Technology and Design

Question 1: *Read the following, then answer the questions which follow:*

Technology provides an understanding, and an appreciation for the world around us. Most modern technological processes produce unwanted by-products in addition to the desired products, which is known as industrial waste and pollution. While most material waste is re-used in the industrial process, many forms are released into the environment, with negative environmental side effects, such as pollution and lack of sustainability. Different social and political systems establish different balances between the value they place on additional goods versus the disvalues of waste products and pollution.
Some technologies are designed specifically with the environment in mind, but most are designed first for economic or ergonomic effects. Historically, the value of a clean environment and more efficient productive processes has been the result of an increase in the wealth of society, because once people are able to provide for their basic needs, they are able to focus on less-tangible goods such as clean air and water.

The effects of technology on the environment are both obvious and subtle. The more obvious effects include the depletion of non-renewable natural resources (such as petroleum, coal, ores), and the added pollution of air, water, and land. The more subtle effects include debates over long-term effects (e.g., global warming, deforestation, natural habitat destruction, coastal wetland loss.) Each wave of technology creates a set of waste previously unknown by humans: toxic waste, radioactive waste, electronic waste.

One of the main problems is the lack of an effective way to remove these pollutants on a large scale quickly. In nature, organisms "recycle" the wastes of other organisms, for example, plants produce oxygen as a by-product of photosynthesis, oxygen-breathing organisms use oxygen to metabolise food, producing carbon dioxide as a by-product, which plants use in a process to make sugar, with oxygen as a waste in the first place. No such mechanism exists for the removal of technological wastes.

Extract from https://en.wikipedia.org/wiki/Technology_and_society

1.   "*Technology is the use of knowledge, resources and skills to meet people's wants and needs.*"

How does the definition of technology, given in this extract, relate to the definition above? (2)

_____

_____

_____

2.   Define industrial waste   (3)

_____

_____

Technology and Design

3. Give an example of a by-product of a technological process, that can be re-used.   (1)

_____

4. Give two examples of negative environmental side effects of industrial processes.   (2)

_____
_____

5. In your opinion, what influence does the wealth of society have on technological processes?   (2)

_____
_____
_____

6. Differentiate between tangible and in-tangible products or goods.   (2)

_____
_____
_____

7. Name three pollutants caused by technology and give the source of each pollutant.   (6)

_____
_____
_____
_____

8. Paraphrase the effects of technology on the environment, making reference to

non-renewable resources and the long term environmental effects of technology.   (4)

_____
_____
_____
_____
_____

Question 2:   _Define each of the following in detail._

1.   Technology   _____

_____
_____   (3)

2.   Technological process   _____

_____
_____   (2)

Technology and Design

3.   Needs   _____

_____

_____ (2)

4.   Constraints   _____

_____

_____ (2)

Question 3:   *Each of the following describes a step in the Technological or Design Process. Read each one carefully, describe what it is and specify the step.* (12)

1. Place the wooden block on a flat surface.
2. Drill four holes into the corners, using a drill.
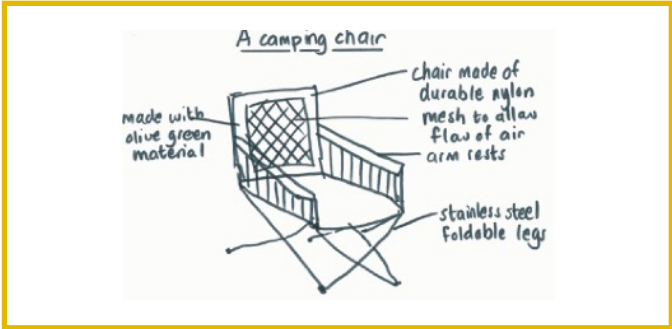3. Take four screws and fasten the bottle caps onto the wooden block.

_____

_____

_____

I will design and make a lunchbox with enough space for food and drinks for school children that is small enough to carry around.

_____

_____

_____

The ball container should be 800 mm in length and 300 mm wide.
It must hold 3 soccer balls.

_____

_____

_____

According to the survey, most people prefer a sports bottle with a volume of 500 ml that has a cap fastened to the bottle.

_____

_____

_____

The team emailed the client throughout the process, sending sketches, until they were able to finalise the design.

_____

_____

_____

Technology and Design

A camping chair
- made with olive green material
- chair made of durable nylon mesh to allow flow of air
- arm rests
- stainless steel foldable legs

_____
_____
_____

After consulting with 20 clients who bought the camping chair, the team decided to shorten the seating area and lower the arm rests.

_____
_____
_____

It will cost approximately R2 400,00 for all the materials needed to construct the table and it will take 5 working days to complete.

_____
_____
_____

According to Medical Research SA, the average person weighs 65 kg. This should be taken into consideration when designing the chair.

_____
_____
_____

Question 4:   You have been given the task to design a stationery container from recycled materials only. The stationery container must be light enough to carry around, but sturdy and stable. There should be separate divisions for scissors, pencils, pens, rulers and erasers.

a)   List the steps you will follow in the **process of designing** the new stationery container.   (5)

1. _____   2. _____
3. _____   4. _____
5. _____

Technology and Design

b)   Make a list of **specifications and constraints** for the designing and making of the stationery container.   (4)

_____

_____

_____

_____

c)   When **labelling** your drawings, you have to follow the _____ principle. Explain each component of the principle in detail: (6)

_____   _____

              _____

_____   _____

              _____

_____   _____

              _____

_____   _____

              _____

_____   _____

              _____

_____   _____

              _____

e)   Draw a **sketch** of your stationery container.   (5)

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f)   Compare a **sketch** to a **design**, using the Venn diagram: (6)

Sketch   **Design**

www.studychamp.co.za
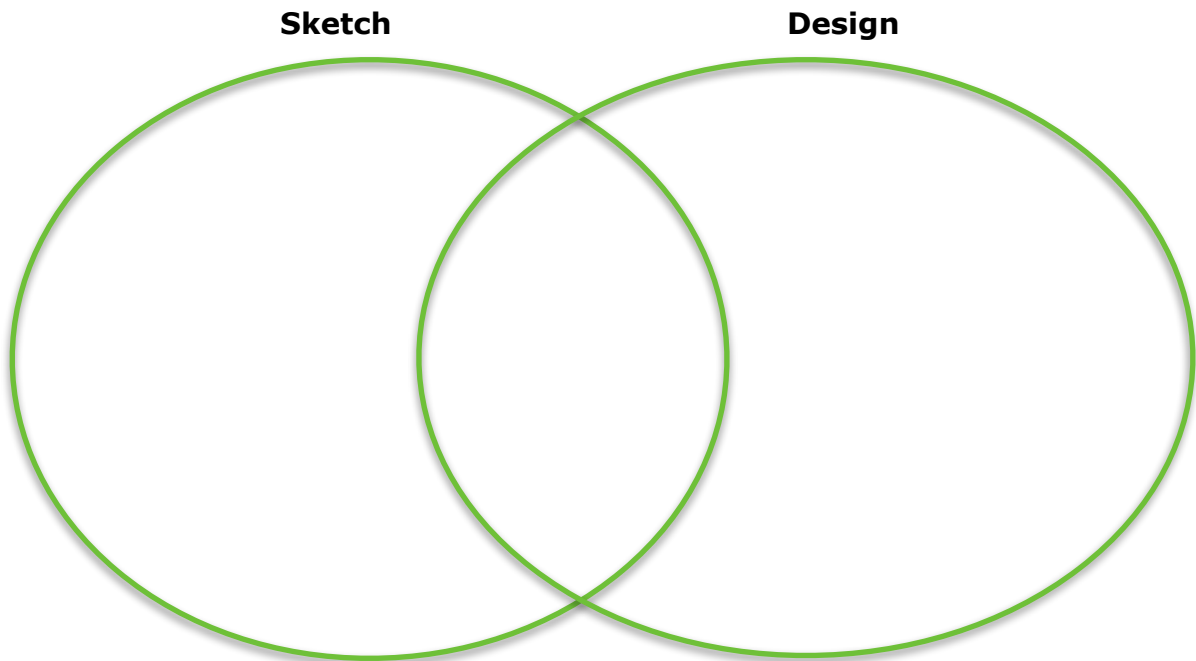
Question 1: Read the article on the development in broadcasting technology, then answer the questions:

1. In which way did MultiChoice change television and broadcasting? (2)

They introduced the first pay-TV channels outside the United States with a service that provided channels directly to your home.

2. Channel 170 was MultiChoice's first channel that was able in

High Definition (HD) (1)

3. List the technological advances to television, in chronological order, that was initiated by MultiChoice. (6)

1. Pay-TV channels brought to South Africa.
2. MultiChoice introduced satellite-based TV.
3. High Definition channels were launched.
4. Powerful decoders were introduced that could play back life TV and record.
5. Mobile satellite TV followed.
6. Connected Services introduced with Catch Up and Remote Recording services.

4. Identify two wants that led to technological developments in broadcasting and television. (3)

Wants: People want more choices when watching television.
People want to have mobile television.
People want to record programs to watch later.
People want to buy series and movies.

5. List two advantages and two disadvantages of the technological developments in broadcasting and television. (4)

Advantages: Television available to more people.
More choices and options for people.
Technological development and competition will lead to better value for money.
News, sport and current events reach all people over the world faster.

Disadvantages: Pay-TV is expensive and not available to all people.
Internet problems will influence download speeds and quality of viewing.
People become less active as they watch more TV.

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6.   Complete the table below:

Old Technology	Intermediate Technology	Advanced Technology
television	satellite television	mobile television
rotary dial telephone	cordless telephone	cell phone
	or cell phone	smart phone

More answers possible.

Question 2:   *Define the following:*

1.   Technology   Technology is the use of knowledge, skills, values and resources to find solutions for problems or to improve previous solutions to problems. The problems are usually a result of a human need or want. Solutions should take the environment into account and be practical. Solutions are usually found in the form of products, which are almost always a result of technology. In short, technology makes things work better.   (3)

2.   Technological process   This is also known as the design process and is the process followed whereby the solution to the problem is investigated, designed, made and evaluated. Through this whole process communication is vital.   (2)

3.   Needs   Needs are things that are necessary for humans to live, e.g. water is a need, food is a need. Technology is involved in meeting people's needs and wants. Technology is used to build dams to ensure the need for water is satisfied.   (2)

4.   Constraints   Constraints are limiting factors that can delay the technological or design process, e.g. weather, cost, materials, labour, etc. can all influence the production line. Constraints can also limit your choices, e.g. the company for which the product is made can put limitations on the measurements of a product.   (2)

Question 3:   *Each of the following describes a step in the Design Process. Read each one carefully, describe what it is and specify the step.*

1. Place the wooden block on a flat surface.
2. Drill four holes into the corners, using a drill.
3. Take four screws and fasten the bottle caps onto the wooden block.

Step-by-step instructions

Making

Technology and Design:MEMO

I will design and make a lunchbox with enough space for food and drinks for school children that is small enough to carry around.

The Design Brief

Design

The ball container should be 800 mm in length and 300 mm wide.
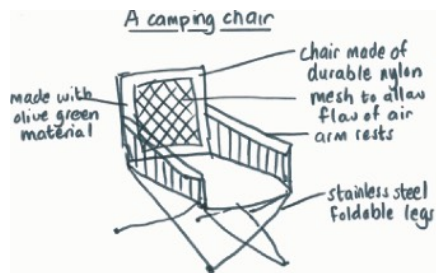It must hold 3 soccer balls.

Specifications and constraints

Design

According to the survey, most people prefer a sports bottle with a volume of 500 ml that has a cap fastened to the bottle.

Conducting a survey

Investigating

The team emailed the client throughout the process, sending sketches, until they were able to finalise the design.

Communication

A camping chair

made with olive green material

chair made of durable nylon
mesh to allow flow of air
arm rests

stainless steel foldable legs

Sketch

Design

After consulting with 20 clients who bought the camping chair, the team decided to shorten the seating area and lower the arm rests.

Evaluating the solution

Specifications - the cost and time it takes to complete the project.
If the time and costs were determined by the company or person for whom the product is made, it will be a **constraint**.

It will cost approximately R2 400,00 for all the materials needed to construct the table and it will take 5 working days to complete.

Technology and Design: MEMO

According to Medical Research SA, the average person weighs 65 kg. This should be taken into consideration when designing the chair.

Investigation - researching the internet to find information that will influence the specifications and constraints of the design.

Question 4:   You have been given the task to design a stationery container from recycled materials only. The stationery container must be light enough to carry around, but sturdy and stable. There should be separate divisions for scissors, pencils, pens, rulers and erasers.

a)   List the steps you will follow in the process of designing the new stationery container.   (5)
   1. Identify and Investigate   2. Design
   3. Make   4. Evaluate
   5. Communication (Not really a step in the process, but there should be communication throughout the process.)

b)   Make a list of specifications and constraints for the designing and making of the stationery container.   (3)
It must be made from recycled materials only.
It must be light, but still strong and sturdy (it must not fall over).
There should be divisions for different types of stationery.

c)   When labelling your drawings you have to follow the NMESS principle.
Explain each component of the principle in detail: (6)
N   Name - every drawing must have a name or a heading
M   Materials - name the materials that different parts will be made of.
E   Explain - explain what each part of the design will do and how it will be joined.
S   Size - show the size of all the parts of the design, given in millimetres.
S   Show - indicate the view of the sketch or final design, e.g. top, side, front view.

e)   Draw a sketch of your stationery container.   (5)
The sketch of your idea should adhere to the specifications and constraints, should be labelled correctly (using the MESS principle), must have a name and should be made completely out of recycled materials. It must be a free-hand drawing, with labels but no colour.

f)   Compare a **sketch** to a **design**, using the Venn diagram: (6)

Technology and Design: MEMO

f)   Compare a **sketch** to a **design**, using the Venn diagram: (6)

Sketch   **Design**

No colour
Free-hand
drawing

Labels:
Name
Materials
Explain
Size
Show - View

In full colour
Use drawing
instruments,
e.g. rulers,
compass