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Friday 15 June 2012 – Afternoon

**GCSE TWENTY FIRST CENTURY SCIENCE
SCIENCE A**

A213/01 Unit 3: Modules B3 C3 P3 (Foundation Tier)

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

Duration: 40 minutes

OCR supplied materials:
None

Other materials required:

- Pencil
- Ruler (cm/mm)



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. 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).
- Do **not** write in the bar codes.

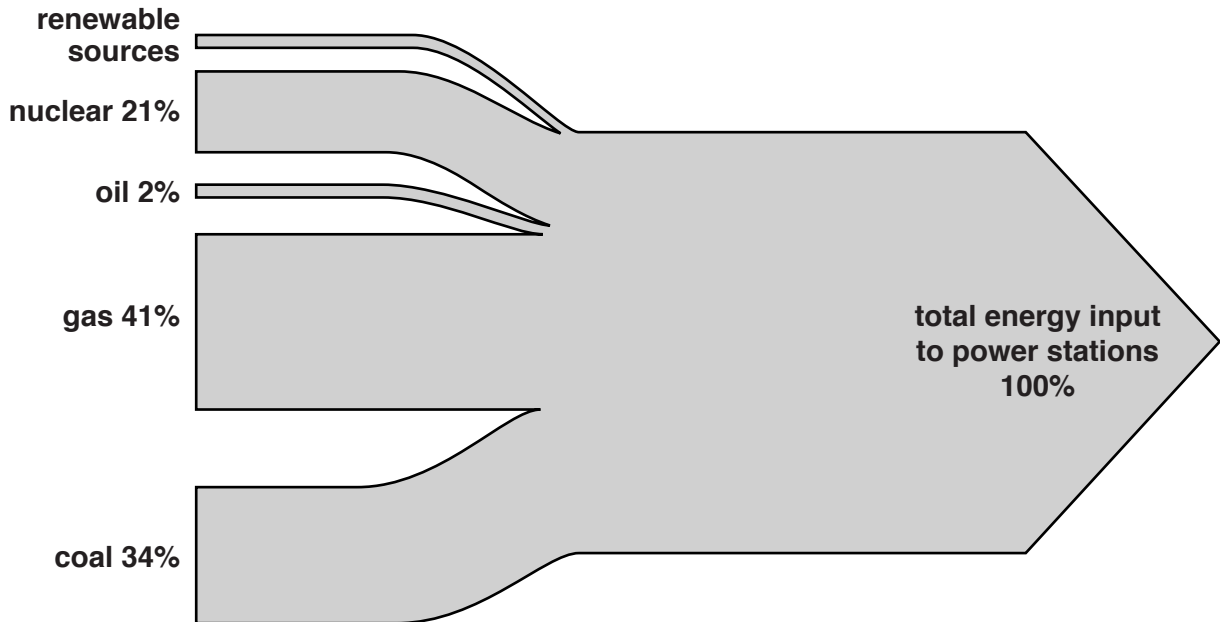
INFORMATION FOR CANDIDATES

- 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**.
- This document consists of **12** pages. Any blank pages are indicated.

Answer **all** the questions.

1 This question is about the generation of electrical energy in the UK in 2009.

(a) The diagram below shows the percentages of different energy sources used by power stations.



(i) Which **carbon fuel** made the biggest energy input to generating electricity in 2009?

..... [1]

(ii) The percentage for renewable sources is not shown.

What is the percentage provided by renewable sources?

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

- 2
- 21
- 34
- 41
- 98

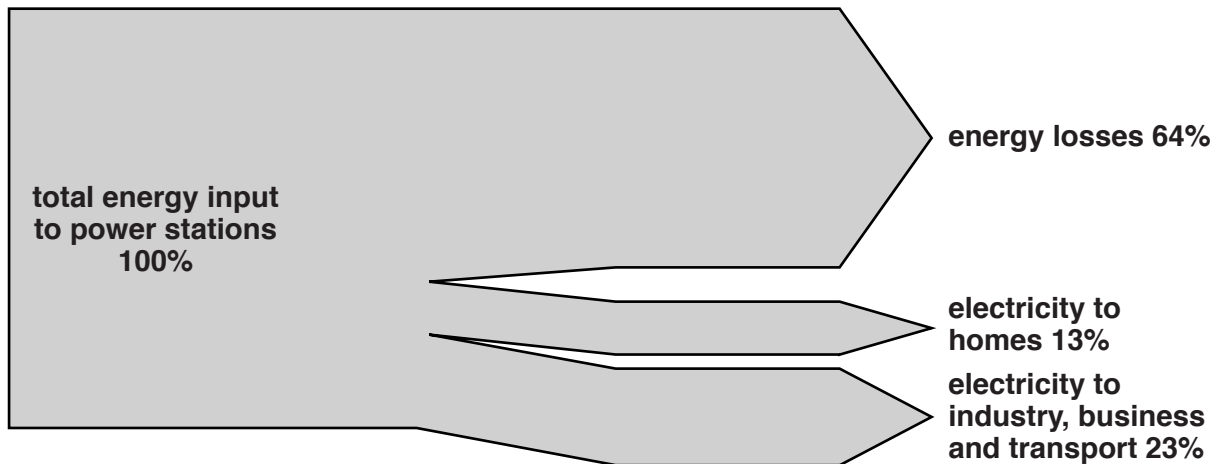
[1]

(b) The amounts of renewable sources and of carbon fuels used to produce electricity will change during the next century.

Suggest and explain **two** changes to the diagram above which are likely to happen.

.....
.....
.....
..... [3]

(c) The next diagram shows what happened to this energy in power stations in 2009.



Which of the following figures was the energy efficiency of British power stations in 2009?

Put a ring around the correct value.

13% 36% 64% 100%

[1]

[Total: 6]

2 This question is about the **advantages** and **disadvantages** of using nuclear power stations.

The following statements about nuclear power stations are all true.

Put a tick (✓) in the correct box after each statement to show whether it is an **advantage** or a **disadvantage**.

statement	advantage	disadvantage
An accident could release radioactive materials.		
Each tonne of fuel gives a lot of energy.		
No carbon dioxide is given out by the fuel when the power station is working.		
Radioactive waste is produced.		
Nuclear fuel will last for many years.		

[2]

[Total: 2]

3 A patient with a medical problem may be treated using a radioactive material which emits beta radiation.

(a) Which of the following statements correctly describes this material?

Put ticks (✓) in the boxes next to the **two** correct statements.

- If the material is heated, it will give off more radiation.
- The amount of radiation emitted will decrease with time.
- The emitted radiation can penetrate several centimetres of metal.
- The emitted radiation is absorbed by a single sheet of paper.
- The emitted radiation is an ionising radiation.

[2]

(b) In the treatment, the radioactive material is injected into the patient's body.

(i) Which of the following statements correctly describes an effect of the injection into the patient's body?

Put ticks (✓) in the boxes next to the **two** correct statements.

- Healthy cells will not be affected.
- Diseased cells may be killed.
- The radioactive material cannot harm the patient.
- The radiation removes ions from the cells.
- The patient is contaminated by the injected material.

[2]

(ii) Suggest why the patient agrees to have this injection.

In your answer, you should say what the likely benefit is, and whether it is worth taking the risk.

.....
.....
..... [2]

[Total: 6]

4 This question is about changes in organisms.

(a) Peter has certain characteristics.

Which characteristic could **not** have been inherited from his parents?

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

cystic fibrosis **his height** **Huntington's disorder** **scar on his face**

[1]

(b) Organisms can change as a result of natural selection or selective breeding.

The table shows changes caused by either **natural selection** or **selective breeding**.

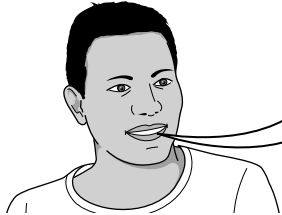
Put a tick (✓) in the correct column to show how each change was caused.

change	natural selection	selective breeding
head lice have become resistant to poisonous shampoo		
racehorses now run faster		
cows now produce larger quantities of milk		
hens lay more eggs every day		


[2]

[Total: 3]

5 Here are some statements from different people about evolution.





Amrit
Some organisms are better suited to survive in an environment than others. They will breed and pass on their features to their offspring.



Beatrice
My dad says that all life was created in 6 days.

Caroline
Darwin noticed that each type of finch on the Galapagos Islands had a different shaped beak.



Edward
All the plants and animals of one species are competing against each other for food.

(a) Who is giving the accepted scientific explanation of evolution?

answer [1]

(b) Who is stating some data about evolution?

answer [1]

(c) Charles Darwin played an important part in developing ideas about evolution.

He noticed that most of the offspring produced by plants and animals do not survive long enough to reproduce.

Suggest why they do not survive.

.....
.....
..... [2]

[Total: 4]

6 (a) In humans the nervous system is coordinated by a central nervous system (CNS).

Name the **two** parts of the CNS.

1

2

[1]

(b) The nervous system is made up of nerve cells linking receptor cells to effector cells.

Complete the sentences.

Choose your answers from this list.

detect impulses make responses start

Sensor (receptor) cells stimuli.

Effector cells produce to stimuli.

[1]

(c) Multicellular organisms have evolved two communication systems.

One is the nervous system.

What is the other one called?

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

circulatory

digestive

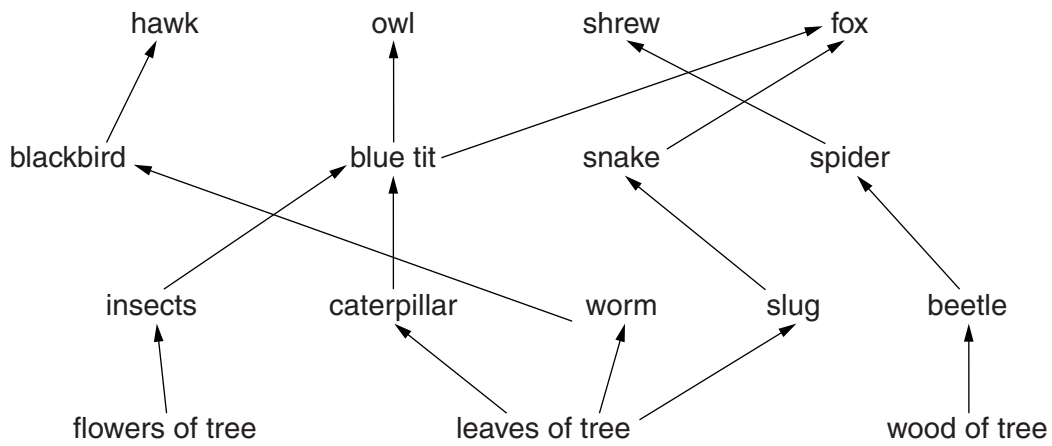
electrical

hormonal

[1]

[Total: 3]

7 The food web shows organisms living in a wood.



(a) Use only information from the food web to construct one complete food chain.

Draw one straight line from a **producer** to its **primary consumer**.

Then draw one straight line from this **primary consumer** to its **secondary consumer**.

Then draw one straight line from this **secondary consumer** to its **top predator**.

producer	primary consumer	secondary consumer	top predator
	beetle	blackbird	shrew
leaves of tree	slug	spider	owl
flowers of tree	worm	blue tit	hawk

[1]

(b) Organisms can sometimes become extinct.

Suggest ways in which this might happen.

.....

.....

.....

.....

.....

[3]

[Total: 4]

8 (a) A newspaper article says that organic fruit has the same nutrients as fruit from intensive farms.

(i) Why do shoppers buy organic fruit even though it has the same nutrients?

Put ticks (✓) in the boxes next to the **two** correct reasons.

All organic fruit is larger and looks better.

There are no pests on organic fruit.

Organic farms do not use synthetic pesticides.

An organic farm employs fewer people.

Pesticides left on intensively farmed fruit may be a health hazard.

[2]

(ii) Some people choose organic foods because they think that the farming methods benefit wildlife.

Explain how organic farming methods may benefit wildlife.

.....
.....
.....
..... [2]

(b) Both organic and intensive farmers add nitrogen compounds to the soil.

Write about

- why it is necessary to add nitrogen compounds to the soil
- the different ways organic and intensive farmers do this.

.....
.....
.....
.....
..... [3]

[Total: 7]

Turn over

9 Jon is learning how proteins are used and removed from the human body.

(a) The sentences below describe what happens.

Draw a straight line from the **beginning** of each sentence to its correct **ending**.

beginning

ending

Digestion breaks down food into ...

... urine.

Muscle, skin and hair are made from ...

... urea.

Unused amino acids are broken down in the liver to make ...

... small molecules.

The liquid excreted by the kidneys is ...

... protein.

[3]

(b) Biscuits contain sugar, starch and fat.

When Jon eats biscuits his blood sugar level rises.

Which **two** statements explain why this happens?

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

- Biscuits contain starch that is digested into glucose.
- Biscuits contain starch which is digested into amino acids.
- Biscuits contain fat which is digested into fatty acids.
- Sugar can be absorbed directly into the blood.
- Biscuits contain starch molecules which are too large to be absorbed.
- Fat is digested into sugar.

[2]

(c) Jon's mother has type 1 diabetes.

Jon makes some notes about type 1 diabetes.

Here is what he writes.

He makes some mistakes.

Type 1 diabetes

1. Type 1 diabetes happens when the pancreas stops producing insulin.
2. Lack of insulin means the amount of sugar in the blood is too high.
3. Type 1 diabetes only affects people over 50.
4. Obesity is a risk factor for type 1 diabetes.
5. Type 1 diabetes is controlled by insulin injections.
6. Type 1 diabetes cannot be controlled by exercise.

Write down the numbers of the **two** sentences that contain mistakes.

sentences and[2]

[Total: 7]

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE



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