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

A214/01

**TWENTY FIRST CENTURY SCIENCE
SCIENCE A**

Unit 4: Ideas in Context (Foundation Tier)

FRIDAY 28 MAY 2010: Morning

DURATION: 45 minutes

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

**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

- 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 40.
-  Where you see this icon you will be awarded a mark for the quality of written communication in your answer.

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Answer ALL the questions.

1 THIS QUESTION IS BASED ON THE ARTICLE 'TO CULL OR NOT TO CULL?'

(a) TB is now increasing in the UK human population.

Suggest two reasons why.

1 _____

2 _____ [2]

(b) A vaccine is being developed to protect cattle against TB.

This vaccine may not completely get rid of TB in cattle.

Suggest two reasons why.

1 _____

2 _____ [2]

(c) Scientists wanted to find out if TB in the badger population was being spread to cattle. They decided to collect some data.

Which two people in the article, chosen from Jane, Ranjit, Peter and Stella, are using DATA in their argument?

answer _____ and _____ [2]

(d) (i) Which person, Jane, Ranjit, Peter or Stella, is stating a correlation but NOT giving a cause?

answer _____ [1]

(ii) Which person, Jane, Ranjit, Peter or Stella, is stating a correlation and giving a cause?

answer _____ [1]

(e) Peter talks about a 20% increase in TB in cattle on neighbouring land when more badgers were culled.

This is an AVERAGE value.

Suggest and explain why an average value was calculated.

[2]

(f) A correlation described in the article supports the view that badgers spread TB to cattle.

What is this correlation?

[1]

(g) Some scientists concluded that there was no evidence that culling badgers would reduce the number of cattle with TB.

Describe two ways, other than culling badgers, that scientists recommend to reduce the number of cattle with TB in the future.

1 _____

2 _____ **[2]**

[Total: 13]

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**2 THIS QUESTION IS BASED ON THE ARTICLE
'CLEANING UP THE MARSHALL ISLANDS'.**

(a) The radioactive waste that fell on Rongelap Island had four main elements in it.

(i) Put ticks (✓) in the TWO correct boxes in each row of the table to show what types of radiation each element gave off.

ELEMENT	ALPHA RADIATION	BETA RADIATION	GAMMA RADIATION
americium			
caesium			
plutonium			
strontium			

[3]

(ii) The radioactive waste emits IONISING radiation.

Write down two things that may happen to living cells after exposure to ionising radiation.

1 _____

2 _____ [2]

(b) Suggest TWO risks from nuclear weapons testing on Bikini Atoll to people living on an island 150 km away.

[2]

(c) Even though Rongelap Island was still radioactive until quite recently, many tourists go diving in the sea there.

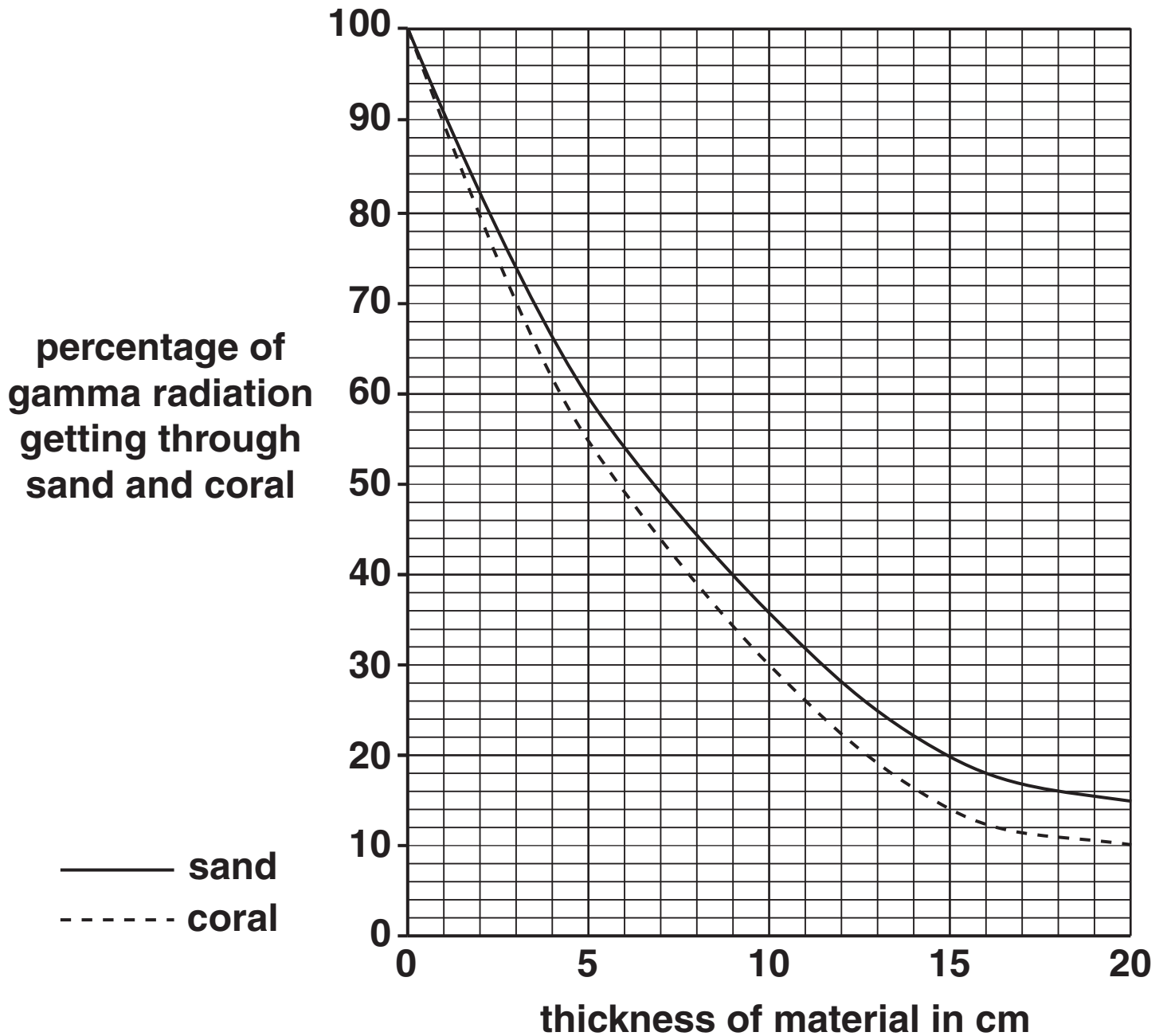
Suggest why these people dive there even though there may be a risk from radiation.

 **One mark is for a clear explanation that considers both risks and benefits.**

[2+1]

(d) The graph compares the percentage of gamma radiation getting through sand and coral of different thicknesses.

ABSORPTION OF GAMMA RADIATION BY SAND AND BY CORAL



- (i) Scientists used crushed coral, rather than sand, to cover the ground containing radioactive chemicals.

Use the graph to find the percentage of gamma radiation getting through a 15 cm depth of sand and a 15 cm depth of coral.

	SAND	CORAL
percentage of gamma radiation getting through 15 cm of material	_____ %	_____ %

[2]

- (ii) A 20 cm depth of CORAL is enough to make the amount of gamma radiation getting through ten times smaller.

Explain how the graph shows this.

[2]

[Total: 14]

3 THIS QUESTION IS BASED ON THE ARTICLE 'CALL TO BAN FOOD COLOURINGS'.

- (a) Some school children suffer from attention deficit hyperactivity disorder (ADHD).**

Write down TWO symptoms of ADHD mentioned in the article.

1 _____

2 _____ [2]

- (b) Suggest why artificial colourings are added to soft drinks.**

_____ [1]

- (c) Scientists at Southampton University carried out research on the effects of some food colourings on hyperactivity in children.**

- (i) The scientists studied the effect of food colourings combined with a preservative commonly found in soft drinks.**

What is the name of this preservative?

_____ [1]

- (ii) The scientists used two drinks containing different mixtures of the preservative with food colourings.

Which FOOD COLOURINGS were present in both mixtures?

_____ [2]

- (iii) The drink given to some children was water.

Explain why.

_____ [1]

- (d) Scientists have advised caution in applying results from this study to the whole UK population.

Use the article to state two reasons why.

1 _____

2 _____

_____ [2]

(e) There is evidence that some food colourings may cause hyperactivity in children. Despite this evidence, some parents buy their children drinks containing these additives instead of natural fruit juices.

(i) Suggest why parents may be willing to buy these drinks for their children.

[2]

(ii) It is impossible for any soft drink to be completely safe to drink.

Give TWO reasons why.

[2]

[Total: 13]

END OF QUESTION PAPER

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