OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

TWENTY FIRST CENTURY SCIENCE SCIENCE A

A214/01

Unit 4: Ideas in Context (Foundation Tier)

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)

Friday 28 May 2010
Morning

Duration: 45 minutes

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- 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.
- Do **not** write in the bar codes.
- 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.
- This document consists of **8** pages. Any blank pages are indicated.

OCR is an exempt Charity

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]

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) Many tourists go diving in the sea around Rongelap Island even though the island was still radioactive until quite recently.

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.

.....

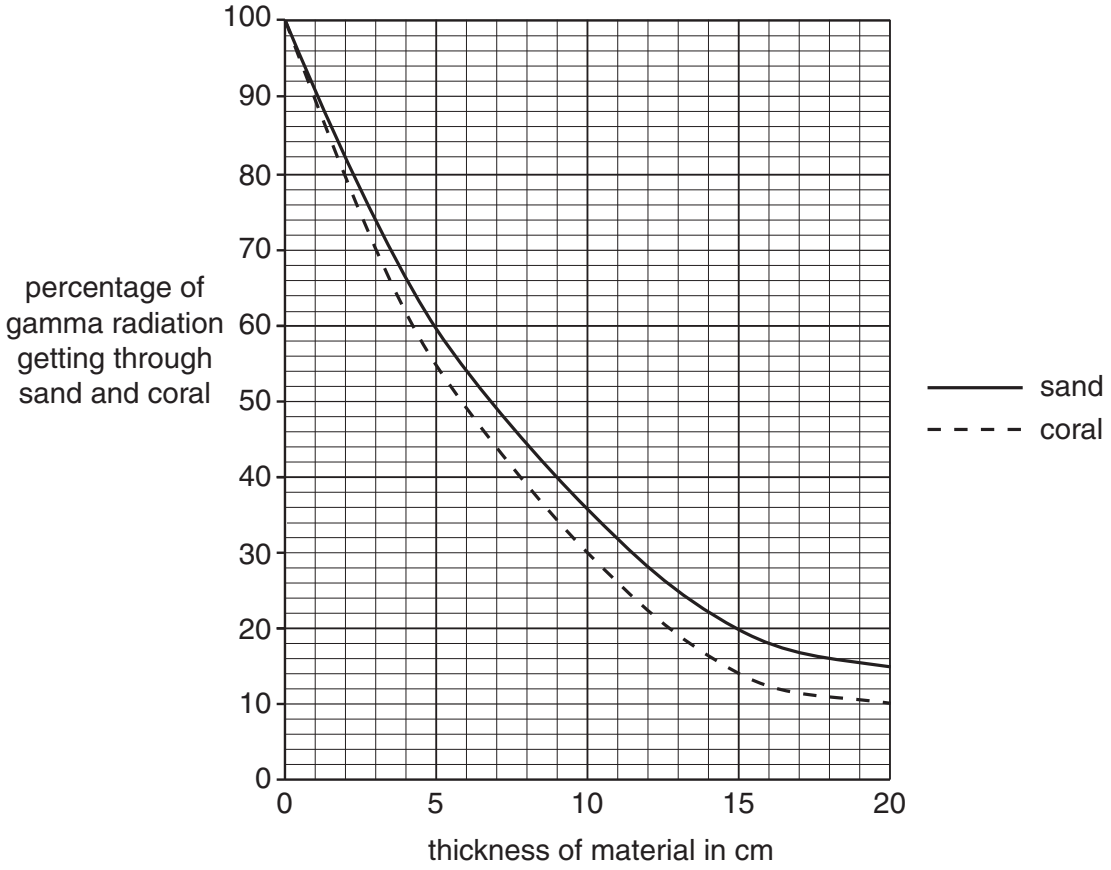
.....

.....

..... **[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

PLEASE DO NOT WRITE ON THIS PAGE