



Subject: Grade 9 Technology

Topic: Technology: Term 1 - Mini-exam

Total: 99 Marks

1. evaluate | evaluation | evaluating | evaluate phase | evaluation phase | evaluating phase 3 marks

Explanation:

During the **Evaluation phase of the Design Process** you would assess the positives and negatives about your design and consider **possibles improvements**.

You can then present the model and discuss your evaluation findings or return to a previous phase to make improvements and produce a better design.

2. ramp | ramps 3 marks

Explanation:

A **sloped** surface which connects two different levels is called a **ramp**.

Ramps are often next to steps to provide access to wheelchair users and other wheeled apparatus such as prams and trolleys.

3. E | D | compression | bending 8 marks

Explanation:

This graphic shows the **5 main types of forces** acting on structures.

- A = **Compression** (squeeze)
- B = **Shearing** (tearing)
- C = **Bending** (opposite directions)
- D = **Torsion** (twisting)
- E = **Tension** (pulling)

4. A: dimension 4 marks

Explanation:

The lines on a technical drawing with accurate measurements are called **dimension lines**.

Dimension lines must conform to **standardised conventions** and are drawn with a ruler and sharp pencil. The lines will be **lighter** or softer than the outlines of an object.



5. top | Orthographic | dimensions

6 marks

Explanation:

This image shows the **side and top view** of a bridge design. The three views in a **Orthographic projection** are the side, front and top views. The view from below is not drawn. If **dimensions** are added to the views they will then become **working drawings**. Dimensions are shown in millimetres and a scale is added.

6. B: the drawing is 200 times smaller than the actual building

4 marks

Explanation:

This drawing plan shows a scale of **1:200** which means that the **drawing is 200 times smaller** than the actual building. The first number is the drawing and the second value is the size of the actual object. The object is **reduced** to fit onto a piece of paper. The scale guides the person constructing the building as to what size it will be in reality.

7. C: The bridge must be able to withstand 500 kg of weight.

4 marks

Explanation:

Specifications are the features which the bridge **must have** and relate to measurements, features and materials.

The scenario does not mention the weight the bridge must hold. It discusses the height and width and that it must cater for wheelchair users.

8. Investigation | Make | Communication | Design

8 marks

Explanation:

- When applying the Design Process to the given scenario your first step is to **research** the type of bridge best suited for this scenario. This is the **Investigation** phase where you gather information about the users of the product, possible designs and suitable materials.
- Building a model bridge from sucker sticks, straws and cardboard is part of the **Make** phase. The model is **constructed**.
- Your company must present your model to the school in the **Communication** phase where you ideas and model are shared with an audience.
- You will draw sketches and create working drawings in the **Design** phase of the Design Process. These **drawings** will include rough sketches, perspective drawings, isometric projections and orthographic projections.

9. specifications | problem | aesthetics | budget

8 marks

Explanation:

- The scenario has various **specifications** which state the **criteria** the bridge must have. These include all dimensions and materials which must be used.
- It also describes the **problem** or challenge which the design must resolve. The design must solve a problem and meet the needs of the users.
- As well as the functionality of the bridge the designer should also consider the **aesthetics** of the bridge. It is most important that the bridge offers a safe and practical way to cross the road but it must also be **attractive**.
- Costing is important and a **budget** should be drawn up including all expenses that the bridge construction would incur. A budget is an estimated amount.

10. concrete and steel | last a long time | not rust

6 marks

Explanation:

- According to this scenario the best materials from which to construct the bridge would be **concrete and steel**. The steel would form a sturdy frame for the bridge as well as the hand rails. The deck and ramp could be made from concrete.
- These materials are **durable** which means they will **last a long time**. the bridge will be an expensive investment and must last.
- Steel and concrete are also both **non-corrosive** and will therefore **not rust** when exposed to acids, air and water.

11. B: Design and make a pedestrian bridge to allow all high school learners to cross the main road safely.

4 marks

Explanation:

The most accurate brief would be:

Design and make a **pedestrian bridge** to allow **all high school learners** to **cross the main road** safely.

- This brief includes **what** must be built, **where** and for **whom** it must be built.
- The word "all" implies that the bridge should be **inclusive** of all learners including disabled individuals.

12. Aluminium

3 marks

Explanation:

Metals are malleable as they can be **rolled out** and **hammered** into **thin sheets**. They are pliable and can be compressed.

Aluminium is malleable.

13. D: Force multiplication

4 marks

Explanation:

The three main methods used to provide **stability** to tall structures are **cross bracing**, **triangulation** and a **wide base**.

14. false

2 marks

Explanation:

One of the main reason why **Plastic PVC pipes** are used for plumbing and **water** distribution is because they are **flexible** and can therefore handle ground movement without cracking and leaking.

15. C: dimensions in millimetres, soft construction lines, arrowheads on lines

4 marks

Explanation:

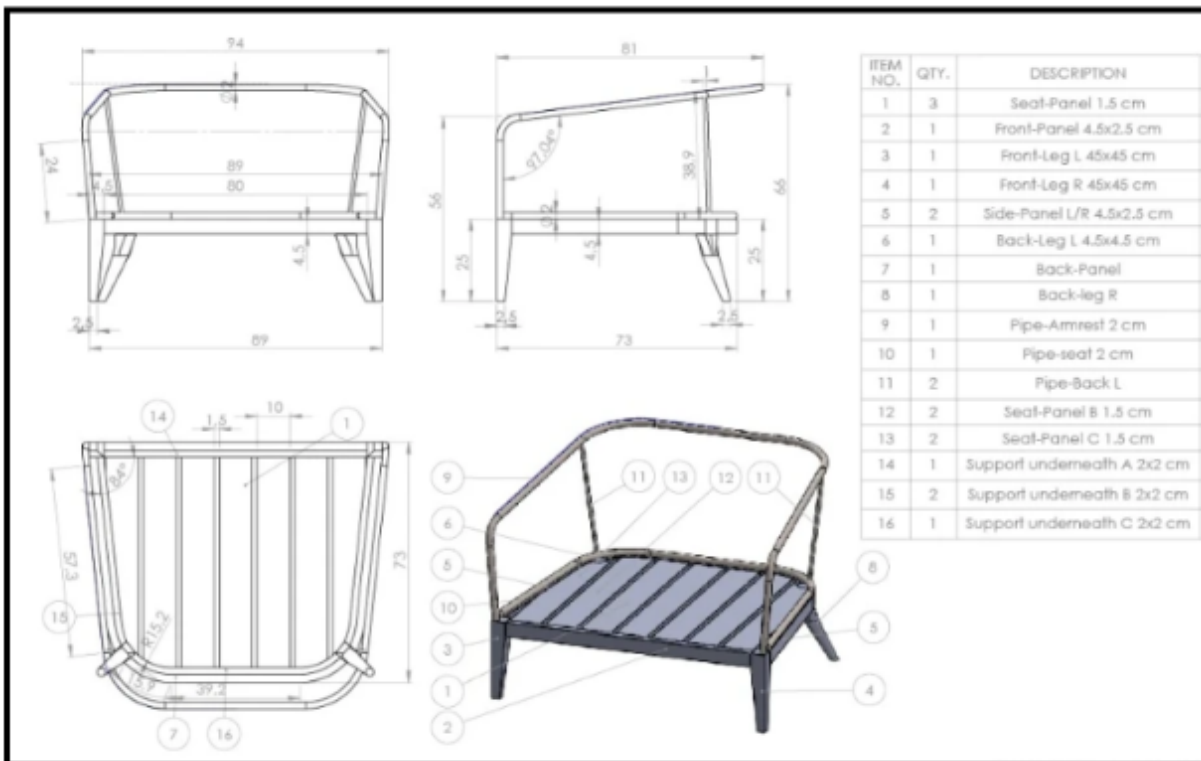
Dimension conventions that apply to technical drawings:

- Dimensions are always given in **millimetres**.
- The **mm is not written** as it is the measuring standard.
- The value is written either **above a horizontal line or left of a vertical line**.
- Construction lines are drawn with a **soft pencil**, only outlines are drawn with a dark pencil.
- There are **arrowheads** at the end of the lines.

16. false

2 marks

Explanation:



This is a sketch diagram and not a working drawing.

A **working drawing** is a **two-dimensional** drawing done using a ruler and includes **accurate dimensions**. It may also include a cut list detailing the quantities required for each piece in the model or object.

17. true

2 marks

Explanation:

Structural failure occurs when a structure **cannot withstand the forces** acting on it. Buildings will get **fractures, bend** or **topple over** when there are too many extreme forces acting on them or they have not been constructed correctly.

18. true

2 marks

Explanation:

An **Isometric projection** is a **three dimensional** drawing. The drawing is done at an angle of **30°** to the horizontal. It is not a perspective drawing. Three dimensional drawings show **height, width** and **depth**.

19. transparent | transparency | see through

3 marks

Explanation:

Glass and plastic (acrylic/ plexiglass) are **transparent (see through)** and therefore they are the most suitable materials to use for windows.

20. false

2 marks

Explanation:

The people walking across a pedestrian bridge exert a **dynamic force** on the deck of the bridge. Any **moving** force is considered dynamic.

21. true

2 marks

Explanation:

When making a model during Technology for a mini-PAT at school **you should** try and **include using recycled materials**.

Depending on the model you need to make you can use paper, cardboard, sucker sticks, paper or plastic straws, bottle tops and other plastic items.

22. function

3 marks

Explanation:

The **function** is most important. Any product or structure must **solve a problem** and be **fit for purpose**. Once the basic idea has been selected the designer can then focus on the appearance and aesthetics.

23. evenly | even

3 marks

Explanation:

The load in a truck should be **evenly** distributed. This will ensure that the forces are evenly distributed and prevent possible accidents. The load on any structure should be evenly distributed to avoid structural failure.

24. yes

3 marks

Explanation:

Bricks are very **dense** and **heavy**. They are usually made from clay and are commonly used to construct homes as they are strong and withstand wind and rain. The matter inside bricks is tightly packed which makes them dense.

25. risers | treads | handrail

6 marks

Explanation:

A staircase is used to access a higher place or next level in a building.

- Steps consist of vertical **risers**. The riser is the elevation or **height** of each step.
- The horizontal part of each step is called the **tread** and is the part where the foot is placed as you step.
- For safety a **handrail** must be added to any open side of a staircase. The top of a handrail in South Africa must be between 900 mm and 1 000 mm from the top of each tread. This is a **safety regulation** which must be applied to all staircases.

