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Centre number						Candidate number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE**

A221/01

**TWENTY FIRST CENTURY SCIENCE
BIOLOGY A**

Unit 1: Modules B1 B2 B3 (Foundation Tier)

TUESDAY 24 JANUARY 2012: Morning

DURATION: 40 minutes

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

**Candidates answer on the Question Paper.
A calculator may be used for this paper.**

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Pencil

Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. HB pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**

INFORMATION FOR CANDIDATES

- **The number of marks is given in brackets [] at the end of each question or part question.**
- **The total number of marks for this paper is 42.**

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Answer ALL the questions.

1 Genes affect the way an organism develops.

(a) Where are genes found?

Put a **ring** around the correct answer.

CELL MEMBRANE

CELL WALL

CYTOPLASM

NUCLEUS

[1]

(b) Which two statements describe the job that genes do?

Put ticks (✓) in the boxes next to the **TWO** correct answers.

Genes ...

... are instructions for a cell.

... transport oxygen around the cell.

... release energy from glucose.

... code for making proteins.

... speed up cell reactions.

[2]

(c) Which two statements describe the STRUCTURE of genes?

Put ticks (✓) in the boxes next to the TWO correct answers.

Genes are ...

... structures that make up chromosomes.

... areas of cytoplasm.

... part of the cell membrane.

... sections of very long DNA molecules.

... made of proteins.

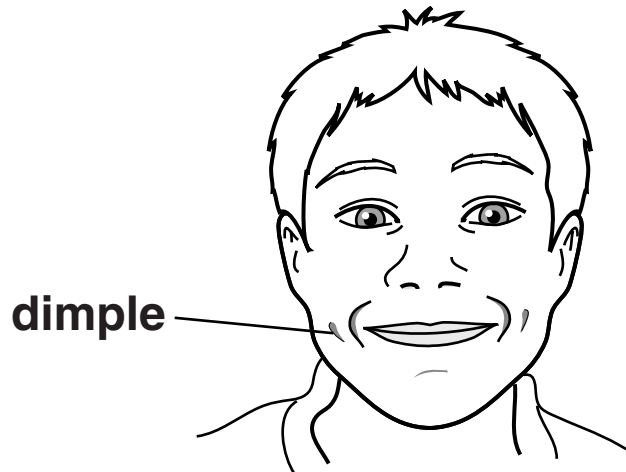
[2]

[Total: 5]

2 Mike and Anita are brother and sister.

One pair of their chromosomes contains the gene that controls dimples.

One chromosome in this pair of chromosomes is inherited from their mother.



**Mike's chromosome
from his mother**

**Anita's chromosome
from her mother**

(a) Shade in the gene that controls dimples on Anita's chromosome from her mother. [1]

(b) The second chromosome of the pair comes from their father.

Having dimples is a **DOMINANT** characteristic.

Mike has dimples but Anita does not.

Complete these sentences to explain why.

Put a **ring** around the correct word in each case.

Different versions of the gene are called...

...alleles.

...DNA.

...chromosomes.

Both of Anita's versions of this gene are...

...dominant.

...different.

...recessive.

[2]

(c) Anita looks a bit like her mother and a bit like her father.

Put a tick (✓) in the box next to the correct explanation for this.

Anita has lived with her parents for so long she has grown to look like them.

Anita has inherited a combination of alleles from both parents.

Children always look like their parents.

Anita has inherited more alleles from her mother than she did from her father.

[1]

[Total: 4]

3 Genetic disorders can have serious symptoms.

(a) People can be tested to see if they have the allele for a genetic disorder.

A couple are thinking about having children. They are told that they are both carriers of a genetic disorder.

What decision do they have to consider?

_____ [1]

Cystic fibrosis is a genetic disorder.

(b) State TWO symptoms of cystic fibrosis.

symptom 1 _____

symptom 2 _____ [1]

(c) Peter and Flora talk about a difficult issue with their friends.

PETER

Flora and I are thinking about whether to have an abortion. A test showed that our unborn fetus has cystic fibrosis.

FLORA

How long will my child be able to live with cystic fibrosis?

ANDY

I do not agree with abortion. It is against the laws of God.

MEERA

There is a small chance that having an abortion could harm the mother.

STELLA

I agree with having an abortion if the fetus is severely disabled.

(i) What ISSUE is being discussed by the five people?

_____ [1]

(ii) Which TWO people are stating VIEWS on what is being discussed?

_____ and _____ [1]

(iii) Flora's question cannot be answered using a scientific approach.

Suggest why.

_____ [2]

[Total: 6]

4 Antibiotics are used to treat some diseases.

(a) Which type of microorganism CANNOT be killed by antibiotics?

Put a **ring** around the correct answer.

BACTERIA

FUNGI

VIRUSES

[1]

(b) Read the statements about antibiotics.

Put a tick (✓) in **ONE** box in **EACH** row to show if each statement is true or false.

	TRUE	FALSE
Over time, strains of bacteria can become resistant to antibiotics.	<input type="checkbox"/>	<input type="checkbox"/>
Antibiotics should not be used on mild infections.	<input type="checkbox"/>	<input type="checkbox"/>
Antibiotics are tested for safety on human cells grown in the laboratory.	<input type="checkbox"/>	<input type="checkbox"/>
Patients should stop taking the antibiotic once they feel better.	<input type="checkbox"/>	<input type="checkbox"/>
Antibiotics are not tested on healthy people because it would be a waste of time.	<input type="checkbox"/>	<input type="checkbox"/>

[2]

(c) Vaccines are used to prevent disease.

Which of these statements about a vaccine is true?

Put a tick (✓) in the box next to the correct answer.

A vaccine is ...

... a safe form of the disease-causing microorganism.

... a medicine that cures the disease.

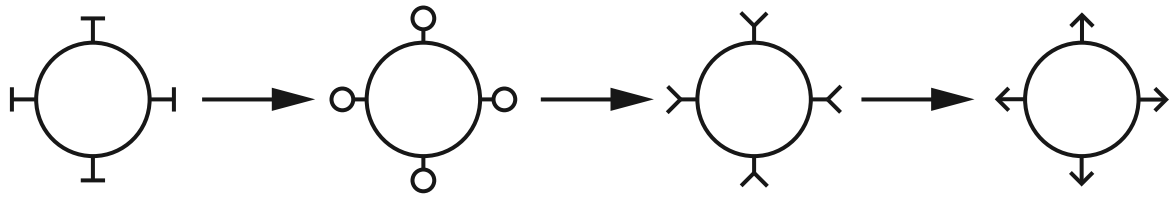
... an extract made from wild plants and herbs.

... a sample of white blood cells.

[1]

(d) Look at the diagram of the influenza virus.

It shows how the virus changes over a short period of time.



New influenza vaccines have to be developed every year.

Use the information in the diagram to help you explain why.

[2]

[Total: 6]

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5 This question is about the heart and heart disease.

(a) Which statement about heart muscle is correct?

Put a tick (✓) in the box next to the correct statement.

Heart muscle receives all of its oxygen from the blood inside the heart.

Heart muscle rests between beats, so it does not need its own blood supply.

Heart muscle has its own blood supply because it needs lots of oxygen and glucose.

Heart muscle has its own blood supply so that it can receive carbon dioxide.

[1]

(b) The structure of arteries and veins is related to their function.

Draw straight lines to connect each BLOOD VESSEL to its correct FEATURE(S).

Then draw straight lines to connect each FEATURE to its correct FUNCTION.

BLOOD VESSEL	FEATURE	FUNCTION
artery	valves inside the blood vessel	maintain blood pressure
vein	thick elastic wall	allow blood to flow easily
	large space (lumen) inside the blood vessel	stop blood flowing backwards

[2]

(c) A scientist is talking to a friend about his work.

I have found a brand new treatment for heart disease. I think I have conclusive evidence that it works.

Suggest what must happen before the scientist's claim is generally accepted.

[2]

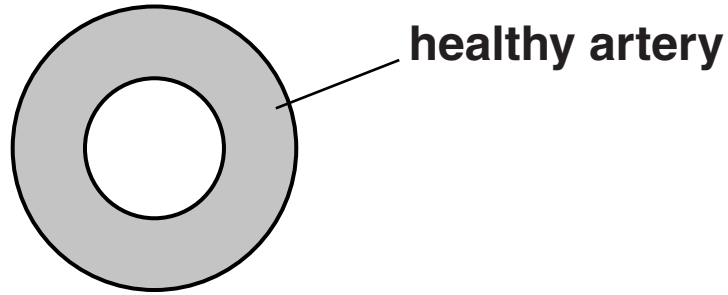
(d) There are many risk factors for heart disease.

Put ticks (✓) in the boxes next to the TWO factors that REDUCE the risk of heart disease.

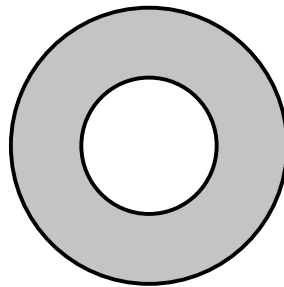
- cigarette smoking**
- regular exercise**
- excess alcohol**
- low fat diet**
- poor diet**
- stress**

[1]

(e) Look at the diagram of a healthy artery.



(i) Complete the following diagram to show an ARTERY WITH FATTY DEPOSITS.



[2]

(ii) Explain how a fatty deposit in an artery leading to the heart muscle can cause a heart attack.

[2]

[Total: 10]

6 There are alternative views about the origin of life on Earth.

VIEW 1 All life started on Earth from molecules that existed in the warm oceans.

VIEW 2 All life on Earth arrived as primitive life forms on asteroids and meteors.

VIEW 3 All life on Earth, as it is now, was created by God.

Look at the statements about these views.

Put ticks (✓) in the boxes next to the TWO statements that are true.

VIEW 2 required imagination and creativity in the development of the explanation.

VIEW 1 contains data and is an explanation.

VIEW 2 conflicts with VIEW 1.

VIEW 3 accounts for all the scientific observations about the origin of life on Earth.

VIEW 1 and VIEW 3 are supported by divergence of the hominid species.

[2]

[Total: 2]

7 Complete the sentences about evolution.

Choose words from this list.

COPY

DELETE

DNA

HUNDRED

MILLION

NAMES

RESHAPE

SIZES

THOUSAND

Life on Earth began 3500 _____ years ago.

Evidence for evolution is provided by fossils

and similarities and differences between the

_____ of different organisms. The first living

things developed from molecules that could

_____ themselves.

[3]

[Total: 3]

8 Organisms are affected by natural selection and selective breeding.

Explain how selective breeding is

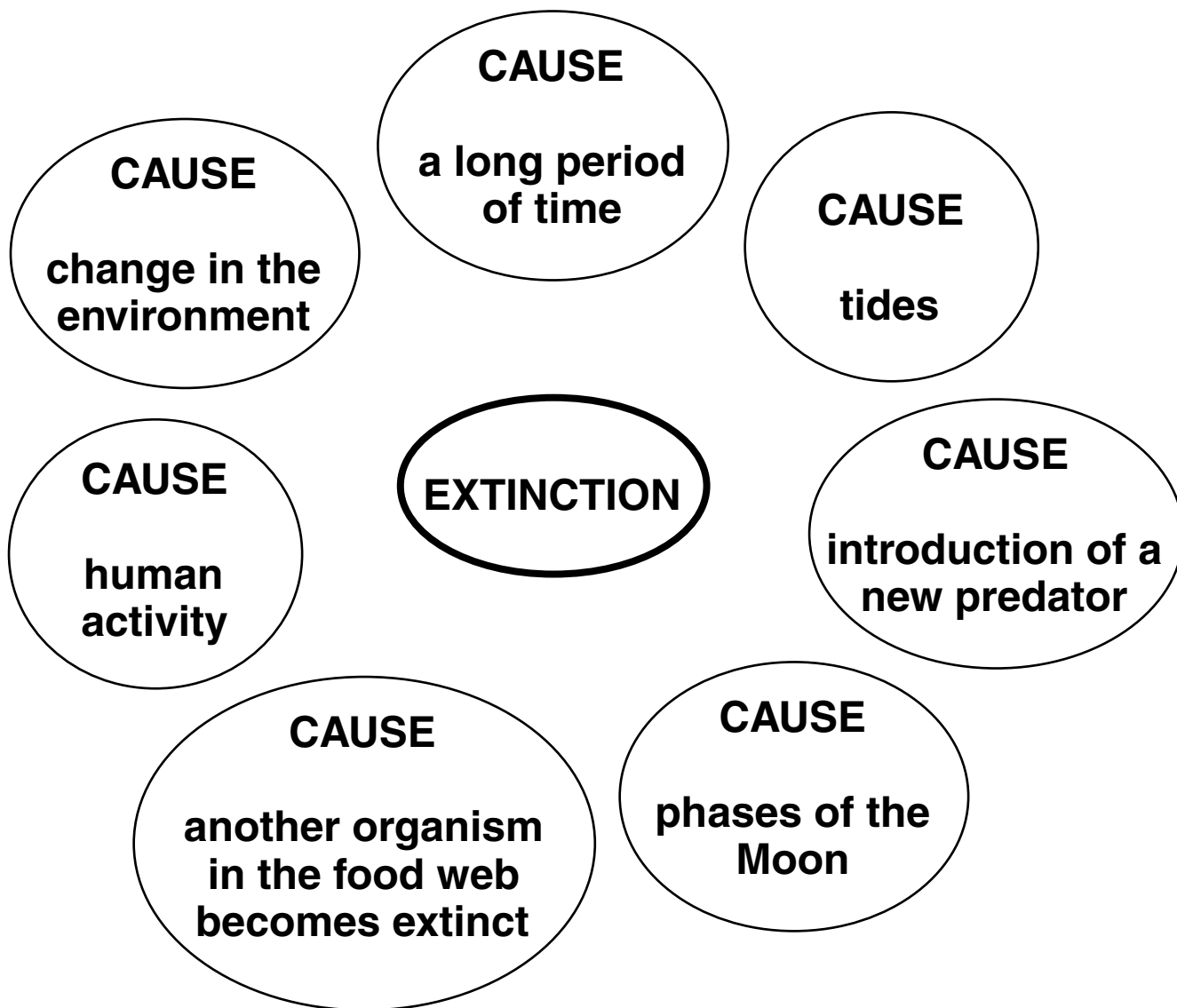
- **similar to natural selection**
- **different from natural selection.**

[4]

[Total: 4]

9 Some organisms on Earth have become extinct.

Draw straight lines linking the **FOUR** correct **CAUSES** of extinction to the central circle labelled **EXTINCTION**.



[2]

[Total: 2]

END OF QUESTION PAPER

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