
THINKING SKILLS

9694/22

Paper 2 Critical Thinking

October/November 2015

1 hour 45 minutes

No Additional Materials are required.

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.

This document consists of **6** printed pages, **2** blank pages and **1** insert.

1 Study the evidence and answer the questions that follow.

Source A

Book extract

from 'Is It Safe To Drink The Water?'

In 1988, 20 tonnes of aluminium sulphate were put into the wrong tank at a water treatment works near Camelford, a small town in the west of England. Aluminium sulphate is routinely used in the treatment of water to clear it of solid particles before other treatment processes are carried out. Because it was put in the wrong tank, the chemical went straight into the mains water supply. In the days that followed, residents complained of their hair turning green, vomiting, bowel problems, short-term memory loss, joint pains and allergies.

Some years later, a government report concluded that there was no evidence that residents suffered long-term effects on their health. However, the report also judged that the water company had shown considerable complacency in dealing with the incident, given the alarming nature of the short term effects.

Source B

Extract

from report of inquiry

The driver of the lorry delivering the aluminium sulphate explained how he had been asked at the last minute to take over the delivery to the water treatment plant, which supplied around 7000 homes and businesses in and around Camelford. He had been told that there would be somebody there when he arrived. He asked colleagues to telephone to say he would be running late but when he arrived at the treatment plant no one was there. He had been told to put his load "in a tank on the left", but was confused because there were several tanks and manhole covers and he emptied it into the wrong one. This resulted in aluminium sulphate flowing into the mains water.

Source C

Extract

from investigative TV programme – 'Who Can You Trust?'

A water company employee dealing with calls from the public was instructed to reassure callers and advise them that the water was safe to drink. However, if they were still worried, residents could be advised to boil the water as a precautionary measure. A few days later it was noticed that the level in the aluminium sulphate storage tank was low and the driver's mistake was discovered. The driver returned to the plant to explain what had happened. He was told not to talk about it as the company did not want to alarm people unduly.

Source D

Newspaper report

of evidence given to official inquiry

Residents caught up in a case of chemical pollution of mains water received the "worst possible advice" in the aftermath of the disaster, an expert has said. Residents were advised to boil their water. However, doing this would result in increasing the concentration of aluminium sulphate in the water by two to three times. Drinking at least one litre a day of mineral water with a high silicon content would have been the correct advice. This would have helped to remove the aluminium from the body.

Source E**Newspaper report of inquest**

An inquest in 2004 into the death of a 54-year-old woman heard that the post mortem revealed that there was an unusually large amount of aluminium in her brain. The woman had lived in Camelford at the time of the water pollution incident in 1988. Her death was caused by an unusual neurological condition.

Source F**Extract**

from 'Journal of Public Health'

A government report into the Camelford water pollution incident concluded that there was no evidence that residents suffered any long term ill health effects. The degree of media attention the incident received created anxiety in residents. The incident coincided with widespread publicity being given to research which suggested a link between aluminium and Alzheimer's disease. This research has since been challenged by a number of scientists but it would have contributed to anxiety at the time. The water company did show considerable complacency in dealing with the incident, given the alarming nature of the short term effects.

- (a) How significant is the evidence in Source A in assessing the overall effects on health of the pollution of water with aluminium sulphate? [3]
- (b) How reliable is the evidence in Source C? [3]
- (c) How useful is the evidence in Source E in assessing the effects on health of the aluminium sulphate pollution? [3]
- (d) To what extent should the lorry driver be held responsible for the incident in Camelford?

Write a short, reasoned argument to support your conclusion, with critical reference to the evidence provided and considering a plausible alternative conclusion. [6]

2 Study the evidence and answer the questions that follow.

Source A

Many people are increasingly worried about a link between declining bee populations and a group of pesticides called neonicotinoids ('neonics'). These pesticides contain compounds which are thought to interfere with the bees' central nervous systems. This has an impact on their memory and ability to find their way back home, which means that individuals and colonies are more likely to starve. In one study, researchers glued tracking microchips to the backs of honey bees. The researchers fed some bees sugar water spiked with a low dose of a neonicotinoid. They found that these bees were about twice as likely to fail to return to the hive as bees not exposed to the insecticide. The insecticides were introduced in the 1990s, and are used on oilseed rape (which honey bees commonly feed on) as well as on cereals, maize and sugar beet.

Source B

Manufacturers of neonicotinoids have criticised scientific research into their effects. They say that researchers dosed the bees at levels that were far greater (up to 60 times) than that commonly experienced in a natural setting. At that level, the manufacturers argue, it is not surprising that the bees were disoriented. They also note that many other factors affect bee populations, including parasites, diseases and modern farming methods. Most significantly, bee populations have also declined in countries where neonicotinoids are not used.

Source C

Research from the UK Food and Environment Research Agency (FERA) has cast doubt on links between the decline of bee populations and a class of pesticides called neonicotinoids. Their research involved assessing the health of colonies near crops that were treated with the pesticides. They failed to find any clear, consistent relationship between neonicotinoid residues and the size of bumble bee colonies or the number of new queens they produce. They conclude that the absence of these effects is reassuring but not definitive.

Source D

The assertion that a ban on neonicotinoids is needed to save bees from extinction is absurd. There are bee species around the world in genuine danger of extinction. For example, in the United States the once-common rusty-patched bumble bee has vanished from 87% of its historic range since the early 1990s. However, disease, rather than pesticide use, is the chief suspect in causing this decline. Although there have been dramatic falls in the numbers of managed honey bee colonies in some countries, it remains a widespread and common bee, not in imminent danger of extinction.

Source E

One potential worry in the use of pesticides is that two or more may 'synergise'; that is, combine to have an effect that is disproportionately bad on a non-target organism like a bee. It is difficult to replicate such synergisation in a scientific experiment. There are features of some pesticides that stand out as posing potential problems. For instance, those containing copper are more likely to 'synergise'. Therefore careful consideration should be made when assessing the potential interaction between mixtures of pesticides where one contains copper.

- (a) “Bee populations have also declined in countries where neonicotinoids are not used” (Source B). Does this enable one to conclude that neonicotinoids are not a significant cause of bee decline? [3]
- (b) Is the passage in Source D an argument? Explain your answer. [2]
- (c) Look at Source E. Suggest **two** examples of additional information needed in order to assess the threat of synergisation posed by neonicotinoids. [4]
- (d) ‘Banning the use of pesticides would contribute significantly to halting the decline in the bee population.’

How justified is this statement? Write a short, reasoned argument to support your conclusion, using and evaluating the information provided in Sources A–E. [6]

3 *Read the passage and answer the questions below.*

- 1 We live in a world full of electronic gadgets. Some older people are irrationally prejudiced against this development. However, in the case of the remote control, the dislike is fully justified. The television remote control is one of those gadgets we could well do without.
- 2 It is significant that the first remote control device, developed in the USA in 1950, was called the 'Lazy Bone'. Much of the lack of exercise that contributes to the worldwide obesity epidemic can be attributed to the fact that one can sit in front of the television all evening without moving. This develops a lazy mindset in the individual.
- 3 The mindless practice of 'channel hopping' (i.e. rapidly flicking from channel to channel) is only possible because of the remote control. The ability of people to do this has meant television programme makers have had to develop superficial attention-grabbing programmes in order to stop people flicking to the next channel. The result is endless car chases in tiresome action movies.
- 4 Some would argue this is another case of the technology being blamed when it is how people use it that is the problem. However, we recognise that using a car is what makes the technology harmful – if nobody drove there would not be a problem with congestion and pollution. So the distinction between the technology and the way people use it is meaningless.
- 5 Children in particular suffer from the harmful effects of the remote control. They are stuck in front of screens when they should be out playing and getting healthy exercise. The task of parenting has been made more difficult because parents need to take charge of remote control devices. Those that take this task on will soon see a great improvement in their children's behaviour.

- (a) Using the exact words from the passage as far as possible, identify the main conclusion. [2]
- (b) Using the exact words from the passage as far as possible, identify **three** reasons which directly support the main conclusion. [3]
- (c) Evaluate the strength of the reasoning in the argument. In your answer you should consider any flaws, unstated assumptions and other weaknesses. [5]
- (d) 'Humanity will be destroyed by technology rather than be saved by it.'

Write your own short argument to support **or** challenge this claim. The conclusion of your argument must be stated. Credit will not be given for repeating ideas from the passage. [5]

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