Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Do not return the insert with the question paper.

Information

- The total mark for this paper is 90.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Quality of written communication will be taken into account in the marking of your answers
  – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

PEARSON

Answer ALL questions.

You should aim to spend no more than 20 minutes on this section.

Choose an answer A, B, C or D, and put a cross in the box ⊠.
If you change your mind about an answer, put a line through the box ⊠
and then mark your new answer with a cross ⊠.

Use the information below to help you answer questions 1 to 4.

YOUTH CRIME IN DIFFERENT REGIONS

Region	Number of crimes	Region population (in millions)	Ratio of crimes to population
North East	22 958	2.6	1:113
Yorkshire	32 070	5.0	1:156
North West	42 351	6.8	1:161
West Midlands	30 447	5.3	1:174
London	28 167	7.4	1:263

(Source: adapted from *FACTSHEET – Youth Crime in England and Wales*, Lara Natale,
CIVITAS 2010 – *www.civitas.org.uk/crime/factsheet-YouthOffending*)

1 The median 'Number of crimes' for the regions given is

⊠ **A** 22 958

⊠ **B** 32 070

⊠ **C** 42 351

⊠ **D** 30 447

(Total for Question 1 = 1 mark)

2 To the nearest 0.1 million the mean population for the regions given is

⊠ **A** 5.8

⊠ **B** 5.6

⊠ **C** 5.4

⊠ **D** 5.2

(Total for Question 2 = 1 mark)

3 Another region has a population of 5 million and 23 274 youth crimes were committed. What would be the corresponding 'Ratio of crimes to population'?

- ☒ **A** 1:215
- ☒ **B** 1:195
- ☒ **C** 1:185
- ☒ **D** 1:175

(Total for Question 3 = 1 mark)

4 The 'Ratio of crimes to population' figure for the different regions makes the data

- ☒ **A** more reliable
- ☒ **B** easier to measure
- ☒ **C** more precise
- ☒ **D** easier to compare

(Total for Question 4 = 1 mark)

5 Occam's Razor can be used to

- ☒ **A** devise a scientific procedure
- ☒ **B** make scientific predictions
- ☒ **C** report new scientific discoveries
- ☒ **D** choose between rival scientific theories

(Total for Question 5 = 1 mark)

6 Which of these best describes evolution and natural selection?

- ☒ **A** Evolution provides a mechanism to explain natural selection
- ☒ **B** Natural selection provides a mechanism to explain evolution
- ☒ **C** Evolution and natural selection mean the same thing
- ☒ **D** There is no connection between evolution and natural selection

(Total for Question 6 = 1 mark)

7 The main reason that some religious groups object to human organ transplants is because they believe that such treatments are

☒ **A** unethical

☒ **B** expensive

☒ **C** unreliable

☒ **D** dangerous

(Total for Question 7 = 1 mark)

8 Which of these is true of a secular state?

☒ **A** There is an official state religion

☒ **B** Church and state are separate

☒ **C** The head of state is a religious leader

☒ **D** Religious dress is not allowed in public

(Total for Question 8 = 1 mark)

9 The development of Utilitarianism in 19th-century Britain is closely associated with

☒ **A** the scientist Michael Faraday

☒ **B** the religious leader Cardinal Newman

☒ **C** the philosopher John Stuart Mill

☒ **D** the politician Benjamin Disraeli

(Total for Question 9 = 1 mark)

10 An ethical objection to the testing of drugs on animals is most likely to relate to the

☒ **A** cost of carrying out the tests

☒ **B** impossibility of testing using computer models

☒ **C** pain suffered by animals during the tests

☒ **D** unreliability of testing drugs on cloned cells

(Total for Question 10 = 1 mark)

11 A criminal suspect arrested and charged by the police does **not** have the automatic right to

☒ **A** remain silent

☒ **B** seek advice from a lawyer

☒ **C** know why they have been arrested

☒ **D** be released on bail

(Total for Question 11 = 1 mark)

12 The branch of the law which deals with the punishment of offenders is known as

☒ **A** civil law

☒ **B** common law

☒ **C** criminal law

☒ **D** case law

(Total for Question 12 = 1 mark)

13 Which of these offences is most likely to be punished by a sentence of community service?

☒ **A** Parking illegally

☒ **B** Shoplifting

☒ **C** Armed robbery

☒ **D** Manslaughter

(Total for Question 13 = 1 mark)

14 The idea that criminals should suffer for what they have done is called

☒ **A** retribution

☒ **B** restoration

☒ **C** rehabilitation

☒ **D** remission

(Total for Question 14 = 1 mark)

15 A prison sentence described as 'exemplary' is

☒ **A** likely to be shorter than expected

☒ **B** likely to be longer than expected

☒ **C** applied only when a further offence is committed

☒ **D** applied at the same time as another sentence

(Total for Question 15 = 1 mark)

Use the information below to help you answer questions 16 to 20.

Mendeleev and the Periodic Table

One of the most important developments in chemistry was Mendeleev's publication of a periodic table in 1869. Mendeleev arranged known elements by increasing atomic weight but, unlike in previous similar tables produced by other scientists, he left gaps in the table where he thought there were missing elements. He then used the densities and melting points of surrounding elements in the table to predict the properties of missing elements.

16 The sentence 'One of the most important developments in chemistry was Mendeleev's publication of a periodic table in 1869' contains

☒ **A** fact only

☒ **B** opinion only

☒ **C** both fact and opinion

☒ **D** no fact or opinion

(Total for Question 16 = 1 mark)

17 The phrase 'Mendeleev arranged known elements by increasing atomic weight' contains

☒ **A** fact only

☒ **B** opinion only

☒ **C** both fact and opinion

☒ **D** no fact or opinion

(Total for Question 17 = 1 mark)

18 Mendeleev's thought that '…there were missing elements…' is best described as

☒ **A** calculation

☒ **B** hypothesis

☒ **C** theory

☒ **D** correlation

(Total for Question 18 = 1 mark)

19 Using properties '…of surrounding elements…to predict the properties of missing elements…' is best described as

☒ **A** induction

☒ **B** deduction

☒ **C** abduction

☒ **D** reduction

(Total for Question 19 = 1 mark)

20 Mendeleev predicted the properties of the elements he thought were missing from the table because

☒ **A** other scientists had made similar predictions

☒ **B** the density of an element could be easily measured

☒ **C** many elements have the same melting point

☒ **D** missing elements could then be identified more easily

(Total for Question 20 = 1 mark)

TOTAL FOR SECTION A = 20 MARKS

21 Use the information in paragraph 1 to estimate the total funding allocated to science research in the UK in 2008.

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(Total for Question 21 = 2 marks)

22 From paragraph 1, identify two different sources of funding for scientific research.

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(Total for Question 22 = 2 marks)

23 Identify one source of funding for scientific research not mentioned in the passage and describe the area of scientific research it supports.

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(Total for Question 23 = 2 marks)

24 From paragraph 3, identify two benefits resulting from the discovery of penicillin.

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(Total for Question 24 = 2 marks)

25 Give an example of scientific research not mentioned in the passage and one technological application of the research.

Scientific research

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Technological application

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(Total for Question 25 = 2 marks)

26 Identify one application of lasers not mentioned in the passage.

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(Total for Question 26 = 1 mark)

27 Spending on research and development by private businesses is described as
'…estimated…(to be)…approximately £14 billion' (paragraph 1). Explain why it might
be difficult to give a precise figure.

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(Total for Question 27 = 2 marks)

28 Use information from the passage to identify the benefits of international
cooperation in science research projects.

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(Total for Question 28 = 2 marks)

29 The passage refers to curiosity-driven research and applied research. Use information from the passage to compare their characteristics.

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(includes 3 marks for Quality of Written Communication)

(Total for Question 29 = 7 marks)

30 The author uses different types of evidence and arguments to support the conclusion that the government should continue to fund curiosity-driven research.

Assess the strengths and weaknesses of these different types of evidence and arguments, using examples from the passage.

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(includes 3 marks for Quality of Written Communication)

(Total for Question 30 = 8 marks)

TOTAL FOR SECTION B = 30 MARKS

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Turn over for Section C

SECTION C

Answer BOTH questions.

You should aim to spend no more than 40 minutes on this section.

31 Some forms of transport such as commercial aircraft and private cars make very large contributions to carbon emissions. Rather than expanding airports and building ever more motorways we should be reducing air travel and restricting cars to essential use only.

Discuss arguments for and against this suggestion.

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(includes 4 marks for Quality of Written Communication)

(Total for Question 31 = 20 marks)

32 The 1948 Universal Declaration of Human Rights, a response to the atrocities of the Second World War, defined various rights such as the right to free elementary education and the right to asylum. While these rights are sometimes described as unconditional, some critics have argued that they are limited because they impose responsibilities on other people, or because they depend on circumstances.

To what extent can human rights be universal or unconditional?

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(includes 4 marks for Quality of Written Communication)

(Total for Question 32 = 20 marks)

TOTAL FOR SECTION C = 40 MARKS
TOTAL FOR PAPER = 90 MARKS

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Edexcel GCE

General Studies

Advanced Subsidiary
Unit 1: Challenges for Society

Friday 11 January 2013 – Morning
Insert

Paper Reference
6GS01/01

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Turn over ▶

P41708A

PEARSON

Can we afford curiosity-driven science?

In 2008 the UK government allocated 0.6% of the national budget of £600 billion for specific science research projects. Another £2.2 billion came through higher education budgets to fund staffing and other on-going costs in universities. During the same period it is estimated that private businesses spent approximately £14 billion on research and development.

Most of the government funding was spent on 'curiosity-driven' (basic) research with no immediate application or technological spin-off in mind. In a few cases, universities collaborated with business sponsors on short-term projects aimed at commercialising particular aspects of research findings. So does the government need to spend billions to satisfy scientists' curiosity? Two examples may help to provide an answer.

It can be argued that Britain's huge pharmaceutical industry has its origins in an accidental discovery. In 1928 Alexander Fleming was working at St Mary's Hospital in London, investigating bacteria. He noticed that a mould had formed in one of his experimental dishes and was destroying the surrounding bacteria. His accidental discovery of penicillin enabled other scientists to develop methods for growing, extracting and purifying enough penicillin to prove its value as an antibiotic. Many millions of people have survived infections which would have caused death were it not for antibiotics.

The laser is based on a theory put forward by Einstein in 1917. Developments over many years led to the first working laser in the 1960s. One important application of lasers is in producing renewable energy through nuclear fusion, though progress by individual countries has been limited by high costs. The UK and US have recently agreed to share research findings in a joint project in this area. Einstein could not have foreseen the many applications which would result from his theoretical work.

The Nobel prize-winning scientist Lord Porter concluded that there were '…two kinds of research – applied research and not-yet-applied research'. The astronomer Carl Sagan said that 'Cutting off curiosity-driven science is like eating the seed corn'. We may have a little more to eat now but what will we plant next year? In a world which is increasingly dependent on science and its technological applications, the question is 'Can we afford **not** to fund basic scientific research?'.