A** sexual reproduction results in genetically identical diploid offspring
- B** asexual reproduction results in genetically different haploid offspring
- C** sexual reproduction results in genetically different haploid offspring
- D** asexual reproduction results in genetically identical diploid offspring

35. Which of these statements about GM organisms are true?

- 1 transgenic organisms have had genes from a different species inserted into their genome
- 2 designer milk containing antibodies can be produced by transgenic organisms

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

36. The production of designer babies has caused some controversy. Which statement is true?

- A** it is ethical to produce designer babies as only one embryo is produced
- B** designer babies can be produced without hormone treatment
- C** cloning is a method of producing designer babies
- D** embryo screening could produce babies which do not carry a genetic disorder

## Plant and human growth

*Use this information to answer questions 37 and 38.*

A willow sapling is a young willow tree.

A scientist investigated the growth of a willow sapling.

The investigation involved these steps.

- 1 the mass of a willow sapling and the mass of soil in a pot were measured
- 2 the sapling was planted in the pot filled with the soil
- 3 the sapling was only watered with rainwater, nothing else was added
- 4 after five years the mass of the sapling (now a tree) and the mass of soil in the pot were measured

### **result**

The mass of the soil decreased by only a small amount but the mass of the tree increased considerably.

**37.** What would be a correct interpretation of the result of this investigation?

- A** sapling growth is only dependent on the soil it is grown in
- B** sapling growth is completely unaffected by the soil it is grown in
- C** the soil and other factors affect sapling growth
- D** without water and soil a sapling will die

**38.** How would you improve the quality of the data for this investigation?

- A** repeat the experiment 10 times with 10 different tree species
- B** repeat the experiment 10 times with 10 of the same tree species
- C** change the soil each year
- D** grow the tree without soil or water as a control



39. Minerals in the soil are needed by the plant.  
Which row of the table correctly matches nitrates and magnesium with their main function in a plant?

	<b>nitrates</b>	<b>magnesium</b>
<b>A</b>	chlorophyll production	making protein for growth
<b>B</b>	chlorophyll production	chlorophyll production
<b>C</b>	making protein for growth	chlorophyll production
<b>D</b>	making protein for growth	making protein for growth

40. Which of these statements about the effect of diet on human growth are true?

- 1 human growth is only affected by the amount of food a person eats
- 2 human growth is only affected by the genes a person has

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

**TOTAL FOR HIGHER TIER PAPER: 24 MARKS**

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**END**

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