Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

THINKING SKILLS **9694/43**

Paper 4 Applied Reasoning **May/June 2019**

1 hour 30 minutes

No Additional Materials are required.

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READ THESE INSTRUCTIONS FIRST

An answer booklet is provided inside this question paper. You should follow the instructions on the front cover of the answer booklet. If you need additional answer paper ask the invigilator for a continuation booklet.

Answer **all** the questions.

The number of marks is given in brackets [ ] at the end of each question.

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1 *Study the information below and answer the question that follows.*

Worrying increase in depression

Depression was once rarely discussed in public. However, a recent publicity campaign involving celebrities who have suffered from the condition has brought the topic of this, and other mental health issues, out into the open.

It has traditionally been difficult to collect hard data about the number of people suffering with depression but one recent, large-scale study has attempted to do just that. There are a number of treatments for depression but some of these, such as talking therapy, are difficult to measure accurately. It is much easier to collect data on sales of particular drugs. SSRIs are the modern drug of choice to treat the symptoms of depression, as well as a range of other mental health conditions. The study has shown that in the years 2013 to 2016 there was a 30% increase in sales of SSRIs. Over the same time period there was no similar increase in sales of medicinal drugs for other illnesses, e.g. heart conditions. This clear increase in the number of people suffering from depression means we can expect a doubling in the number of sufferers over 10 years.

Make **five** criticisms of the statistics in the passage or any inferences that have been drawn from them. [5]

Questions 2, 3 and 4 refer to Documents 1 to 5.

2 Briefly analyse the argument in Document 1: *What should we think about GM foods?* by identifying its main conclusion, intermediate conclusions and any counter-assertions. [6]

3 Give a critical evaluation of the strength of the argument in Document 1: *What should we think about GM foods?* by identifying and explaining any flaws, implicit assumptions and other weaknesses. [9]

4 'We should encourage the development of GM foods.'

Construct a reasoned argument to support **or** challenge this claim. In your answer you should make critical use of the documents provided. [30]

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DOCUMENT 1

What should we think about GM foods?

Much of our food now contains organisms that have been genetically modified (GMOs) and the proportion is increasing. The manufacturers of these foods tell us we should not be concerned but it is clear that in growing and consuming these foods we are taking a big and unnecessary risk. Tobacco companies once claimed that smoking was good for you, so we can dismiss claims by GM food companies that their products are harmless.

High school science tells us that genes code for proteins, and proteins are what people with allergies are allergic to. Soya beans with 'extra' genes from a brazil nut contain nut proteins. In tests, people with nut allergies went into shock after eating these soya beans. Fears have also been raised over possible links to other disorders. The more GM foods we produce, the greater the possibility of a risk to health. Furthermore, the actual process of genetic modification involves creating bacteria that are resistant to antibiotics – if these escaped it could prove disastrous for the spread of disease.

GM foods pose a serious risk to the environment. Many GM crops contain genes that make them resistant to herbicides. Cross-pollination of GM seeds with wild varieties would pollute the gene pool and create super-weeds that might out-compete wild species and domestic crops. Furthermore, GM growers tend to plant fewer varieties of crop, increasing the risk that a disease could wipe out a greater proportion of the food supply, with devastating effects. Also, fewer crop varieties means fewer species that can feed on the crops. So animals further up the food chain become endangered. A scientific study in the US showed that GM food crops greatly reduced butterfly populations.

We should be suspicious of any safety claims originating from scientists about GM foods. The problem with scientifically testing the impact of these foods is that the checking of scientific test results by fellow scientists, known as 'peer review', is hindered by the unwillingness of the companies that produce GMOs to present all their data to be scrutinised. Safety claims usually come directly from the biotechnology companies or from government agencies that are heavily influenced by a powerful industry lobby. I have not yet seen any unbiased findings showing that GM crops are safe. To date there have been only a little over 500 field trials of GMOs in the US, but on this basis the US Department of Agriculture (USDA) concluded that there were no concerns regarding safety. However, many reports failed to mention or even measure any associated environmental risks and the Union of Concerned Scientists believes that the USDA's evaluation was based on too little data. A recent study in Europe showed that many of the promises given by GM food companies were false.

It is often said that GM foods are needed to feed an increasing human population, but people go hungry because of issues other than food production. There are food distribution problems, for example due to war; there is the growing of cash crops rather than food staples to pay off the national debt, and there is desertification. One scientist advising the UK government has said, 'Today the amount of food available per person has never been higher'.

Finally, genetic modification is unnatural. Natural food tastes better and is better for you. Research has shown that consumers got more pleasure from eating food they believed to be organic or ethically produced.

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DOCUMENT 2

The GMO debate is over

Genetic modification allows foods to grow more quickly, have a better flavour or texture, contain useful vitamins or minerals or be resistant to weeds or animal pests. In short, the list of potential benefits is enormous. It might surprise you to learn, however, that a US-based poll in 2015 found that only 37% of the public thought GM foods were safe, compared to 88% of scientists. Are these stats about to change?

The most comprehensive and detailed report ever produced by the scientific community on genetically engineered food and crops was released recently. The committee's findings were clear: after examining hundreds of scientific papers and hours of live testimony, the report found no substantiated evidence that GM foods were less safe than traditional, non-GM foods. The scientists even considered comments from members of the public, however ludicrous, and engaged with them carefully as constructive challenges. For example, the committee listened to Greenpeace, to a self-styled anti-GMO activist who stated that genetically engineered foods cause just about every imaginable modern ailment, and to a French scientist, Professor Seralini, who was once professionally humiliated by having to retract his paper claiming rats that had been fed GMOs suffered from an increase in tumours.

The committee considered claims about a long list of health issues. GM foods are relatively common in the US but almost non-existent in the UK, largely because of a scare campaign run by a handful of influential newspapers. Thus it is possible to use comparisons between these two countries to examine potential GM effects. Patterns of changing cancer incidence over time are similar in both places; the same goes for coeliac disease and autism. US rates of kidney disease have not changed since GM foods were introduced. There is no published evidence to support a link between GM foods and obesity or diabetes. Interestingly, the committee did not even find a relationship between consumption of GM foods and the well documented increase in food allergies.

So, will public suspicion of GM foods disappear and allow us to spend time looking for the real causes of these diseases? Probably not. Psychological associations developed over many years are difficult to break. Furthermore, these attitudes are continually reinforced by a vocal and well-funded anti-GM lobby.

Perhaps even more worrying is how much this report undermines the reputation of major environmental groups. Some have begun to exhibit the type of science-denial they have been campaigning against with regard to climate change. Friends of the Earth's website claims that numerous studies show GM foods can pose serious risks to health. A spokeswoman from the group described the report as 'deceptive' without reading it. Food and Water Watch issued a rebuttal before the report was published, claiming there was no scientific consensus and accusing the report's authors of having links to GM-food-producing giant Monsanto. Ironically, many of the tactics these groups use against GM foods mimic those used by the anti-climate-change lobby. Demonstrably false statements about a lack of scientific consensus abound on both issues.

In reality there is no need for the general public to worry about this issue as it is being policed by science itself. The report points out that the overuse of GM crops has led to the evolution of herbicide and insecticide resistance. Domination of GM technology by big business might, indeed, restrict access to improved seeds by small farmers from poor countries. But there is no debate about the safety of consuming GM foods. That issue has been resolved. If you accept that climate change is real, you need to stop being scared of genetically modified foods.

Science writer

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DOCUMENT 3

If GM foods can do this to rats, what can they do to humans?

A controversial study by scientists has shown that rats fed a diet of genetically modified corn suffered tumours along with liver and kidney damage. The team from Caen University in France released shocking images of tumours in rats caused by exclusively eating GM corn for their entire lives.

The study – led by molecular biologist Professor Gilles-Eric Seralini, a leading critic of GM technology – has been peer-reviewed by independent scientists to guarantee the results are valid. It was published in US journal *Food and Chemical Toxicology*. It is the first to look at the impact of eating a GM diet over the entire two-year lifetime of a rat.

Some rats were fed GM corn, others GM corn sprayed with weed-killer, and a control group fed a 'clean' diet of unadulterated corn. The GM corn was genetically modified to withstand spraying with a weed-killer.

The scientists found that

- Up to 70% of females in the GM group died prematurely compared with only 20% in the control group
- 50–80% of female rats developed large tumours after 23 months compared to only 30% of the control rats
- Large tumours appeared in females after seven months, compared to 14 months in the control group.

This newspaper's food safety campaign has long sought to expose problems with the lack of rigorous safety tests for GM food products.

Scientists said the results raised serious questions about the safety of GM foods and the assurances offered by biotech companies and governments. An expert on GM foods from King's College, London, said, 'I am shocked by the extreme negative health impacts.'

The research has been criticised as being of 'no value' by some other scientists. A professor of cell biology at Edinburgh University has questioned the way the research was conducted, saying the number of rats involved in the study was too small to allow any meaningful conclusions to be drawn. 'It looks to me like random variation in a rodent likely to develop tumours anyway,' he said.

Report on a newspaper website

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DOCUMENT 4

GM Weed needs Agent Orange to kill it

Super-weeds created by farming GM crops are so virulent in the US that they can be killed only by flame-throwers and a chemical used during the Vietnam War.

For years now, US farmers have been growing millions of hectares of genetically modified corn and soya. The crops have been genetically modified to withstand a weed-killer developed by a US GM food company. The idea is that the weed-killer can be sprayed on the fields and it will kill weeds but leave the GM crops unharmed.

However, a number of problem weeds, including giant ragweed, have developed resistance to the weed-killer. Farmers are now having to use flame-throwers and a chemical called 2,4-D which was a key ingredient in Agent Orange, the defoliant used to strip the leaves from Vietnamese jungles by the US army in the 1970s. The 2,4-D will be used along with a new 2,4-D-resistant GM crop. The US government has declared the chemical safe but not everyone is convinced. A local farmer said, 'If people understood the chemicals we use, they would want us to use something different'.

Newspaper report

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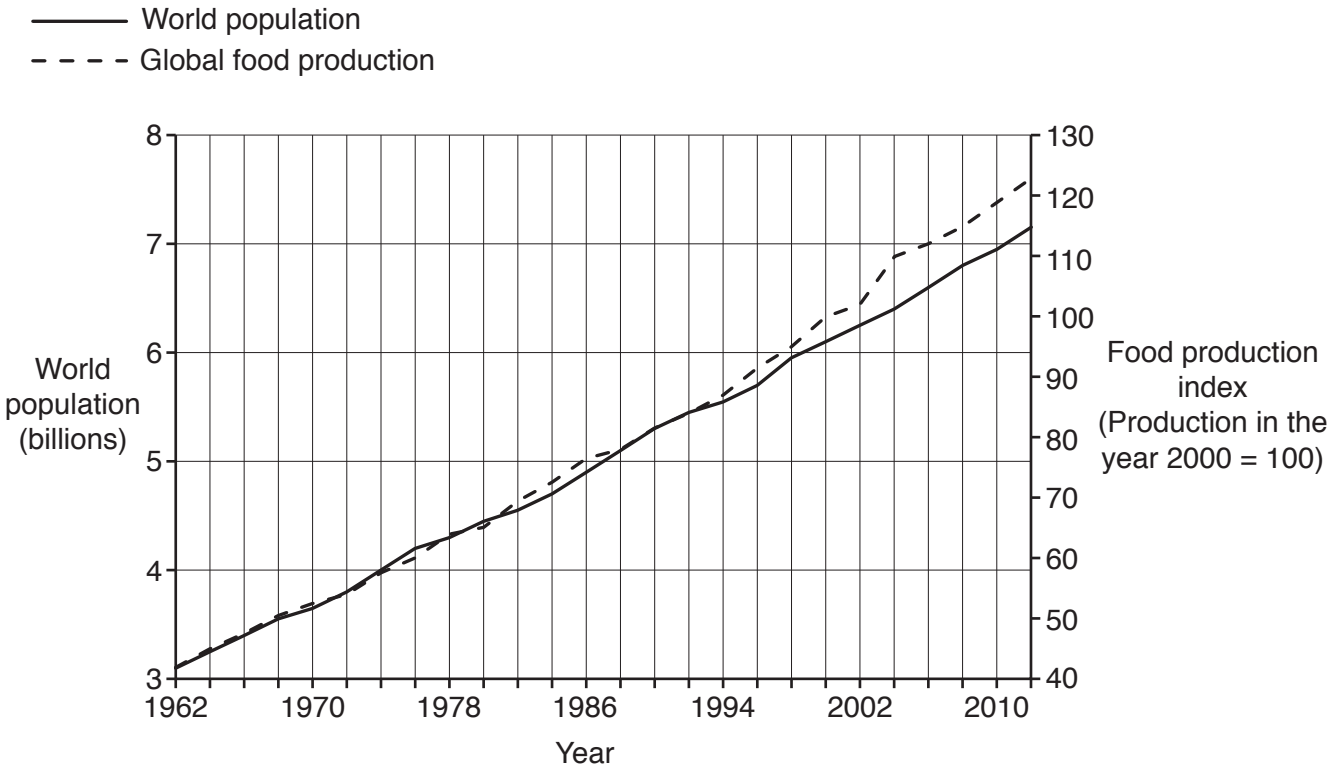
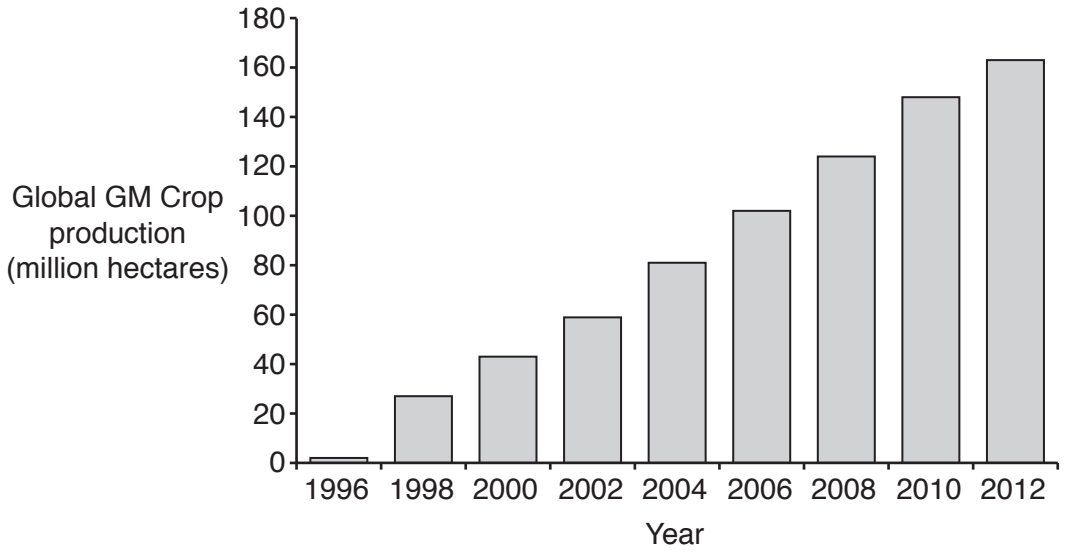
DOCUMENT 5

Food production graphs

Graph A



Graph B



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