



General Certificate of Education
Advanced Subsidiary Examination
January 2013

General Studies (Specification A)

GENA2

Unit 2 AS Science and Society

Thursday 17 January 2013 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 AQA 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. 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 material in the Source Booklet. There is 1 mark for each question.
Section B contains three alternative pairs of questions. Marks are shown after each question and the total for each pair is 35.

Section A**Answer Questions 1.1 – 1.30.**Each of the 30 questions carries 1 mark.

Read the passage entitled **Greenland: some effects of climate change**, which is printed in the separate 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** According to the source, lettuces grow best when
- A** ice melts.
 - B** the climate is warmer.
 - C** spring arrives.
 - D** plants are in flower.
- 1.2** From 1993 to 2005 the median of the mean March temperatures in Greenland (**Figure 1**) was
- A** -9.3°C
 - B** -9.6°C
 - C** -9.8°C
 - D** -9.9°C
- 1.3** It can be concluded from **Figure 1** that
- A** the difference between March and September temperatures is fairly constant.
 - B** if March is warmer than usual, so too is September.
 - C** March temperatures have varied more than September temperatures.
 - D** there is an overall trend towards warmer Septembers.
- 1.4** According to paragraph 2, Greenland
- A** has the largest island population in the world.
 - B** is populated only by Inuits.
 - C** is smaller than Australia.
 - D** is larger than the UK.

1.5 Recent temperature changes in Greenland are

- 1** causing storms to last longer.
- 2** making it more difficult to catch seals.
- 3** leading to more people hunting for meat.
- 4** leading to greater imports of fish.

Answer

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

1.6 Cod and halibut have migrated north (paragraph 3)

- A** because the ports are now often ice-free.
- B** in order to find warmer water.
- C** to escape a booming fishing industry further south.
- D** as the oceans increase in temperature.

1.7 A fjord (paragraph 3)

- A** describes a sea rich in fish.
- B** is the name for a seaport in Greenland.
- C** describes water that is ice-free.
- D** is a narrow deep-water inlet.

1.8 According to paragraphs 2 and 3, the traditional way of life of the Inuit in Greenland is disappearing primarily because

- A** the population is too low.
- B** the people are eating more imported meat.
- C** the ice is thinning.
- D** many more tourists are visiting the island.

1.9 According to paragraphs 2 and 3, the economy of Greenland is booming because

- 1** more fish are being caught and traded.
- 2** imports of meat have increased.
- 3** boats now put to sea less frequently.
- 4** tourism on Greenland has increased.

Answer

- A** if **1** and **2** only are true.
- B** if **1** and **4** only are true.
- C** if **2** and **3** only are true.
- D** if **2** and **4** only are true.

Turn over ►

1.10 What is the approximate percentage of the world's known mineral types that have been found in Greenland?

- A** 8%
- B** 13%
- C** 16%
- D** 25%

1.11 Which of the following allow experts to estimate the amount of undiscovered oil and gas in Greenland's waters?

- 1** knowledge of yields from existing oil fields
- 2** an analysis of the geology of the seabed
- 3** records showing how the climate is changing
- 4** improved production technology within the oil industry

Answer

- A** if **1** and **2** only are correct.
- B** if **1**, **3** and **4** only are correct.
- C** if **2**, **3** and **4** only are correct.
- D** if all are correct.

1.12 Graphite is a form of

- A** aluminium.
- B** carbon.
- C** iron.
- D** lead.

1.13 The early exploitation of the mineral wealth of Greenland focused on the mining of

- A** cryolite and graphite.
- B** gold and diamonds.
- C** hydrocarbon deposits.
- D** a new mineral called greenlandite.

1.14 Approximately when did mining for cryolite begin in Greenland?

- A** 1700
- B** 1880
- C** 1987
- D** 2005

1.15 The mineral wealth of Greenland received a boost following the

- 1** discovery of jade in the 1960s.
- 2** beginning of olivine extraction in 2005.
- 3** finding of large diamonds in 2006.

Answer

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

1.16 A large aluminium plant on the west coast of Greenland is being planned (paragraph 10) because

- A** there are still remaining cryolite deposits in the ground.
- B** higher temperatures mean that shipping can access ports throughout the year.
- C** labour costs are falling as traditional employment is decreasing.
- D** the costs of hydroelectric power are expected to fall.

1.17 Why does China ration the sale of rare earth minerals?

- A** It allows them to be sold at a higher price.
- B** Mining for rare earth minerals is a dangerous process.
- C** The minerals are extracted as oxides and treatment is required before they can be used.
- D** The minerals have to be shipped from Australia to China before they are exported.

1.18 Rare earth elements have only recently become important because

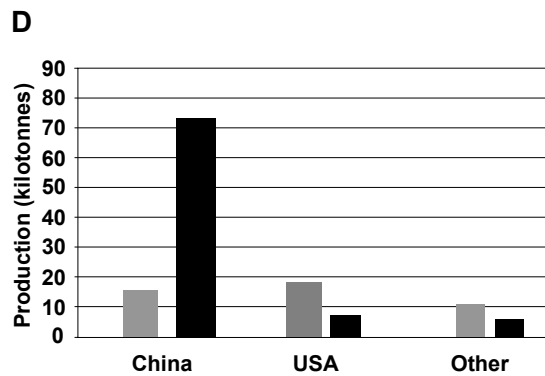
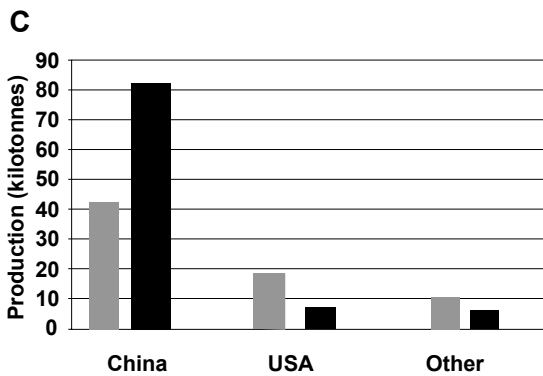
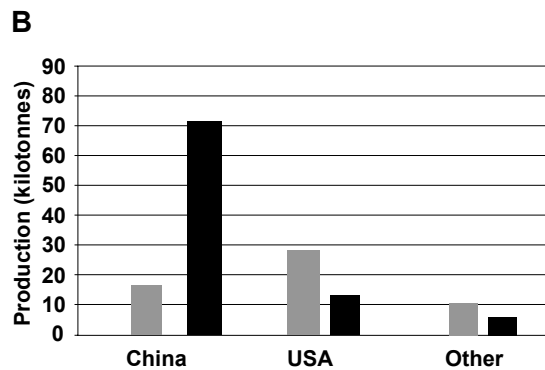
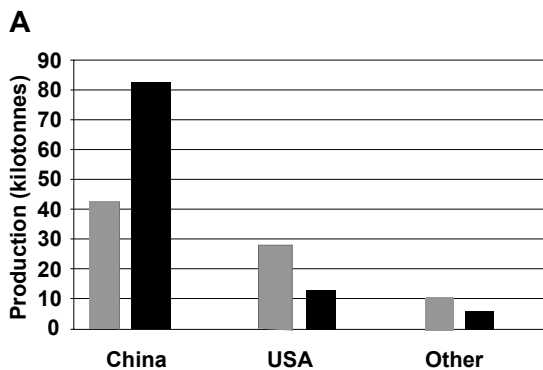
- A** they used to be too difficult to extract from the ores.
- B** little was known about them and their chemistry.
- C** their radioactivity meant they were difficult to use.
- D** more electronic products are being sold.

Turn over for the next question

Turn over ►

1.19 Which of the charts below best illustrates the quantity of rare earth oxides produced by China, the USA and other regions of the world in 1991 and 2000 (**Figure 3**)?

Key 1991  2000 



1.20 Why would Greenland previously have imported vegetables from Denmark?

- A Until recently Greenland was governed by Denmark.
- B Denmark is the nearest European country to Greenland.
- C Both countries are members of the European Union.
- D Greenland had previously concentrated on growing flowers.

1.21 The weather influences mining in Greenland because

- A too much rain floods the mines.
- B without wind it is hard to ventilate mines.
- C frozen ground is difficult to dig.
- D surface ice helps maintain a constant temperature.

1.22 Greenland has one of the highest concentrations of hydrocarbons and minerals in the world. Which of the following is attracting most interest at present?

- A the large deposits of cryolite for aluminium production
- B the rich deposits of many heavy metals such as silver
- C oil which is still obtained from the hunting of whales
- D the reserves of oil and gas under the sea

1.23 Which of the following would be advantageous to the consumer if another supply of rare earth elements were to be developed?

- 1 more components could be produced
- 2 competition could drive prices down
- 3 political pressure could be reduced
- 4 the demand would exceed the supply

Answer

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

1.24 The author asserts that explorers from each of the following countries have profited from Greenland's mineral wealth **except**

- A China.
- B Denmark.
- C Norway.
- D Sweden.

1.25 Which one of the following is likely to be the most important factor in increasing Greenland's income over the next decade?

- A the development and production of oil and gas from the reserves
- B the increase in tourism as a result of rising temperatures
- C obtaining political independence from Denmark
- D continued expansion of the fishing industry

1.26 The Inuit, the Danes, private operators and international companies may all feel that they have a right to gain financially from Greenland's natural resources. The decision as to who or which should gain most is

- A economic.
- B political.
- C scientific.
- D social.

Turn over for the next question

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 | Hunting the traditional food of the Inuit is becoming dangerous | because | imported meats are taking the place of the diet of seal and whale. |
| 1.28 | The fishing industry in Greenland is becoming more successful than ever | because | melting glaciers are improving the quality of sea water. |
| 1.29 | Oil is a mixture of hydrocarbons | because | it can be used as a source of energy. |
| 1.30 | The Greenland cryolite mine is no longer operational | because | cryolite is not needed nowadays. |

END OF SECTION A

Section B

Answer **one pair** of questions only, EITHER **02** and **03**
OR **04** and **05**
OR **06** and **07**

For **each pair** of questions, read the stimulus extract provided and answer the questions with reference to the extract and your own knowledge.

You will be marked on your ability to use good English, to organise information clearly and to use specialist vocabulary where appropriate.

EITHER**Questions 02 and 03****THE USE OF ANIMALS IN RESEARCH**

Animals are essential in scientific research, the development of medicines and safety testing. They are necessary to understand the body in health and disease, and to develop new and improved medical treatments. However, their use is not undertaken lightly. Both the potential scientific and medical benefits of the research, and the possible suffering of the animals used, are weighed up carefully before any animal research project can proceed.

No-one wants to use animals in research, and no-one would use them unnecessarily. Animal research is considered a last resort, to be used only when there is no alternative method. In the UK, strict regulations and a licensing system mean that animals must be looked after properly and may not be used if there is any other way of doing a piece of research.

Non-animal methods are used for the majority of biomedical research, and animal studies are used alongside these other types of research. Such 'alternative' methods include the study of cells and tissues grown in the laboratory, computer-modelled systems, and the use of human patients, volunteers or populations.

Source: adapted from 'About research', *Understanding Animal Research*, 2011
<http://www.understandinganimalresearch.org.uk/>

- 0 2** Examine the reasons why many scientists consider that animal experiments are an essential part of some areas of scientific research. (17 marks)
- 0 3** Discuss the moral and political issues that arise from the use of animals in scientific research. (18 marks)

Turn over ►

OR

Questions 04 and 05

TOP TEN 'INVENTIONS' THAT CHANGED THE WORLD

A panel of 20 experts from the British Science Association drew up this list of innovations to mark National Science and Engineering Week.

- 1 **GPS Technology** uses a network of satellites around the Earth to pinpoint the exact position of a receiver anywhere on the planet.
- 2 **The Sony Walkman** – this iconic personal stereo spawned the era of wearable technology.
- 3 **The Barcode** enables stores to instantly access product details, prices and stock levels with a sweep of a laser.
- 4 **TV Dinners** transformed the way families ate meals; they are also blamed for driving the obesity crisis.
- 5 **PlayStation** took gaming out of teenagers' bedrooms and into adult living rooms.
- 6 **Social Networking** sites have completely changed the way we interact and who we interact with.
- 7 **Text messages** – among 13–17 year olds, text messaging now outweighs old-fashioned phone calls by seven to one.
- 8 **Electronic Money** – credit cards gave us greater convenience for spending, greater security and the ability to spend money anywhere in the world.
- 9 **Microwaves** are used by mobile phones, wireless broadband internet and satellite television.
- 10 **Trainers** – turned from being purely practical clothing for sport into a fashion item.

Source: adapted from RICHARD GRAY, 'Top ten inventions that changed the world',
Daily Telegraph, 13 March 2009
 ©Telegraph Media Group Limited 2011

0 4 Explain the technology behind any **two** of the 'top ten inventions' listed in the source.
 (17 marks)

0 5 Consider the extent to which any **two** of the 'top ten inventions' listed in the source have made a significant difference to modern life. (*These may be the same as, or different from, those chosen in Question 04.*)
 (18 marks)

OR

Questions 06 and 07

SPORT AND DEVELOPMENT

There is a broad consensus that regular exercise is essential for the physical, mental, psychological and social development of children and adolescents. Involvement in sport can boost children's health, improve academic performance and help reduce crime. The United Nations Children's Fund (UNICEF) believes that sport can be an effective tool to help achieve goals in health, education, gender equality, child protection and child development.

Source: adapted from 'Sport for Development', *UNICEF*, 19 September 2007
<http://www.unicef.org>

After the Games, the Olympic Park will be transformed into one of the largest urban parks created in Europe for more than 150 years. The world-class sports facilities will be adapted for use by sports clubs and the local community as well as elite athletes. The Athletes' Village, where athletes and officials will stay during the Games, will be converted into homes. A range of transport improvements are already underway and thousands of new jobs will be created in the Park.

Source: adapted from, 'Legacy after the Games', *London2012.com*, 2011
<http://www.london2012.com/legacy-after-the-games>
©The London Organising Committee of the Olympic Games and Paralympic Games Ltd

- 0 6** Explain how sport can contribute to the health and well-being of individuals and groups.
(17 marks)
- 0 7** To what extent are major international sporting events a vehicle for achieving social and economic change and development?
(18 marks)

END OF QUESTIONS

There are no questions printed on this page