



General Certificate of Education  
Advanced Subsidiary Examination  
January 2010

## General Studies (Specification A)

## GENA2

Unit 2 AS Science and Society

Monday 18 January 2010 9.00 am to 10.30 am

**For this paper you must have:**

- a Source Booklet for Section A (enclosed)
- an objective test answer sheet for Section A
- a 4-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** question from Section B (Question 2, 3 or 4) 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 1 mark for each question.  
**Section B** contains three alternative structured questions. Marks are shown after each question and total 35.

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**SECTION A**

There is 1 mark for each question.

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Read the passage entitled **Science and Sport** 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** Physiology (paragraph 1) is the science of

- A** the mind.
- B** healing and medicine.
- C** the functioning of the body.
- D** living things.

**1.2** The most likely reason for the ‘explosion in papers and conferences dedicated to the science of sport’ (paragraph 1) is that

- A** more people in the UK now enjoy sport than ever before.
- B** a more empirical approach enables athletes to perform to higher standards.
- C** the 2012 Olympics is supported by the government and London’s Mayor.
- D** the National Lottery now provides funds for a wide range of sports.

**1.3** A person suffering from anxiety could experience which of the following physical sensations?

- 1** palpitations
- 2** rapid heart beat
- 3** feeling faint
- 4** trembling

Answer

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

**1.4** ‘debilitating effects of performance-induced anxiety’ (paragraph 2) may be demonstrated by

- A** underperformance.
- B** loss of muscle tissue.
- C** boredom.
- D** reduced glycogen stores.

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**1.5** Physiological changes that accompany the ‘fight or flight’ response (paragraph 4) include

- 1** quicker reactions.
- 2** intensified awareness.
- 3** sharper eyesight.
- 4** increased hormone production.

Answer

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

**1.6** The ‘fight or flight’ body changes (paragraph 4) would be most advantageous to a

- A** golfer.
- B** horse-rider.
- C** pistol shooter.
- D** sprinter.

**1.7** Key moments in some sporting events can be particularly stressful because

- 1** the financial implications of success and failure can be very different.
- 2** television companies may broadcast the events globally.
- 3** a modern audience does not appreciate a good loser.

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.

**1.8** Paragraph 5 says that

- A** psychologists use images to stop themselves worrying about match results.
- B** imagining yourself dealing with a stressful event beforehand is helpful.
- C** stress improves performance on the big day.
- D** key strategies should be developed during competitions.

**Turn over ▶**

1.9 Which of the following forces act on a ball moving through the air without any spin?

- 1 drag
- 2 weight

Answer

- A if neither is correct.
- B if 1 alone is correct.
- C if 2 alone is correct.
- D if both are correct.

1.10 Kicking a ball to the right-hand side of its centre (as shown below) will make the ball



Non-Kicking foot

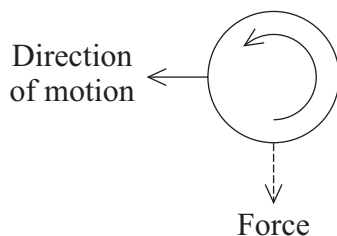
Kicking foot

- A curve to the left.
- B curve to the right.
- C drop suddenly at the end of its path.
- D balloon upwards into the air.

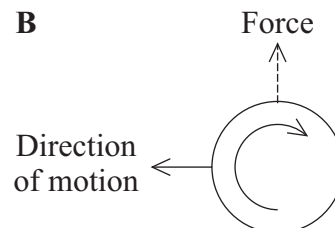
1.11 Topspin occurs when the top of the ball rotates in the direction of motion. Backspin is the opposite. Backspin produces lift which is useful in some sports, particularly golf.

Three of the following diagrams show a correct arrangement for a moving ball's motion, rotation and resulting force from the spin. (All diagrams show the view from the side.) Which diagram is **incorrect**?

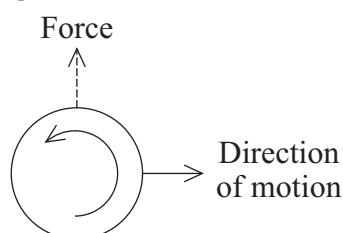
A



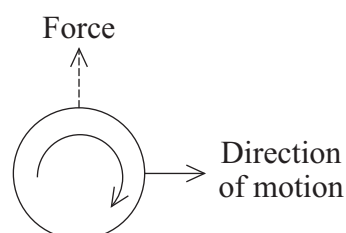
B



C



D



**1.12** Although easier to apply, backspin is not as useful as topspin in a football penalty shoot out because

- A** the goalkeeper can easily predict where the ball will go.
- B** the ball is likely to rise above the bar.
- C** the ball could go to right or left of the original direction.
- D** the ball cannot be kicked as hard.

**1.13** Aerodynamics is the study of

- A** air forces.
- B** streamlined objects.
- C** the motion of streamlined objects through air.
- D** forces and the motion of objects through air.

**1.14** If the ball shown in **Figure 2** has a spin rate of 8 revolutions per second, approximately how many times will it rotate before it reaches the goal?

- A** 8
- B** 16
- C** 25
- D** 200

**1.15** Which of the following statements is/are correct?

- 1** Anaerobic conversion of energy is faster than aerobic.
- 2** Anaerobic conversion does not use oxygen.
- 3** Glycogen is a carbohydrate.

Answer

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

**1.16** Which of the following sportspeople rely most on the anaerobic conversion of energy?

- 1** weight lifters
- 2** tennis players
- 3** sprint cyclists
- 4** divers

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 **2** and **4** only are correct.

**Turn over ►**

- 
- 1.17** The best meal for a rugby player five hours before a match would consist of
- A** vegetable soup, baked potato and yoghurt.
  - B** melon, grilled fish and fresh fruit.
  - C** chicken soup, spaghetti bolognese and rice pudding.
  - D** prawn cocktail, cauliflower cheese and ice cream.
- 1.18** What approximate percentage of body weight might a 120 kg rugby player lose during a game (paragraph 10)?
- A** 0.02%
  - B** 0.2%
  - C** 2.0%
  - D** 20%
- 1.19** ProZone (paragraphs 11 and 12) is a computer system used to determine
- 1** the total distance travelled by a sportsperson in a match.
  - 2** the effectiveness of passing the ball to another player.
  - 3** how well an attacking line-up works.
  - 4** how well a defensive line-up works.
- 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.
- 1.20** How many positions of an individual player would the ProZone computer system record during a 90 minute game?
- A** 54
  - B** 540
  - C** 5400
  - D** 54000
- 1.21** If the probability of a single successful pass is 60%, and it is assumed that passes are mathematically independent, what is the probability that a sequence of passes consists of at least 6 successive successful passes?
- A** 4.7%
  - B** 3.6%
  - C** 1.8%
  - D** 0.2%

**1.22** Which of the following is a fact rather than an opinion?

- 1** A 'smart ball' will remove disagreements about whether a ball crosses a line.
- 2** It will be possible to map accurately the position of a 'smart ball' on the pitch.

Answer

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

**1.23** The introduction of Hawkeye in cricket has resulted in increased TV audiences. As a consequence of this

- A** umpires will make fewer mistakes.
- B** the top teams will play at a higher standard.
- C** the sport is able to attract greater levels of sponsorship.
- D** successful cricketers are now those who are the most popular.

**1.24** International sporting successes achieved following the applications of science can be helpful to the general public because

- A** any profits raised from successful events can be invested in public services.
- B** the major success of a few individuals can inspire many others to be more active.
- C** increased salaries for such successful athletes eventually helps raise the salaries of all.
- D** a national 'feel good factor' only occurs following such sporting achievements.

**1.25** Which of the following is a fact rather than an opinion?

- 1** Athletes will need to be paid more if the UK is to win more medals in the 2012 Olympics than in Beijing in 2008.
- 2** Sportspeople now rely on the use of scientists more than ever before.

Answer

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

**1.26** Some UK cities have been keen to host major sporting events because

- A** they cannot afford to turn down a guarantee of making a profit.
- B** their local populations hope for reduced council taxes from increased business.
- C** increased awareness of these cities should lead to long-term growth in investment.
- D** without such events politicians cannot justify spending public funds on sport.

**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.

	<b>Assertion</b>	<b>Reason</b>	<b>Argument</b>
<b>A</b>	True	True	Reason is <b>a correct</b> explanation of assertion
<b>B</b>	True	True	Reason is <b>not a correct</b> explanation of assertion
<b>C</b>	True	False	Not applicable
<b>D</b>	False	—	Not applicable

**ASSERTION****REASON**

<b>1.27</b>	Many top professional sportspeople now use the services of psychologists	because	science now includes many more areas of study than a few generations ago.
<b>1.28</b>	When the ‘fight or flight’ response is activated, blood is diverted from the digestive tract and directed into muscles and limbs	because	muscles and limbs require extra energy and fuel for running and fighting.
<b>1.29</b>	Distance runners can run faster than sprinters	because	distance runners have more well-developed muscles than sprinters.
<b>1.30</b>	Psychologists now work with many sportspeople in a wide range of sports	because	sportspeople are not classed as professional unless they employ a psychologist.

**END OF SECTION A**



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**SECTION B**

Answer **one** two-part question only from **Questions 2, 3 or 4**.

Wherever possible use your own words to show you understand the arguments.

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

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**EITHER****2****Scientists condemn Prince over GM crop warning**

The Prince of Wales was accused of not understanding genetically modified crops after claiming that the technology would cause “the biggest environmental disaster of all time” and lead to “no food in the future”.

His views were overwhelmingly rejected by scientists, who said that GM crops were already grown safely by 12 million farmers, 11 million of them in the developing world.

The Prince’s comments, in which he blamed GM food and modern agriculture for environmental and social problems such as climate change and food shortages, were described by leading scientists as “ill-informed”.

Plant researchers said that he had completely misunderstood the benefits and risks of GM crops, which the Prince labelled a “gigantic experiment with nature and the whole of humanity that has gone seriously wrong”.

Source: Adapted from MARK HENDERSON, ‘Scientists condemn ‘ill-informed, negative’ Prince over GM crop warning’, *The Times*, 14 August 2008

- (a) Explain how crops can be genetically modified. (17 marks)
- (b) Discuss the environmental, social and economic ‘benefits and risks’ of GM crops. (18 marks)

**Turn over ▶**

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**OR**

**3**

**Smoking and health**

Many fewer of us light up than in 1948, when 82% of British men and 41% of British women were regular smokers. But that still leaves 23% of men and 21% of women, or just over 9 million people, still smoking. They must know, or at least be aware of, the risks they are running: half of all regular cigarette smokers will die from their habit. Each year, some 114 000 smokers in the UK die from smoking-related causes. Smoking remains the single biggest cause of preventable deaths in Britain, killing more each year than alcohol, obesity, road accidents and illegal drugs put together.

These days, it's actually quite difficult to be a smoker. In Britain, there's no more tobacco advertising; cigarette packets inform you bluntly that smoking their contents will kill you; it's illegal to sell tobacco products to the under-18s; you can get help with quitting on the NHS. Most striking of all, it has become illegal to smoke in pubs, clubs, restaurants, or any enclosed public space.

Source: Adapted from JON HENLEY, 'All puffed out', *The Guardian*, 7 October 2008

- (a) Examine the relationship between tobacco smoking and health. *(17 marks)*
- (b) To what extent are existing and potential measures aimed at reducing tobacco use acceptable and likely to be effective? *(18 marks)*

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**OR**

**4**

**Wheelie bins made smaller to increase recycling**

Some councils are cutting the size of residents' wheelie bins in an attempt to encourage recycling.

Local authorities are to introduce new 'baby bins' which will give householders 180-litre containers instead of the 240-litre versions previously provided.

Supporters of the recycling drive say the aim is to deter unnecessary waste, but the tactic has sparked protests from critics who argue it is likely to encourage fly-tipping. The row, which follows nationwide protests over the abolition of weekly collections by some councils, will reinforce concerns about whether reducing the amount of rubbish collected – rather than persuading the public to change their habits – is the best way to boost recycling rates.

Council officials are concerned that, despite increased recycling rates, many residents exploit the size of their wheelie bins – which are typically four times larger than old-fashioned bins – to get rid of waste that could be reused.

Source: Adapted from 'Wheelie bins made smaller to increase recycling', *The Daily Mail*, 14 May 2007

- (a) Explain why the disposal of household waste (for example, in landfill or by incineration) is an increasing problem. *(17 marks)*
- (b) Discuss ways in which government, manufacturers and the public could reduce the impact of domestic waste on the environment. *(18 marks)*

**END OF QUESTIONS**

**There are no questions printed on this page**

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