

Candidate forename						Candidate surname					
Centre number						Candidate number					

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE
A214/01
TWENTY FIRST CENTURY SCIENCE
SCIENCE A

Unit 4: Ideas in Context (Foundation Tier)

THURSDAY 24 MAY 2012: Morning
DURATION: 45 minutes
plus your additional time allowance
MODIFIED ENLARGED

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

OCR SUPPLIED MATERIALS:

Insert (inserted)

OTHER MATERIALS REQUIRED:

Pencil


Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- The Insert will be found in the centre of this document.
- 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 **40**.
-  Where you see this icon you will be awarded a mark for the quality of written communication in your answer.

Answer ALL the questions.

1 This question is based on the article “Particulate perils”.

(a) Particulates are linked to several diseases.

(i) Name TWO of these diseases.

1 _____

2 _____ [1]

(ii) Scientists think that particulates less than 10 micrometres in diameter are very harmful.

Explain why.

_____ [2]

(b) How does burning fossil fuels release particulates into the air?

_____ [2]

- (c) Suggest how an increase in particulate concentration in the air may cause a rise in sea level.**

[3]

- (d) The ‘Boston study’ discovered a correlation involving particulates.**

Complete the sentence to describe this correlation.

**As the _____ increases
the _____ rises. [1]**

(e) Look at the graph of PM₁₀ concentration in a European city centre from 1st to 6th January 2010.

- (i) On some days the PM₁₀ concentration measured at any one time NEVER reached the daily average limit set for Europe.**

On which days was this the case?

_____ **[2]**

- (ii) At each time on each day, the scientists measured the PM₁₀ concentration once.**

Describe how they could get a better estimate of the PM₁₀ concentrations.

_____ **[2]**

[Total: 13]

- 2 This question is based on the article “Scientist knows his own future”.**

The article is about gene mapping.

(a) It is now possible to map a person’s genes.

(i) Explain what a gene is.

[2]

(ii) The first paragraph refers to Stephen Quake having his genes mapped.

Explain what this means.

[1]

- (b) The gene mapping shows that Stephen is at risk of ‘sudden death syndrome’.**

This means that there is an increased risk of him dying suddenly.

- (i) Describe TWO implications that Stephen will have to think about.**

[2]

- (ii) Explain why GENE THERAPY may be important for Stephen.**

[1]

(c) Four people are talking about the article.

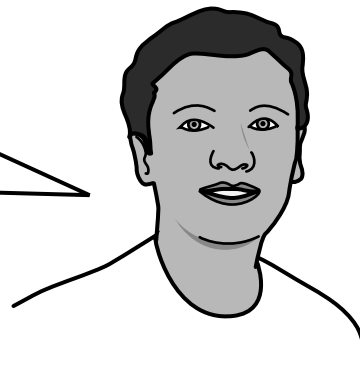
MIKE

It's hard to decide if finding out your own future risks for genetic diseases is the right thing to do, or not.



PETER

Knowing your own genetic future is not right. It's only for God to know what lies ahead for us.



ANITA

Who cares whether diseases are inherited or caught from somebody else? Either way you end up being ill.



MARY

It may soon be possible to treat diabetes with genetic engineering.



- (i) Which person is saying that certain actions are never justified because they are unnatural or wrong?

name _____ [1]

- (ii) Which person is stating something that could be addressed using a scientific approach?

name _____ [1]

- (iii) Which TWO people are talking about ethical issues?

name _____ and _____ [1]

- (d) When talking about gene mapping, Stephen said that this issue raises “many questions that need to be addressed”.

State clearly what issue Stephen is talking about and summarise TWO different views that might be held.



One mark is for presenting different points of view on the issue.

[2+1]

- (e) Two people have their genes mapped. They are told that they have an equal risk of developing the same genetic disease.**

Explain why one person may develop the disease whilst the other may not.

[2]

[Total: 14]

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TURN OVER FOR QUESTION 3

3 This question is based on the article “Observing the night sky”.

(a) Sam is an astronomer.



Write down two ways in which Sam can tell that what she is looking at is likely to be a comet, NOT a star.

- 1** _____
- 2** _____ **[2]**

(b) The invention of the telescope allowed astronomers to make new discoveries.

Write down two discoveries made using a telescope that are mentioned in the article.

- 1** _____
- 2** _____ **[2]**

(c) The Solar System was formed from a nebula.

Write down what this nebula contained.

_____ and _____ [2]

(d) When Shapley and Curtis had their debate about starry nebulae, no-one knew who was right.

Who was right? _____

What was his idea, and what evidence showed that he was right?

_____ [2]

(e) Scientific explanations often lead to predictions, which can be tested by new observations.

This happened to the explanations given by Shapley and Curtis.

Using the article, give ANOTHER example of a prediction and an observation that tested it.

prediction _____

observation _____ [1]

- (f) The table gives the distances to different galaxies and the speeds at which they are moving away from us.

distance in millions of light-years	10	15	20	31	35
speed in km/s	220	330	450	650	750

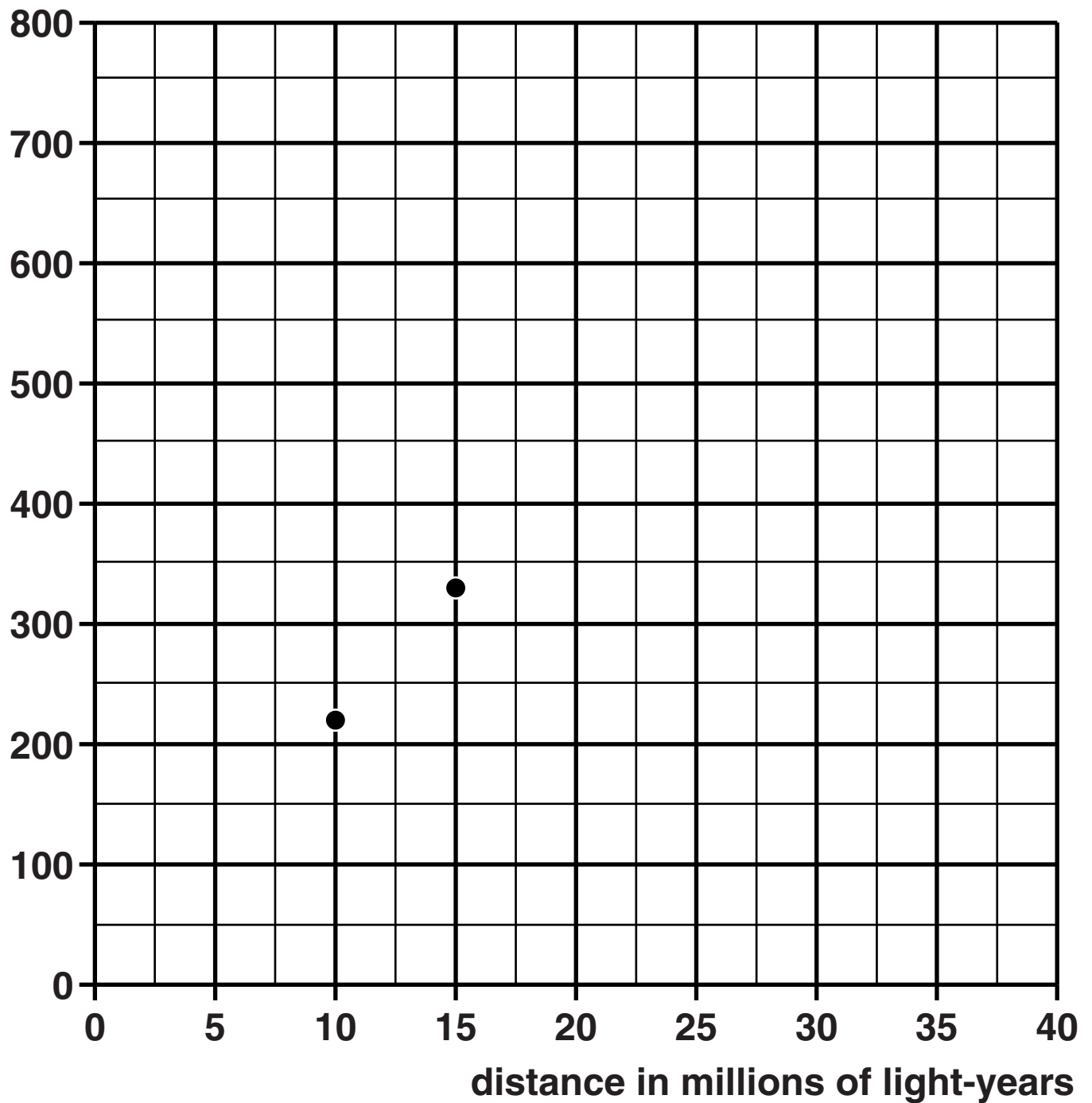
- (i) Plot the data on the graph (opposite). Two points have been plotted for you. [2]
- (ii) Draw a straight line of best fit through the data on the graph. [1]
- (iii) A galaxy is moving away from us at a speed of 300 km/s.

Use your graph to find the distance to this galaxy.

distance = _____ million light-years [1]

[Total: 13]

speed in km/s



END OF QUESTION PAPER

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