



General Certificate of Education
Advanced Subsidiary Examination
June 2010

General Studies (Specification A)

GENA2

Unit 2 AS Science and Society

Wednesday 26 May 2010

1.30 pm to 3.00 pm

For this paper you must have:

- a Source Booklet for Section A (enclosed)
- an objective test answer sheet for Section A
- an 8-page answer book for Section B.

You may use a calculator.

Time allowed

- 1 hour 30 minutes

Instructions

- Use black ink or black ball-point pen.
- Write the information required on the front of your answer book for Section B. The **Examining Body** for this paper is AQA. The **Paper Reference** is GENA2.
- Answer Section A (Questions 1.1 to 1.30) using the answer sheet provided **and one** pair of questions from Section B in your separate answer book.
- Do all rough work in your answer book.
- Hand in **both** your answer sheet **and** your answer book separately at the end of the examination.

Information

- The maximum mark for this paper is 65.
- This paper consists of **two** sections.
Section A contains 30 objective test questions based on the Source Material in the separate Source Booklet. There is one mark for each question.
Section B contains three alternative pairs of questions. Marks are shown after each question and total 35.

Section A

There is one mark for each question.

Read the source entitled **Nuclear renaissance in the USA?** which is provided in the Source Booklet and answer **Questions 1.1 to 1.30** by choosing the answer represented by the letter **A, B, C** or **D** that you think best. Mark your responses on your objective test answer sheet.

1.1 The energy generated by the existing 103 commercial nuclear power plants in the United States provides enough electricity to

- A** meet all the needs of 31 states within the USA.
- B** provide 20% of the needs of 31 states within the USA.
- C** provide a fifth of the needs of all states within the USA.
- D** meet the expected increase in demand within the USA.

1.2 An atom

- A** is an indivisible particle of matter.
- B** contains positively charged protons.
- C** contains positively charged electrons.
- D** releases neutrons to become an ion.

1.3 The energy produced in a nuclear reactor is derived from

- A** nuclear fission.
- B** nuclear fusion.
- C** combustion.
- D** chemical reactions.

1.4 According to paragraph 2, concerns have been expressed about nuclear fuels because

- 1** there is a potential use by terrorists.
- 2** there is a limited supply available.
- 3** nuclear emissions are likely.

Answer

- A** if **1** alone is correct.
- B** if **1** and **2** only are correct.
- C** if **2** and **3** only are correct.
- D** if all are correct.

1.5 Landfill gas (**Figure 1**) is mainly

- A** carbon dioxide.
- B** hydrogen.
- C** methane.
- D** ozone.

- 1.6 The Energy Policy Act of 2005 (paragraph 3) aims to
- A see more nuclear power plants completed by 2010.
 - B convert all power stations to nuclear.
 - C monitor emissions from nuclear power stations.
 - D support funding for the construction of new nuclear reactors.
- 1.7 If the energy currently used by the USA is x , which of the following represents the estimate for the USA's energy use in 25 years' time (paragraph 7)?
- A $0.5x$
 - B $1.5x$
 - C $x + 50$
 - D $50x$
- 1.8 Paragraph 8 mentions each of the following as a benefit of using nuclear energy as an energy source **except**
- A it is a less expensive source of energy than coal.
 - B environmental standards are not compromised.
 - C a nuclear plant costs less to develop than a coal-burning plant.
 - D more homes will receive electricity.
- 1.9 Coal still remains the greatest energy source in the United States. Which of the following are likely reasons for this?
- 1 Coal is relatively cheap in the USA.
 - 2 Coal-powered power stations cost less to develop than nuclear ones.
 - 3 The technology of coal-powered power stations is well known.
 - 4 Coal produces little atmospheric pollution.

Answer

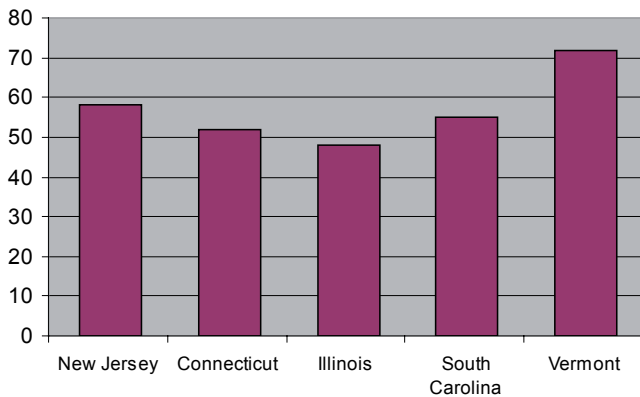
- A if 1 alone is correct.
- B if 1 and 2 only are correct.
- C if 1 and 3 only are correct.
- D if 2 and 4 only are correct.

Turn over for the next question

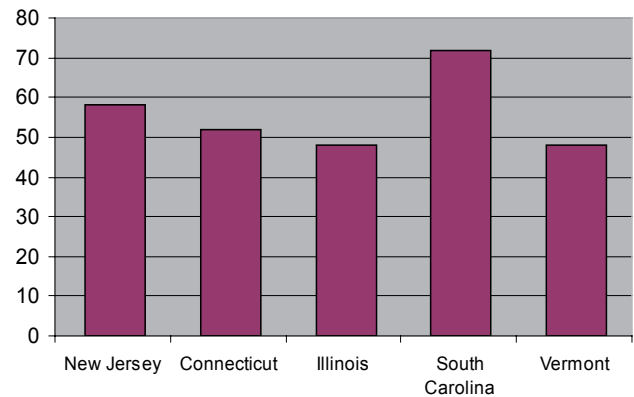
Turn over ►

1.10 Which bar chart best represents the percentage of electricity obtained from a nuclear source by some of the states of the USA in 2005?

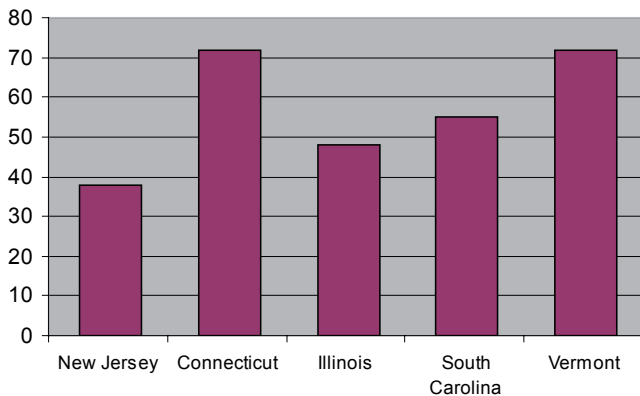
A



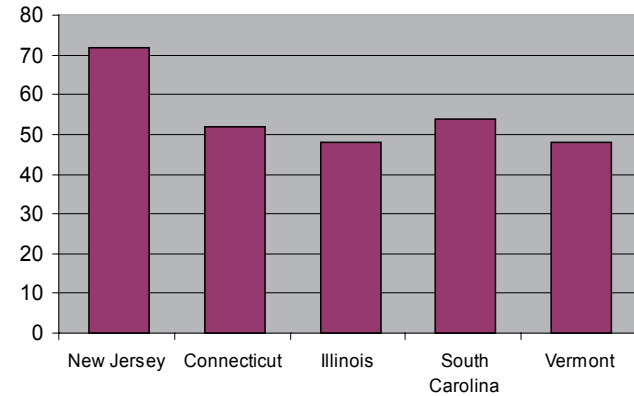
B



C



D



1.11 Many people disagree with the assertion that nuclear energy is 'emission-free' (paragraph 11) because

- A** radioactive disasters have occurred occasionally.
- B** all forms of power generation produce greenhouse gases.
- C** information published in the USA cannot be trusted.
- D** the term 'emissions' should include radioactivity.

1.12 According to paragraph 13, after the nuclear fuel has been used to generate electricity, the spent fuel rods are currently

- A** stored on the sites of the nuclear reactors.
- B** transported and stored in a geological repository in the Yucca mountains.
- C** recycled and made into new fuel rods.
- D** buried underground near to the power plants.

1.13 Yucca Mountain was considered to be a suitable site for the location of spent nuclear fuel because

- 1** it is close to most reactors.
- 2** it could accommodate all the waste that is likely to be produced.
- 3** Nevada produces more electricity from nuclear energy than any other state.

Answer

- A** if none is correct.
- B** if **1** alone is correct.
- C** if **2** alone is correct.
- D** if **3** alone is correct.

1.14 Use **Figure 2** to determine which of the following statements about the generation of electricity is/are true.

- 1** More states generate some electricity by nuclear generation than do not.
- 2** Most of the states which use nuclear-generated electricity are on the western side of the USA.
- 3** The states in the northern half of the USA use a greater percentage of electricity generated from nuclear energy than the southern states.

Answer

- A** if none is true.
- B** if **1** alone is true.
- C** if **1** and **3** only are true.
- D** if **2** and **3** only are true.

1.15 According to paragraph 16, which of the following describes the current number of countries generating nuclear power and the contribution they make to the world's demand for electricity?

- A** 16 countries generate 50% of the world's needs.
- B** 30 countries generate 16% of the world's needs.
- C** 42 countries generate 16% of the world's needs.
- D** 48 countries generate 50% of the world's needs.

1.16 According to the article, it is planned to increase the number of nuclear power plants in the United States by approximately

- A** 3%
- B** 20%
- C** 30%
- D** 50%

Turn over ►

1.17 Each of the following is a renewable source of energy **except**

- A hydro-electric.
- B nuclear.
- C solar.
- D wave.

1.18 The radiation warning sign, shown opposite, has rotational symmetry. Which angle of rotation would leave the sign unchanged?

- A 60°
- B 90°
- C 120°
- D 180°



1.19 The fuel rods are held vertically in most nuclear reactors. Control rods must be put between fuel rods to absorb excess neutrons and keep the reaction steady or stop it in emergency.

The 'fail-safe' way to insert the control rods is

- A from above.
- B from below.
- C horizontally.
- D diagonally.

1.20 Arguments against nuclear power include

- 1 radioactive gases and liquids may be emitted.
- 2 disposing of the waste is difficult.
- 3 mining uranium is hazardous to health.

Answer

- A if 1 alone is correct.
- B if 2 alone is correct.
- C if 2 and 3 only are correct.
- D if all are correct.

1.21 In the passage, reasons given for using new technology and increasing nuclear power generation of electricity include

- 1 decreasing imports of coal and oil.
- 2 reducing radioactive waste.
- 3 emitting less carbon dioxide.

Answer

- A if 1 alone is correct.
- B if 2 alone is correct.
- C if 1 and 3 only are correct.
- D if all are correct.

1.22 The building of new nuclear reactors in the USA is planned to

- 1 increase the overall number in operation.
- 2 lower the dependence on fossil fuels.
- 3 reduce carbon emissions.

Answer

- A if 1 alone is correct.
- B if 1 and 2 only are correct.
- C if 2 and 3 only are correct.
- D if all are correct.

1.23 Each of the following statements is true **except**

- A some governments believe their problems obtaining fuel can be solved by using nuclear power.
- B using nuclear power instead of fossil fuel to generate electricity reduces carbon dioxide emissions.
- C used fuel rods from nuclear reactors can be reprocessed after their first use.
- D any accident at a nuclear power plant will only affect the immediate vicinity.

1.24 Which of the following is/are facts rather than opinions?

- 1 The solution to greater demand for electricity in the USA must be to build more nuclear power plants.
- 2 Without the use of nuclear power plants the USA would have emitted more carbon dioxide.

Answer

- A if both are facts.
- B if 1 alone is a fact.
- C if 2 alone is a fact.
- D if neither is a fact.

1.25 Having many nuclear reactors in many different countries causes some concern because

- A most countries with reactors do not have sufficient skilled scientists to run them.
- B it may provide more opportunities for terrorists to obtain nuclear material.
- C it allows spies easier access to the nuclear secrets of world powers.
- D the pollution from emissions will cover a greater proportion of the Earth's surface.

1.26 The most accurate description of the passage is that it is a

- A subjective article designed to promote the advantages of nuclear power.
- B factual account which provides reliable information about nuclear power.
- C scientific study of the use of nuclear power in the USA.
- D warning about the dangers of the use of nuclear power in the USA.

Turn over ►

Assertion / Reason questions

For **Questions 1.27 to 1.30** you are given an assertion followed by a reason. Consider the assertion and decide whether, on its own, it is a true statement. If it is, consider the reason and decide if it is a true statement. If, and only if, you decide that *both* the assertion and the reason are true, consider whether the reason is a valid or true explanation of the assertion. Choose your answer (**A** to **D**) as follows and indicate your choice on the answer sheet.

	Assertion	Reason	Argument
A	True	True	Reason is a correct explanation of assertion
B	True	True	Reason is not a correct explanation of assertion
C	True	False	Not applicable
D	False	–	Not applicable

ASSERTION

REASON

- | | | | |
|-------------|---|---------|---|
| 1.27 | In the United States all the spent fuel from the nuclear reactors is recycled | because | it is expensive to dispose of old fuel rods. |
| 1.28 | The nuclear accident at Chernobyl was more serious than the one at Three Mile Island | because | the accident at Chernobyl was in the former Soviet Union. |
| 1.29 | The use of nuclear energy for power generation in the USA is being encouraged | because | there are no carbon emissions from nuclear fuel. |
| 1.30 | There has been considerable opposition to the development of nuclear power stations in the United Kingdom and other countries | because | there are potential hazards and difficulties in disposing of the spent fuel rods. |

END OF SECTION A