**Test 4\_13**

**Reading Passage 1**

**Looking Into the Telescope**

A story is told that around 400 years ago some children were fooling around in an eye glass shop.  They noticed that when they placed lenses one on top of the other, they were able to see a considerable distance.  They played around with the concept for a while, experimenting with what happened when they varied the distance between the lenses.  Hans Lippershey, the Dutch lensmaker who eventually applied for the first telescope patent, credits children as having been his motivation for the invention of the first telescope.

The first telescopes built in the early 1600s were very primitive inventions allowing the user to see around 3-times further than the naked eye.  It was not too long however, until Italian astronomer Galileo heard about the invention ‘that through use of correctly-positioned lenses, allowed people to see things a long way away’.  The tools used in the manufacturing of the first refracting telescope was all Galileo needed to know and within 24 hours he had developed a better one.  In fact, the process of improvements Galileo made on Lippershey’s telescope were quite dramatic.  Whereas the original version had a magnification of 3, the new telescope had a magnification of around 30.  Galileo achieved these extraordinary results by figuring out the combination of the positions of the lenses and also by making his own lenses which were of better quality.  Although he originally thought they were stars, the better quality lenses – and some scientific analysis - enabled him to eventually use his telescopes to see the moons of Jupiter.  Galileo’s refracting telescopes - so-called due to the way they handled the light that passed through them - were the standard at that time.

Some 70 years later, British scientist Isaac Newton, explored the way a prism refracts1 white light into an array of colors.  He recognised that a lens was a circular prism and that the separation of colors limited the effectiveness of the telescopes in use at the time.  Newton created a Reflective Telescope, one that used a dish-shaped or parabolic mirror to collect light and concentrate the image before it was visible in the eyepiece.  Thus, lenses used for magnification in telescopes were replaced by mirrors.  Mirrors have since been the standard for telescopes.  In fact, according to telescope researcher Dr. Carl Addams, the basic designs of telescopes have not changed much in the last 100 years.  What has changed however, is the way technology has been used to improve them.  For example, the larger telescopes in the world today are around 10 metres in diameter and the mirrors placed within them are so finely polished that even at the microscopic level there are no scratches or bumps on them at all.  To achieve such a flawless surface requires a very expensive process that operates with the utmost precision.

The mid-1700s, saw the discovery and production of the Achromatic telescope.  This type of telescope differed from previous ones in the way it handled the different wavelengths of light.  The first person who succeeded in making achromatic refracting telescopes seems to have been the Englishman, Chester Moore Hall. The telescope design used two pieces of special optical glass known as *crown and flint* glass.  Each side of each piece was ground and polished and then the two pieces were assembled together. Achromatic lenses bring two wavelengths - typically red and blue - into focus in the same plane.  Makers of achromatic telescopes had difficulty locating disks of flint glass of suitable purity needed to construct them.  In the late 1700s, prizes were offered by the French Academy of Sciences for any chemist or glass-manufacturer that could create perfect discs of optical flint glass however, no one was able to provide a large disk of suitable purity and clarity.

Currently the largest telescopes are around eight to ten metres in size.  These extremely expensive and sophisticated pieces of equipment are located primarily throughout Europe and America.  Dr Addams believes that the telescopes of the future will be a gigantic improvement in what is currently considered state-of-the-art.  Telescopes that are 20 or 30 metres in diameter are currently being planned, and there has been a suggestion put forward by a European firm that they would like to build a 100-metre telescope.  Says Addams, ‘The quality of the glass needed to build a 100 meter telescope is like building a lense the size of a football field and having the largest bump in that football field being a ten-thousandth of a human hair’. The engineering and technology required to build such a flawless reflective surface is most impressive.

**Questions** **1-5**

You should spend about 20 minutes on **Questions 1-13** which are based on Reading Passage 1.

Choose the correct letter, **A**, **B**, **C** or **D**.

Write the correct letter in boxes 1-5 on your answer sheet.

**1** According to the writer, the first telescope was……………….

 **A** invented by children.

 **B** made by a lensemaker.

 **C** a reflective telescope.

 **D** quite a complex piece of equipment.

**2** The writer states that Galileo…………………

 **A** improved on the design of the first telescope.

 **B** created the first reflective telescope.

 **C** took 24 hours to make a reflective telescope.

 **D** allowed people to see 3 times further than the first telescope.

**3** The Galileo telescope was better than the first telescope because it……………..

 **A** used mirrors rather than glass.

 **B** was longer than the first telescope.

 **C** used better lens positioning and quality.

 **D** used better quality lenses and glass.

**4** The writer states that today large telescopes are………………..

 **A** 20 or 30 metres in size.

 **B** as big as 100 metres.

 **C** very costly items.

 **D** as good as will ever be built.

**5** Large, powerful telescopes are difficult to build because………………..

 **A** designs have not changed in nearly 100 years.

 **B** it is difficult to locate the flint glass needed for them.

 **C** the area needed to house the telescope is simply too large.

 **D** the lenses must be extremely reflective.

***Questions 6 - 10***

Classify the following features as belonging to

|  |  |  |
| --- | --- | --- |
|   | **A** | the Achromatic telescope |
|   | **B** | the Reflective telescope |
|   | **C** | the Refracting telescope |

Write the correct letter **A**, **B** or **C**, in boxes 6-10 on your answer sheet.

**6**          The first telescopes made.
**7**          Uses a series of lenses one on top of the other.
**8**          Highly polished lenses.
**9**          First use of mirrors to collect light.
**10**        Two pieces of glass stuck together.

**Questions 11 -13**

Complete the summary below using words from the passage.

Choose **NO MORE THAN THREE WORDS** from the passage for each answer.

Write your answers in boxes 11-13 on your answer sheet.

There have been a number of changes in telescopes since they were first invented.  For example, Galileo’s telescope increased magnification of the previously made telescope by a factor of 30.  He did this by altering the lenses **11** …………. and also constructing lenses **12** ……………  Other improvements followed but the most significant step forward, and still a major factor today in telescope design, has been the inclusion of **13**…………………

**Reading Passage 2**

**A** The intense rate of change in the world gives rise to numerous new products - many of them electronic.  What is brand new and state-of-the-art one month is quickly relegated to ‘old model’ status the next.  Within the world of computing, this frenetic pace of change has led to millions of out-dated, worthless products.  Keystone, an American-based research company reported, ‘In 2005, one computer became obsolete for every new one introduced in the market.  By the year 2010, experts estimate that in the USA there will be over 500 million obsolete computers.  Most of these computers will be destined for landfills, incinerators or hazardous waste exports.’  Old, outdated keyboards, monitors and hard drives all combine to produce what is now widely known as ‘e-waste’ and the way to appropriately dispose of them is proving to be a challenge.

**B** Most computers are a complicated assembly of hundreds of different materials, many of which are highly toxic.  Most computer users are unaware that these toxic metals, acids, plastics and other substances have been shown to be the cause of various blood diseases and cancers.  Amongst workers involved in the recycling of computer products, there has been a proliferation of blood diseases.  Printed circuit boards for example, contain heavy metals such as antimony, silver, chromium, zinc, lead, tin and copper.   Environmentalist Kieran Shaw estimates there is hardly any other product for which the sum of the environmental impacts of raw material, extraction, industrial refining and production, use and disposal is so extensive as for printed circuit boards.

**C** Workers involved in the disposal of computers via incineration are themselves being exposed to significantly high levels of toxicity.  Copper, for example, is a catalyst in the release of harmful chemicals when exposed to the high temperatures of incineration.  In US and Canadian environments, incineration is one of the greatest sources of heavy metal contamination of the atmosphere.  Unfortunately, another form of incineration, smelting, can present dangers similar to incineration.  Concerns have been expressed that the Noranda Smelter in Quebec, Canada is producing atmospheric pollutants from the residual presence of plastics in the e-scrap.

**D** In an effort to explore other alternatives, landfills have been tried.  Studies have shown however, that even the best landfills are not completely safe.  In fact the shortcomings of dealing with waste via modern landfills are well documented.  The main ‘offender’ in the area of metal leaching is mercury.  In varying degrees, mercury escapes or *leaches* from certain electronic devices such as circuit breakers, condensers and computer circuit boards into the soil.  According to Phil Stevenson, managing director of CleanCo a recycling plant in the UK, “Everyone knows that landfills leak - it has become common knowledge.  Even the best, state-of-the-art landfills are not completely tight throughout their lifetimes, to one degree or another, a certain amount of chemical and metal leaching occurs.  The situation is far worse for older or less stringent dump sites.”  If uncontrolled fires are allowed to burn through these landfill areas, other toxic chemicals such as lead and cadmium are released.

**E** An overwhelming majority of the world’s hazardous e-waste is generated by the industrialised market economies.  Because labour costs are cheap and government regulations in some countries are decidedly lax, the exporting of e-waste has been practiced as another method to deal with its disposal.  In the USA for example, Datatek, a research company, estimated that it was 12 times cheaper to ship old computer monitors to China than it was to recycle them.  Data on the prevalence of this activity is scarce due to past bad publicity and dealers of e-scrap not bothering to determine the final destination of the products they sell.  In 1989 the world community established the Basel Convention on the Transboundary Movement of Hazardous Waste for Final Disposal to stop the industrialised nations of the OECD from dumping their waste on and in less-developed countries.

**F** Europe has taken the lead on e-waste management by requiring governments to implement laws controlling the production and disposal of electrical products.  The European Union (EU) has drafted legislation on Waste from Electrical and Electronic Equipment (the WEEE Directive) based on a concept known as Extended Producer Responsibility (EPR).  Essentially, EPR places the responsibility of the production and disposal squarely on the shoulders of the producers of electronic products.  It requires that producers consider carefully the environmental impact of the products they bring to the marketplace.  The aim of EPR is to encourage producers of electrical equipment to prevent pollution and reduce resource and energy use at each stage of the product life cycle.  The lead in Europe has been necessary because WEEE is about three times higher than the growth of any other municipal waste streams.

**G** WEEE legislation will phase-out the use of toxic substances such as mercury, cadmium and lead in electronic and electrical goods by the year 2008.  It will require producers of electrical equipment to be responsible financially for the collection, recycling and disposal of their products.  It has stipulated that products containing any lead, mercury, cadmium and other toxic substances must not be incinerated.  It encourages producers to integrate an increasing quantity of recycled material in any new products they produce.  In fact, between 70% and 90% by weight of all collected equipment must be re-cycled or re-used.  These directives will go a long way toward improving the e-waste problem in Europe and other governments of the world should look seriously at implementation of some or all of the legislation.

**Questions 14 - 20**

You should spend about 20 minutes on **Questions 14 – 27.** Reading Passage 2 has 7 paragraphs, **A-G.** Choose the correct heading for each paragraph from the list of headings below. Write the correct number, **i-xi**, in boxes 14-20 on your answer sheet.

|  |  |  |  |
| --- | --- | --- | --- |
|

|  |
| --- |
| **List of Headings** |
| iiiiiiivvviviiviiiixxxi | Exporting e-wasteThe hazards of burning computer junkBlame developed countries for e-wasteLandfills are not satisfactoryProducer’s legal responsibilityThe dangers of computer circuit boardsElectronic changes bring wasteEuropean e-waste lawsThe dangerous substances found in computersLandfills and mercury leachingNew products must contain recycled products |

 |

**14**        Paragraph **A**
**15**        Paragraph **B**
**16**        Paragraph **C**
**17**        Paragraph **D**
**18**        Paragraph **E**
**19**        Paragraph **F**
**20** Paragraph **G**

***Questions 21 - 24***

Look at the following list of statements (Questions 21-24) and the list of companies below.

Match each statement with the correct company. Write the correct letter **A-D** in boxes 21-24 on your answer sheet.

**NB**       You may use any letter more than once.

**21**        waste sites without strict dumping rules leads to big problems
**22**        e-waste should be re-located to other countries
**23**        most old computers will be buried or burned
**24**        it is impossible to contain metal waste in soil

|  |
| --- |
| **List of companies** |
| **A****B****C****D** | Noranda SmelterDatatekKeystoneCleanCo |

**Questions 25-27**

Choose **THREE** letters, **A-G.**

Write the correct letters in boxes 25-27 on your answer sheet.

According to the information in the text, which **THREE** of the following pollution laws have been proposed in Europe?

**A** Manufacturers will have to pay for disposal of their products.
**B**         Manufacturers must dispose of the electronic goods they produce.
**C** Products made in Europe must be completely recyclable.
**D** Consumers are responsible for the disposal of the products they purchase.
**E** Disposal of products containing mercury should be incinerated.
**F**          Other governments around the world will implement the EU laws.
**G**         A large percentage of old products must be included in new products.

**Reading Passage 3**

**Preparing for the Threat**

It is an unfortunate fact that over the past 20 years, around 260 million people a year have been affected by natural disasters around the world.  Regrettably, a vast majority of the victims of this staggering number are from developing countries.  Whether it be earthquakes, tornadoes, floods, volcanoes or tsunamis, over the past twenty years, natural disasters have been happening more frequently and affecting more people than ever before.  It follows that the international community should address the issue of 'disaster preparedness' and establish a process by which natural disasters are dealt with.

On December 26, 2004, a massive earthquake centered off the coast of the Indonesian Island of Sumatra caused a series of deadly tsunamis in the Indian Ocean.  The damage from this extraordinary disaster was estimated to be in the vicinity of US$13 billion - the equivalent to the combined GDP1 of the world’s developing countries for an entire year.  In a matter of seconds, the tsunami waves wiped out the long years of struggle for development, and the world was once again reminded of the fearsome and destructive power of natural disasters.

The United Nations designated the 1990s as the International Decade for Natural Disaster Reduction, and has been active in promoting and developing international cooperation on disaster preparedness.  The UN's Yokohama Strategy for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation was adopted in 1994.  Among the guidelines, developing countries are encouraged to organise and implement their domestic resources for disaster reduction activities and donor developed countries are encouraged to give greater priority to disaster prevention, mitigation and preparedness in their assistance programs and budgets, including through increasing financial contributions.

In January, 2005 the UN World Conference on Disaster Reduction (WCDR) met in Kobe, Hyogo Prefecture to discuss and debate how the international community should address issues of disaster preparedness and mitigation.  The meeting itself attended by over 4,000 delegates representing some 168 countries occurred almost 10 years to the day after the Great Hanshin earthquake in Kobe.  The January meeting of the WCDR in Kobe provided experts and scientists from over 150 countries, government officials, Non-Government Organisation (NGOs) and United Nations representatives an opportunity to review the Yokohama Strategy.  It recorded on the 2005-15 Yokohama Strategy Action Plan that participant countries and agencies should work over the next 10 years to reduce vulnerability to natural disasters.  The Action Plan encourages as a first step, the integration of disaster prevention programs in all development and policy-making plans for all countries.  Jim Edgeland, UN representative stated, “Disaster risk reduction is not an additional expense – it is an essential investment in our common future.  But the benefits of this investment will be calculated not only in dollars or euros or yen saved, but most importantly, in saved lives in every corner of the globe.”

Perhaps the most significant work done at the WCDR meetings was the drafting and adoption of the Hyogo Declaration.  This document expresses the united determination of the international community to rely not only on advanced technology or facilities for disaster preparedness, but on a people-centered early warning system.  The people-centered system requires effective communication and education in the building of disaster-resilient countries and communities

As the intergovernmental panels of the WCDR were meeting, the Great Hanshin-Awaji Earthquake Forum was also underway.  The earthquake measuring a magnitude of 7.3, led to the loss of over 6,400 lives and widespread destruction affecting some 460,000 households.  This public forum offered a variety of sessions, during which the lessons learned from the disastrous earthquake were discussed.  Earthquake expert Professor Tomohiro Kawata said, “Because this disaster happened over a decade ago, the memory of the devastation can be forgotten.  Part of our gathering here today is to make sure that we do not forget what happened back in 1995.”  Also included were some personal stories from the earthquake victims themselves.  Earthquake victim Kumiko Nagota told attendees that her house collapsed in the Kobe earthquake and she was trapped under it.  She tried to call for help but after a while she lost her voice and just had to wait there until help came.  Attendees were told of how the town mobilised to facilitate recovery and reconstruction.  An exhibition hall showed pictures of mounds of rubble produced by the earthquake as well as a display of objects donated by earthquake victims including a broken clock and a child’s toy that melted in the fires caused by the earthquake.  Said Kawata, “As well as being a memorial, our facility and, indeed this forum, is a place to learn from earthquake experiences and incorporate the things we learned into our preparations for future disasters”.  During the forum, it was agreed that in May 2005, a new hub for the coordination of international disaster recovery support activities would be established in Kobe.

**Questions 28-31**

You should spend about 20 minutes on **Questions 28-40**

Do the following statements agree with the information given in Reading Passage 3?

In boxes 28-31 on your answer sheet, write

|  |  |  |
| --- | --- | --- |
|   | **TRUE** | if the statement agrees with the information |
|   | **FALSE** | if the statement contradicts the information |
|   | **NOT GIVEN** | if there is no information on this |

**28** Mostlypeople from poorer countries are affected by natural disasters.

**29** Present-day natural disasters are more dangerous than disasters of the past.

**30** It will take the countries affected by the tsunami many years to rebuild.

**31**        Being prepared and knowing what to do in a disaster should be a global issue.

**Questions  32 – 35**

Choose the correct letter, **A**, **B**, **C** or **D**.

Write the correct letter in boxes 27-31 on your answer sheet.

**32** According to the passage, reducing the risk of disasters is important because……

**A** countries can then focus on growth and development.

**B** communities will be drawn together in support of each other.

**C** help international communities to be more economically stable.

**D** it will save lives and money.

**33** According to the writer, the most important outcome of the World Conference on Disaster Reduction (WCDR) was the………..

**A** discussion and debate amongst the international community attendees.

**B** chance for participants to review the Yokohama Strategy.

**C** writing and acceptance of the Hyogo Declaration.

**D** acknowledgement that disaster risk reduction is an investment in the future.

**34** The town of Kobe was effectively rebuilt due to……………….

**A** the support of the United Nations.

**B** the people of Kobe.

**C** the Government of Japan.

**D** the leadership of Professor Kawata.

 **35** The stated purpose of the Great Hanshin-Awaji Earthquake Forum was……………..

**A** to help others be better prepared for any future natural disasters.

**B** for people to learn more about natural disasters.

**C** to remember the Kobe earthquake of 1995.

**D** for people to remember and learn from what happened.

**Questions 36 – 40**

Look at the following statements (Questions 36 – 40) and the list of disaster control initiatives below. Match each statement with the correct disaster control initiative, **A-D.**

Write the correct letter, **A-D**, in boxes 36-40 on your answer sheet.
**NB:** You may use any letter more than once.

**36** people should be the early broadcasters of disaster information

**37** led to a new central area for support in disaster recovery

**38**        a reminder of the impact of disasters

**39** in times of disaster,developed countries should do more to help less-developed countries

**40**        national development and disaster prevention should be considered at the same time

 **Disaster Control Initiatives**

**A**         Hyogo Declaration
**B**         Great Hanshin-Awaji Earthquake Forum
**C**         World Conference on Disaster Reduction
**D**         Yokohama Strategy for a Safer World