Centre Number	Candidate Number	Candidate Name

NAMIBIA SENIOR SECONDARY CERTIFICATE

FIRST LANGUAGE ENGLISH HIGHER LEVEL 8302/1

PAPER 1 Reading and Directed Writing — 2 hours 30 minutes

Marks 60 — **2020**

Additional Materials: Answer Book

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Write your answers in the Answer Book provided.
- Write your Centre Number, Candidate Number and Name in the spaces provided on the Answer Book.
- **Start each question on a new page.**
- Write in blue dark or black pen.
- Do not use correction fluid.

- Answer **all** questions.
- Dictionaries are not permitted.

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

This document consists of **7** printed pages and **1** blank page.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

PART 1

Carefully read the following passages and then answer Questions **1** and **2**.

Passage A

Space Junk

Should we be worried about the debris we are leaving in Earth's orbit?

We humans are not particularly good at cleaning up after ourselves on Earth, and it turns out we may be even worse when we leave our planet. In over 60 years of space exploration, we have rapidly filled Earth's orbit with junk, which could become a serious problem in the not too distant future.

The Soviet satellite Sputnik 1 became our first piece of space junk in October 1957 after it had become the first human-made object ever to orbit Earth. By January 1958 its orbit had decayed enough that it re-entered our atmosphere and burned up, never to cause any trouble. Since then, however, we have launched thousands of satellites into space, and many of them have been left in Earth orbit even after they have stopped working.

Space junk comes in all shapes and sizes, from bits as small as a fleck of paint to chunks as large as a satellite. More than 7 500 satellites have been launched into space since Sputnik 1, and over half of these are now defunct and orbiting Earth as junk. About 23 000 pieces of debris larger than a baseball are tracked in orbit, but it is estimated that there are 167 million of smaller pieces. Travelling at speeds of more than 28 000 kilometres per hour, their size does not really matter, but all of these bits of space junk could cause devastating damage if they hit another object.

Space is huge, so it seems almost inconceivable that small, human-made objects could pose any sort of problem. However, over the years we have learned that this is anything but the case, with numerous instances of collisions occurring. As a result, Earth orbit can now be a dangerous place, so hazardous in fact that satellites often need to perform avoidance manoeuvres in order to dodge debris. Satellite operators must move their satellites out of the way if a piece of debris is predicted to head in their direction. Even the large International Space Station (ISS) must be moved now and then. In extreme circumstances, the crew of the ISS prepare to evacuate in case debris hits the station and causes severe damage, although, thankfully, no evacuation has been required yet.

Hitting something large can be disastrous, as a number of events over the years have shown. In 1996 part of a French satellite called Cerise was ripped apart when it was hit by debris from a ten-year-old piece of an Ariane rocket. This was followed in 2009 by a defunct Russian satellite slamming into a US satellite, shattering both into thousands of pieces of debris that continue to orbit Earth today. Even small pieces can pose a problem. In 2016, British astronaut Tim Peake noticed that one of the windows on the ISS had been cracked by a small piece of debris, either human-made or a natural micrometeroid of some sort. Although not detrimental to the station, it was evidence of the danger posed.

We can track debris thanks to groups like the US Space Surveillance Network, which keeps an eye on the more than 23 000 objects larger than a baseball floating around above us. The smaller bits, one of which was the likely cause of the chip on the ISS window, are impossible to see. A device called the Space Debris Sensor was sent to the ISS in December 2017. It is used to monitor how much debris is hitting the ISS. Protecting against this smaller debris is much more difficult, and spacecraft need to have sufficient layers to ensure that in the event they are hit, those onboard can survive.

In an effort to try and limit the amount of debris in orbit, a number of guidelines have now been put into place. While these will not limit the amount of debris already in orbit, they can help us stop adding to the problem. For example, satellite manufacturers are now required to ensure their satellites burn up in the atmosphere within 25 years of mission completion, either using their thrusters to re-enter or being placed in an orbit that causes enough atmospheric drag to bring them back.

Also, not all is lost for debris already in orbit. Proposals have been put forward of which one includes using lasers on Earth to attempt and push debris back into our atmosphere where it can burn up. Others have suggested launching new spacecraft with nets or tethers onboard and using them to snag dead satellites and bring them back down. Further suggestions include similar de-orbit measures on new satellites to ensure they do not get stuck in space.

Everything mentioned so far points to a much bigger problem – the Kessler syndrome. The idea is that colliding space debris could start a chain reaction of collisions in Earth orbit, destroying more and more satellites and ultimately making some regions all but unusable.

Space junk is a problem that will not go away any time soon. With more and more satellites being launched into space, the risk of collisions rises. As our ambitions increase, we are required to prove that we are indeed capable of keeping space tidy before it is too late.

(Abridged and adapted, www.HOWITWORKSDAILY.com, How It Works magazine, May 2018, pp 26 – 31)

Passage B

How to Solve the Plastic Problem

Around 300 million tonnes of plastics are produced annually. As of 2015, 8.3 billion tonnes of plastics have been produced by humans since the early 1950s. Of these 8.3 billion tonnes, 6.3 billion tonnes become waste! By 2050 the total amount of plastic produced by humankind is projected to have risen to 34 billion tonnes. Over 480 billion plastic bottles were sold in 2016, which is more than 60 bottles per person on the planet. Up to one trillion plastic bags are discarded every year.

After having looked at these figures, so huge we can hardly grasp them, the following facts cannot escape our notice either. Only 9% of plastic is recycled. New bottles are made from only 6.6% of recycled plastic. 12% gets incinerated. The rest accumulates in landfills or the natural environment. As much as 13 million tonnes of plastic enter the oceans globally each year – a mass equivalent to that of around 85 000 blue whales. Plastic debris results in an estimated $13 billion a year in losses from damage to marine ecosystems. This includes financial losses to fisheries and tourism as well as time spent cleaning beaches.

On land, plastic bottles will take 450 years to decompose. At sea, however, they will never truly disappear. They break down into microplastics, less than 5mm long. 180 species of marine animals have been documented to be feeding on plastic. Plastics have furthermore been found in a third of UK-caught fish. People who eat shellfish may be eating around eleven thousand pieces of microplastic per year.

Scientists are increasingly finding deposits of plastic at the bottom of the oceans, even as far down as the 10 km-deep Mariana Trench in the Pacific. The facts are horrifying, but scientists and entrepreneurs are working on ways to halt the flow of plastic into our oceans to get rid of all that is already there before the problem becomes even worse.

The “Ocean Cleanup” originally conceived by an 18-year-old Dutch entrepreneur aims at using huge barriers in the ocean to passively trap plastic as it moves around large circulating currents that keep the floating plastic in place, allowing the debris to accumulate against the barrier. Two Australians designed “Seabins” with solar-powered pumps to suck in the floating waste that accumulates around harbours and other seaside structures. Another suggestion for plastic collection involves underwater drones. The autonomous vehicles could whizz around plastic-saturated areas of the ocean, swallowing rubbish with their circular ‘jaws’ while keeping fish away using a sonic transmitter.

Bacteria are potentially the most versatile creatures in existence, capable of making a home in almost any environment on Earth. It is perhaps unsurprising, then, that in recent years scientists have found evidence that some have evolved the capacity to break down plastics. Last year, for example, a Japanese team identified a bacterium capable of biodegrading PET – a plastic found in everything from polyester clothing to water bottles – prompting speculation that bacteria could be employed to stem the tide of plastic pollution by munching through it. Some microbes, however, might even be breaking down the plastic into ever smaller particles, which are not only harder to detect and clean up, but could be damaging marine ecosystems. Plastic-munching microbes are an intriguing area of research, and certainly worth exploring further. However, with the plastic piling up fast, we might not be able to rely on bacteria to do our dirty work for us.

Ultimately, plastics are not our enemy. They are durable, lightweight, inexpensive and useful. The major issue is that around 40% of the plastic we produce is going into single-use items such as cotton buds, drinking straws, carrier bags and plastic forks, which have a long life following disposal. Fortunately, we are beginning to see more projects that repurpose discarded plastics. Not only can plastics be recycled to make the usual suspects such as packaging, but they can be transformed into more specialist products such as clothes. Some companies melt down plastic bottles and turn them into fibres that can be woven into fabrics, a process that uses 50% less energy than producing polyester, the plastic most widely used in clothing, from scratch. Plastics can also be used as fuel, with new technologies allowing us to efficiently convert them into diesel and gasoline. By heating plastic in a controlled way, coupled with a catalyst, it is possible to produce fuel that does not even require refining and is ready for use.

All of this means less plastic leaking out of the system and ending up in the oceans.

(Abridged and adapted, Very Interesting, March/April 2018, pp 27 – 33)

1 Summarise the impact (a) junk has on space (**Passage A**) and
(b) plastic has on the ocean (**Passage B**).

You should write about **1 - 1½** pages, allowing for the size of your handwriting. **[20]**

2 You are a radio announcer dealing with the topic of waste and how we human beings do not seem to be able to clean up our mess.

You have invited two scientists for a discussion on your programme, one of whom is an analyst of space junk; the other a researcher on plastic pollution of the oceans.

As the interviewer you will steer the discussion with your two studio guests from gloominess to a more positive outlook on the various clean-up methods being developed.

Write your answer in the form of a radio script, set out as a triologue. Begin with the following words:

Radio announcer: *……*

Base the content of the discussion on both **Passage A** and **Passage B**.

You should write about **1½ - 2** pages in length, allowing for the size of your handwriting. **[20]**

PART 2

3 You are a passionate user of your smartphone and depend on it for the social contacts in your life. So far you have ignored all warnings from your parents and teachers about the overuse of your phone.

However, recently you have come across some articles airing views on the use of smartphones, some strikingly similar to the warnings issued by the adult world around you. It made you think and wonder.

You feel your peers should also be aware of the points raised.

Write an **informative article** for your school magazine.

Base the content of your article on the notes you took of what seemed important to you while you were reading numerous articles.

Your article should be **1½ - 2** pages in length.

YOUR NOTES

What has happened?

Love for smartphones – showing them off – special cases for them – invaded our lives – skeptical about its use regarding our health – habit – behaviour – Nokia re-released the dumbphone of 2000 in 2017, sold out in a week

Questions raised

In January 2018 – a letter to Apple demanding the company assist parents mitigate effects of smartphone use on children – scientists studying mobile addiction feverishly

Higher daily frequency of checking Facebook on a smartphone:

associated with smaller grey matter volumes in the brain region linked to tracking rewards such as food

Sensory integration

People doing more media multitasking – having a stronger ability to integrate information from multiple sensory channels

Exposure to just two hours of **blue light from backlit tablet:** delays release of melatonin, a sleep-promoting chemical from the pineal gland by about 22%

Lindsay Squeglia, a psychiatry professor – at the Medical University of South Carolina – runs the Mobile Technology Workgroup for Adolescent Brain Cognitive Development study – largest study of brain development and child health undertaken in the United States – researches how 10 000 nine- to ten-year-olds use social media and smartphone over a timespan of a decade

In comparison with non-users, **heavy smartphone users:** impaired attention, lower ability to process numbers, reduced excitability in the right prefrontal cortex, an area in the brain associated with decision-making

Distorted perspective

thinking to have been on the phone for only one hour – actually having been on phone for two hours – phone users underestimating their time spent on their smartphone

Warning sign?

"My students keep their cellphones facedown on their desks, but if you watch, they're flipping them over every, I don't know, two minutes?" says a professor from James Madison University – has never owned a smartphone – "It's like a nervous tic."

People doing more media multitasking, e.g. smartphone while watching TV: performance worse on cognitive control tasks – have smaller density of grey matter in the brain region associated with executive function.

Addiction?

42% of people look at their phone within first ten minutes of being awake – smartphone habits interfering with relationships, health, work, or school: severe form of addiction; psychologist to treat smartphone addiction – feel like overusing your phone but still having friends, managing school or work: mild addiction – download a use tracker to indicate time spent on phone, or productivity app such as Hold – rewards you for staying off screen.

(Abridged and adapted, Popular Mechanics, May 2018, pp 12 – 15)

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