



Subject: Grade 8 Technology

Topic: Technology: Term 1 - Mini-Exam

Total: 101 Marks

1. false

2 marks

Explanation:

Roof trusses are **frame** structures. They provide **support from the inside**. The roof covering (tiles, sheets, thatch) is laid over the roof truss.

2. scale

3 marks

Explanation:

When a technical drawing represents an object or structure we use a **scale which is a ratio** to explain how large or small the object is in relation to the drawing.

- If we **scale down** then we draw the object much smaller than the real object such as a house. e.g. 1:50

- If we **scale up** then we draw the object much larger such as designing small cellphone components. 5:1

3. true

2 marks

Explanation:

The two basic types of forces acting on structures are:

- **Static** forces are **still** and do not move and refer to the actual load and weight of the structure itself.

- **Dynamic** forces are forces which **move**. These forces change over time, and it is usually the direction of the force that changes.

4. A: An idler gear is a third gear wheel between two gears which functions to make the gears move faster.

4 marks

Explanation:

When an **idler gear** is added between two gears, this **changes the direction of the driven** or follower gear. The driver and driven gear will then turn in the same direction. The idler gear does not impact the gear ratio.

5. false

2 marks

Explanation:

This machine is called a **cam and follower**. This image shows the red cam which rotates as well as the green follower which moves up and down.



6. simple | shaft | knob | axle

8 marks

Explanation:

- The **wheel and axle** is an example of a **simple machine**. It is a basic mechanism consisting of a wheel attached to an axle, and if the wheel turns, then the axle turns.
A fixed axle does not turn
- An axle is a rod or **shaft** on which the wheel turns.
- A **door knob** is also an example of this machine. As the knob is turned the axle which is inside the door also turns. This axle is connected to the locking mechanism and the door catch is released when it turns.
- The **axle is inside** the door and the wheel is on the outside.

7. wedge

3 marks

Explanation:

The **wedge** is a basic mechanical system. Ancient Egyptians used wedges as tools and to create ramps while building the great pyramids.

8. false

2 marks

Explanation:

This image shows a **crank**. A crank is part of a shaft or an axle which is **bent at right angles**. A crank functions by converting **circular motion into reciprocating motion or vice versa**.

9. I-beam | I beam

3 marks

Explanation:

This is an **I-beam**. In cross-section, it has a **capital letter "I" shape**, which resists bending and shearing forces in large structures. They are usually made from **steel**.

10. 30

3 marks

Explanation:

When drawing an isometric projection, the angles are drawn at 30° to the horizontal. The horizontal lines are all drawn at this angle and not 90° to the vertical.

11. shell

3 marks

Explanation:

These domes are **shell** structures. They are similar to a bird's egg. The structure is on the outside and protects the contents inside.

12. false

2 marks

Explanation:

Structural failure does not refer to a test. Structural failure is when a building or member cannot **perform its function**. The structure then becomes deformed, breaks or collapses.

13. isometric | three | depth

6 marks

Explanation:

- An **isometric projection** is a drawing constructed on a **30-degree angle**. It is drawn using a protractor, set square or suitable grid paper.
 - It is a **three-dimensional** drawing, unlike an orthographic, which is 2D.
 - An isometric projection shows the three dimensions of an object, which are the width, depth, and height dimensions.
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14. climbed | wind | triangulation | steel

8 marks

Explanation:

Pylons are large structures which support electricity cables to transport electricity across the country.

- It is important that these structures cannot easily be **climbed** by people. This is for safety reasons to ensure they are not electrocuted. Special equipment is used to scale the pylons for repairs.
 - **Wind** must be able to pass through the pylons to ensure they do not blow over. If pylons were solid, they would easily be blown over in extreme weather.
 - **Triangulation** and cross-bracing are used to ensure these tall structures are stable. These triangular shapes can easily be seen on most pylons.
 - Electricity pylons are usually made from wood, concrete or **steel**. Steel is lightweight and very durable and is the preferred material.
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15. true

2 marks

Explanation:

A working drawing is a **2D** drawing. It is usually an orthographic projection. Each view then has **dimensions** added to it. This drawing can then be *worked* with while constructing the object.

16. B: A - tie-beam, B - rafter, C - king post, D - strut.

4 marks

Explanation:

A is a **horizontal tie-beam** which connects the roof trusses.

B is a **rafter** which **slopes** to form the **frame**.

C is a **king post**, which is the **long central post** connecting the tie-beam to the top of the rafters.

D is a **strut** which is always in **compression** and makes the frame more **stable**.

17. true

3 marks

Explanation:

To make an artistic drawing of an object look **realistic**, **shade and light** are added. This is also known as **rendering**. Showing the texture of an object makes it look real.

18. column | tension | deck | compression

8 marks

Explanation:

- A cable-stayed bridge consists of tall **columns**. These columns are anchored into the ground below the river or at the bottom of a valley.
 - The tensile steel cables are attached to the columns and the deck and are in **tension**.
 - Cars, trucks and trains drive on the **deck** of a bridge. This is the name given to the flat horizontal beam on which traffic moves across the bridge.
 - The deck of the bridge is in **compression** from each end.
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19. C: Fractures, toppling over, bending.

4 marks

Explanation:

There are three main ways that structures such as buildings, towers and bridges fail:

- **Toppling over** - this occurs when a structure does not have a wide enough base or is top-heavy.
 - **Bending** - when a structure is too stiff then buckling may occur, often due to the incorrect material being used.
 - **Fractures** - This occurs over time due to continued forces acting on the structure. Structures have a life span, and it is important that regular maintenance is done to replace or repair worn components.
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20. B: Outline, construction line, hidden detail, centre line, dimension line.

4 marks

Explanation:

These are the main line types used in technology from top to bottom:

- **Outline** - a thicker, darker line to show the outline of the main shape.
- **Construction line** - a soft, thin line used to construct all lines.
- **Hidden detail** - a broken or dotted line showing detail that cannot be seen from that view.
- **Centre line** - a broken line with short and long dashes used to show the middle of a shape, often a circle.
- **Dimension line** - soft construction lines with arrow heads and short dimension lines. The number tells us how long that part is in mm.

21. mechanical advantage

3 marks

Explanation:

Mechanical Advantage is how much a machine or mechanical device helps or benefits the user. It refers to the relationship between the effort force and the load force.

22. A: Suspension bridges are simple and cost effective to build.

4 marks

Explanation:

Suspension bridges are fairly **complex** bridges. They are not simple like a beam and column bridge.

Suspension bridges are **very expensive** to construct.

23. one | balconies | suspension

6 marks

Explanation:

- Cantilever bridges are **supported at one end** and not both ends. The cantilever sticks out into space, and the two ends meet in the middle. This makes the construction process simpler, and the road below may not need to be closed during construction.
 - Simple cantilevers are also used to construct **balconies that stick out** from blocks of flats or offices. These balconies do not have any support from below and are only anchored from one end.
 - Many long **suspension bridges** are also constructed using two cantilevers. A beam is suspended between the two cantilevers, and the bridge can be even longer.
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24. D: Compression and tension

4 marks

Explanation:

The shape on the left is experiencing **compression** forces as it is **pushed, squeezed or squashed** from both sides.

The shape on the right is in **tension** as it is **pulled** on both ends.

25. to the correct size | arrowheads | mm | working

8 marks

Explanation:

- The purpose of dimension lines is to ensure that products are built to the **correct size**. The measurements must be 100% accurate.
 - Dimension lines are drawn with **arrowheads** and short dimension lines at each end. The arrows show where the measurement starts and ends.
 - The values on dimension lines are always given in **mm**. This is a convention, so the unit is not written as everyone who reads the drawing knows it is in millimetres.
 - Dimension lines are usually found on **working drawings**. Artistic drawings do not usually have dimensions.
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Total: 101 Marks