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Centre Number						Candidate Number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

A221/01

**TWENTY FIRST CENTURY SCIENCE
BIOLOGY A**

Unit 1 Modules B1 B2 B3 (Foundation Tier)

FRIDAY 21 MAY 2010: 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 clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully and make sure that you know what you have to do before starting your answer.**
- **Answer ALL the questions.**
- **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).**

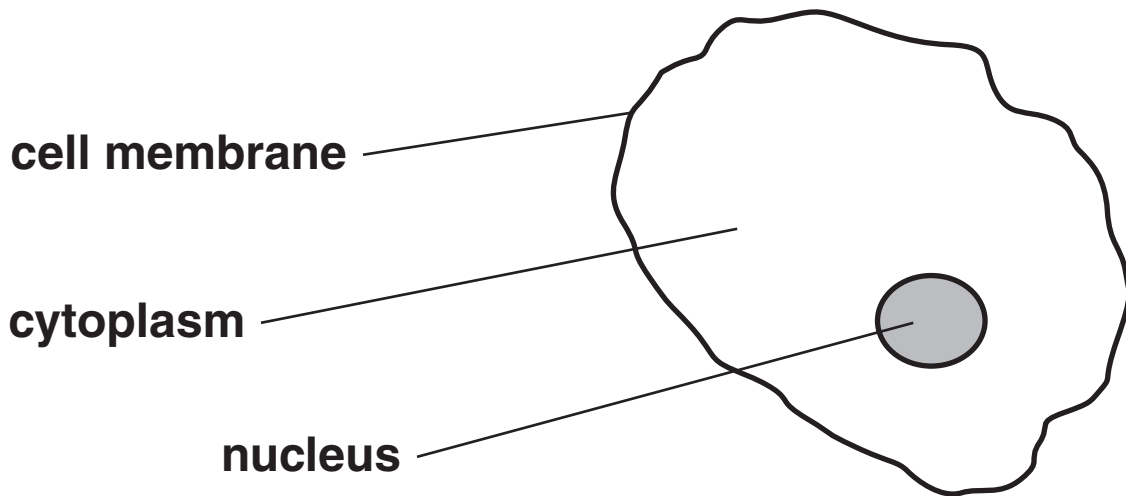
INFORMATION FOR CANDIDATES

- **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 Look at the diagram of a cell.



(a) Where are genes found in the cell?

Choose your answer from the labels on the diagram.

answer _____ [1]

(b) What is the job of genes?

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

to store glucose from digestion

to describe how to make proteins

to release energy by respiration

to transport materials around the cell

[1]

(c) Which statement best describes the structure of genes?

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

Genes are sections of ...

... very long DNA molecules that make up chromosomes.

... very short DNA molecules that make up chromosomes.

... very short chromosomes that make up DNA molecules.

... very long chromosomes that make up DNA molecules.

[1]

[Total: 3]

2 Human BODY cells have 46 chromosomes.

Chromosomes can replicate themselves.

(a) How many chromosomes are found in each human SEX cell?

Put a ring around the correct answer.

1 2 23 46 92

[1]

(b) Mary has cystic fibrosis.

Where did Mary get her alleles for cystic fibrosis from?

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

both from her mother

both from her father

neither from her mother nor her father

one from her mother and one from her father

[1]

(c) Neither Mary's mother nor father has cystic fibrosis.

Which statement is the best explanation for this?

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

Cystic fibrosis is caused by ...

... one dominant allele.

... two dominant alleles.

... one recessive allele.

... two recessive alleles.

... one dominant and one recessive allele.

[1]

[Total: 3]

3 Genetic testing can be used to find the chances of a person developing certain conditions in the future.

Read these two people’s views about this kind of genetic testing.

AMRIT – AN EMPLOYEE

I want to have a genetic test to see if I am at risk of getting cancer. Then I can make sure that my family will be prepared if anything happens to me. However, my employer wants to know the results of my tests. I do not want to tell him. If I am at risk of cancer he may sack me and I would lose my job and all my income.

RAJ – AN EMPLOYER

I am pleased that Amrit wants to have the genetic test. But I think I have the right to know the result of the test. After all, if he is ill I will have to pay sickness pay and I may have to employ someone else to do his job. That is going to cost me a lot of money that my business cannot afford.

Summarise why Amrit and Raj have different views about the use of the genetic test results.

[3]

[Total: 3]

BLANK PAGE

4 Our body is sometimes invaded by microorganisms.

(a) White blood cells can destroy invading microorganisms.

Some of the statements about white blood cells are true. Some are not.

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

White blood cells destroy microorganisms by ...

... using high frequency sound.

... engulfing them.

... drowning them.

... digesting them.

... making antibodies.

... using an electrical impulse.

... making antigens.

... using high speed collisions.

... injecting them with hormones.

[2]

(b) Microorganisms can grow in the human body.

Which conditions inside the body help microorganisms to reproduce rapidly?

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

presence of nitrogen gas

acidic

cold

wet

presence of food

dry

warm

presence of carbon dioxide

[3]

(c) Our bodies have natural barriers to prevent microorganisms from entering our blood.

One natural barrier is the skin, which is a physical barrier.

Write down THREE other examples of these natural barriers and describe how they work.

[3]

[Total: 8]

BLANK PAGE

5 Steve is concerned about his heart. He wants to stay healthy.

(a) He makes a list of activities that could affect his health.

Put ticks (✓) in the boxes next to the TWO activities Steve should continue to do.

smoke cigarettes

exercise regularly

drink a lot of alcohol

have a poor diet

reduce his stress level

[2]

(b) Fatty deposits could build up in Steve's blood vessels. This could produce a heart attack.

Read the sentences.

Put a ring around the correct choice in each sentence.

Blood is supplied to Steve's heart muscle cells through the coronary ARTERY / VEIN.

Fat deposits in the blood vessels INCREASE / DECREASE the blood supply to Steve's heart.

This means the muscle cells in Steve's heart get less OXYGEN / CARBON DIOXIDE.

This can cause cells in Steve's LUNGS / HEART to die. [2]

(c) Steve wants to know if any other factors are a major cause of heart disease.

He makes a list of factors that he thinks might affect his chances of developing heart disease.

- A I get lots of colds.**
- B I enjoy playing football.**
- C My father and grandfather both had heart attacks in their early forties.**
- D I only get about six hours sleep most nights.**

Which of these are high risk or low risk factors in causing heart disease?

Write the letters A, B, C and D in the correct columns.

HIGH RISK	LOW RISK

[2]

[Total: 6]

BLANK PAGE

- 6 Eating a diet containing a lot of fatty food can increase the risk of getting heart disease.**

Different people have different views about this.

JANE

I read on the internet that eating fatty foods for 20 years will cause heart disease. But I believe scientists who say it will just increase my risk of developing heart disease.

RANJIT

My grandad ate fatty food all his life. He lived until he was 83 and died of influenza. It's a good job scientists examine lots of data before they conclude that a high fat diet increases the risk of heart disease.

STELLA

I am a food scientist. My findings are always checked by other scientists before they are published.

PETER

We only know that fatty foods can cause heart disease because lots of different scientists have collected data. If the tests had not been repeated they would not have been reliable.

To answer these questions you may use each person once, more than once, or not at all.

- (a) Which person says that the absence of replication is a reason for questioning a scientific claim?**

answer _____ [1]

- (b) Which person is suggesting that individual cases do not provide convincing evidence for or against a CORRELATION?**

answer _____ [1]

- (c) Which person is describing the process of peer review?**

answer _____ [1]

- (d) Which TWO people are suggesting that factors might increase the chance of an outcome but not always lead to it?**

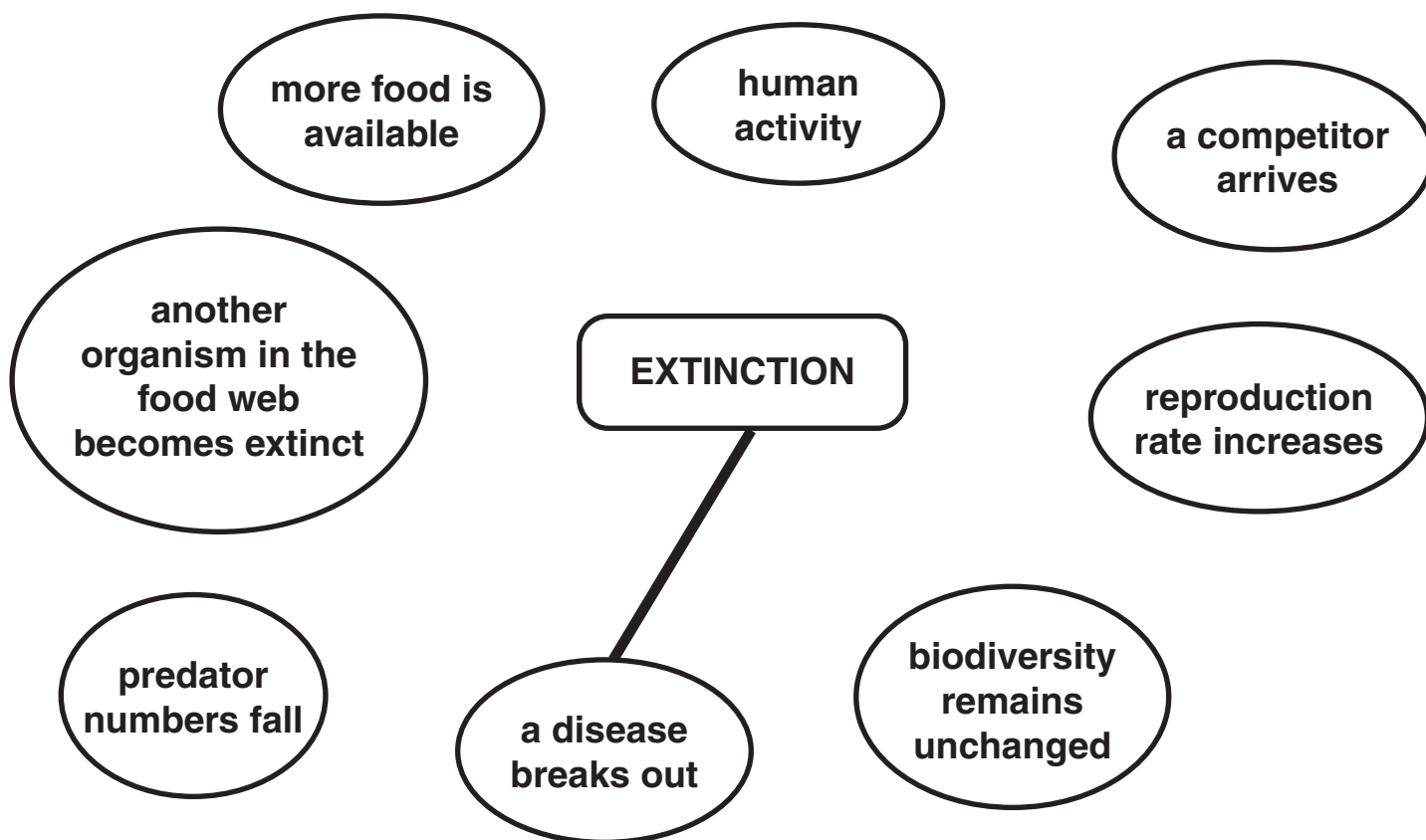
answer _____

and _____ [1]

[Total: 4]

7 Wendy is revising for her exams.

She produces a mind map to help her revise about extinction.



Draw lines to connect the FOUR CIRCLES containing correct reasons why extinction may happen, to the EXTINCTION box.

One of the four lines has been done for you. [2]

[Total: 2]

BLANK PAGE

8 Scientists have gathered evidence to show that life on Earth evolved.

(a) Which statements provide evidence for evolution?

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

ancient manuscripts like the Dead Sea Scrolls

stories passed down from one generation to the next

the fossil record

looking at how life evolved on other planets

similarities and differences in DNA

using the internet to research our ancestry

[2]

(b) Read the sentences about evolution.

Put a ring around the correct choice in each sentence.

Evolution has happened over millions of years.

The first living things developed from molecules that COULD / COULD NOT copy themselves.

Most scientists think that evolution happens by NATURAL / UNNATURAL selection. **[1]**

(c) Many scientists think that the Earth may warm up in the future.

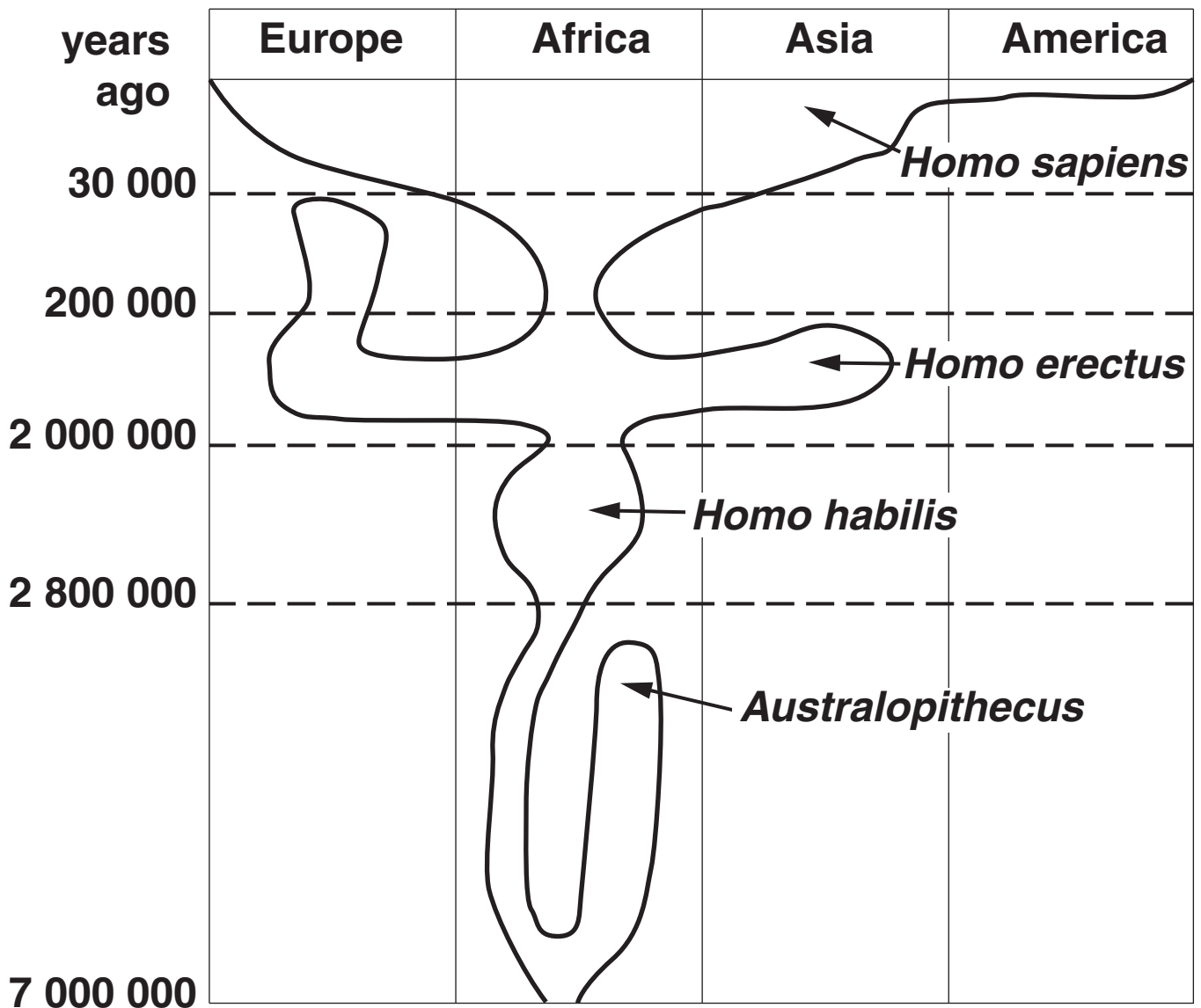
This is called climate change.

SUGGEST and EXPLAIN how climate change could have an effect on evolution.

[2]

[Total: 5]

9 The chart shows the evolution of humans (*Homo sapiens*) over the last 7 million years.



(a) Neanderthals are another extinct relative of humans.

They did not evolve into *Homo sapiens*.

Neanderthals became extinct just over 30 000 years ago.

Shade in the part of the chart that represents the Neanderthals.

[1]

(b) Use the chart to answer the questions.

(i) Which of these statements is true?

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

All the species named on the chart evolved from a common ancestor.

Only one of the species evolved from a common ancestor.

***Australopithecus* evolved from *Homo habilis*.**

None of the species evolved from a common ancestor.

***Homo erectus* was mainly found in America.**

[1]

(ii) Which process is shown by the chart?

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

The chart shows ...

... central evolution.

... convergent evolution.

... divergent evolution.

... negative evolution.

[1]

(iii) Name one species shown on the chart that is not yet extinct.

answer _____ [1]

(c) Explain how changes to the brain influenced human evolution.

_____ **[2]**

(d) Ideas about evolution have changed with time.

Darwin produced data to back up his theory of evolution by natural selection.

This data conflicted with the old explanations that many scientists believed.

Even so, scientists were still reluctant to give up these old explanations.

Suggest TWO reasons why scientists involved in a scientific issue may disagree.

[2]

[Total: 8]

END OF QUESTION PAPER



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