education
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

TECHNOLOGY

GRADE 8 TERM 3

2024

FORMAL PRACTICAL ASSESSMENT TASK 2



TOPIC: TENDERING FOR CONTRACTS

CONTEXT: A STRUCTURE WITH MECHANISM FOR LIFTING A LOAD

CONTENT: TENDERING FOR CONSTRUCTION OF HEADGEAR FOR A MINE/QUARRY

SCHOOL : _____

CLASS : _____

SURNAME & NAME : _____

ALLOCATION OF MARKS

	MARKS ALLOCATED	MARKS OBTAINED
INVESTIGATIONS	15	
DESIGN	20	
MAKE	35	
TOTAL	70	

This exemplar consists of 9 pages.

WEEK 4

ACTIVITY 1: INVESTIGATIONS **DATE: _____**



Figure 1: Steel headgear



Figure 2: Concrete headgear

1. **Read the scenario and answer the questions that follow**.

The headgear of a mine is the structure that supports the hoisting rope or cable of a mine shaft. It allows for materials and people to be transported between levels within the mine. Headgears come in various shapes and sizes, but they all serve the same basic purpose.

In South Africa, mine headgear plays an essential role in the mining industry. It allows for the safe and efficient transportation of materials and people between levels within the mine. Headgears are also a symbol of the mining industry, and they can be seen for miles around many mining towns.

There are two main types of headgears used at South African mines: steel headgears and concrete headgears. Steel headgears are typically lighter and less expensive to construct than concrete headgears, but they are also more susceptible to corrosion and fire damage. Concrete headgears are heavier and more expensive to construct than steel headgears, but they are also more durable and resistant to corrosion and fire damage.

The type of headgear used at a particular mine will depend on a number of factors, including the depth of the mine shaft, the type of materials being mined, and the seismic activity in the area.

Steel headgear: Impala Platinum's Shaft 17 headgear, near Rustenburg, is one of the tallest steel headgears in the world, at 87 meters high.

Concrete headgear: Impala Platinum's No. 16 shaft, near Rustenburg, has the tallest concrete headgear in the world, at 132 meters high.

Mine headgears are an essential part of mining operations in South Africa. They allow for the safe and efficient transportation of materials and people between levels within the mine. Headgears are also a symbol of the mining industry, and they can be seen for miles around many mining towns, they are a symbol of the country's rich mining heritage.

1.1 What is a mineshaft headgear? (2)

_____

_____

1.2 List the strengthening technique used to strengthen Figure 1, steel headgear. (1)

_____

1.3 Give **TWO** main purposes of mineshaft headgears in the mining industry. (2)

_____

_____

_____

_____

1.4 Use the table below to compare the steel headgear and the concrete headgear.

(8)

Steel headgear	Concrete headgear

1.5. Study the diagram below and answer questions that follow.

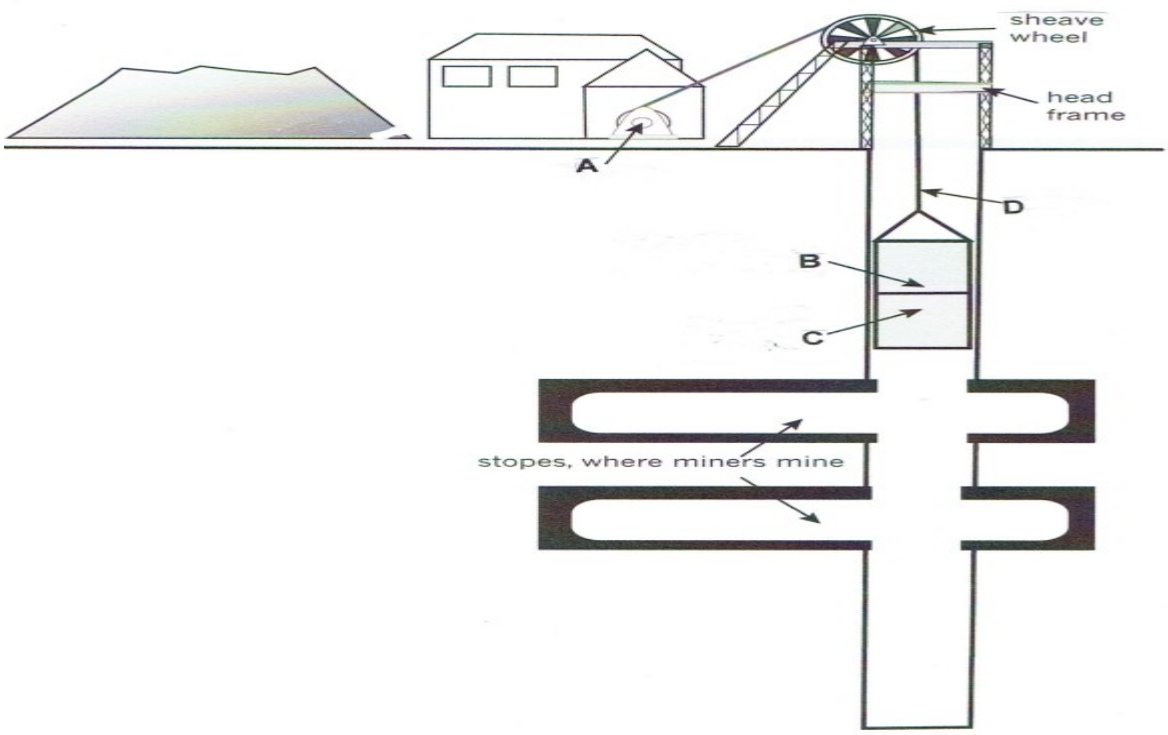


Figure 3: Mine headgear diagram

Word bank

skip	sheave-wheel	headgear	steel-cable	winch
cage	stopes	mine		

1.5.1 Label the parts of the diagram from **A** to **D**. Use the words from the word bank. (4)

A. _____ B. _____

C. _____ D. _____

1.5.2 Explain the importance of a groove in a sheave wheel. (1)

_____

_____

1.5.3 Why do the legs on the headgear slope towards the part labeled **A**? (1)

_____

_____

WEEK 6

ACTIVITY 2: DESIGN SKILLS **DATE: _____**

SCENARIO

South Africa is a country that is rich in mineral resources. Mining occurs to some extent in every province of our country. We have huge reserves of coal, copper and iron ore. We are the main suppliers of platinum, manganese, and chromium in the world.

A commercially viable ore body containing platinum group metals has been found on land belonging to a tribe in rural South Africa. Drill samples have proved that the reef lies at a relatively shallow depth only 500m below the surface. Your mechanical engineering company has decided to submit a tender for the construction of a shaft head-gear suitable to transport miners to and from the work level, and for raising ore and waste in loads.

The headgear must be able to transport miners and equipment 500m underground. It must also be able to lift platinum ore that weighs 10 tons back up to the surface.

2.1 Write a design brief with specifications and constraints for the mining headgear that will solve the problem from the scenario. (3)

_____

_____

_____

_____

Rubric

Criterion	Marks: 0	Marks: 1	Marks: 2	Marks: 3	Mark Obtained
A design brief	Inappropriate design brief. It does not tell what is supposed to be designed and	Writes an acceptable design brief. It tells what is supposed to be designed but	Writes an acceptable design brief. It tells what is supposed to be designed and at	Writes an acceptable design brief. It tells what is supposed to be designed and at least two or more	

	there is no specification given	no specification is given	least one specification is given	specifications are given	

2.2 Sketch **2** initial ideas to meet the requirement given in the scenario. (8)

Idea 1	**Idea 2**

Rubric

Criterion	**Marks: 0**	**Marks 1**	**Marks 2**	**Marks 3-4**	**Marks 5-6**	**Marks 7-8**	**Marks Obtained**
Initial idea sketches	Failed to produce initial ideas	Produces one sketch but does not meeting the requirements	Produces one sketch that partially meets the requirements	Produces one sketch that meets the requirement	Produces two sketches but only one meets the requirements	Produces two sketches that both meet the requirements.	

2.3 Evaluate sketches of individuals and select the best idea for the team to bid. Motivate the selected idea. (5)

_____

_____

_____

_____

_____

Rubric

Criterion	Marks: 0	Marks: 1-2	Marks: 3-5	Marks obtained
Evaluate sketches	Cannot evaluate the individual sketches and select the best idea	Can evaluate the individual sketches and select the best idea but cannot motivate on a selected idea	Can evaluate the individual sketches, select the best idea and motivate on the selected idea	

2.4 Draw 2D of final design showing one or more views with dimensions in the space provided. (4)

Rubric

Criterion	Marks 0	Marks 1-2	Marks 3- 4	Marks Obtained
2D drawing design	Does not produce 2D drawing.	Produce 2D drawing without dimensions	Produce 2D drawing, with dimensions	

WEEK 7 **DATE:**

_____

3.1 Use the table as a guide. Prepare a budget for your mining headgear. (7)

NB: Some of the given prices are not realistic.

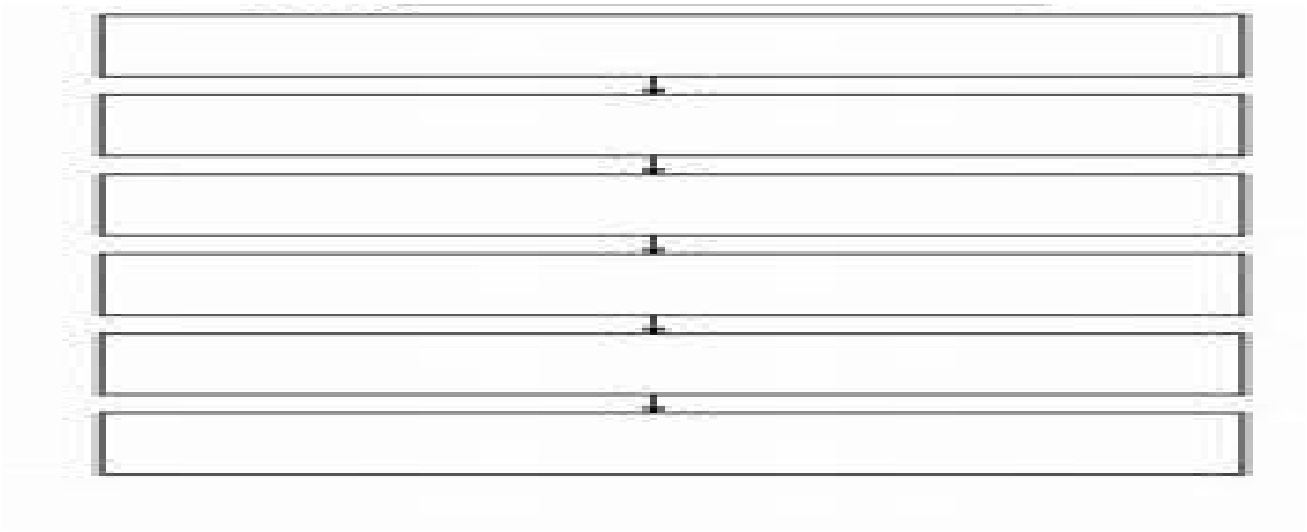
BUDGET

Labour costs	**Cost per day**	**Number of days**	**Cost**
Architect	R825,30	3	R2475,90
Engineers- Structural	R836,80		
Welders	R588,00		
Bricklayers	R353,95		
Fitter and turner	R983,00		
Unskilled labour	R202,85		
Accountants	R1320,00		
Office staff	R412,50		
Volunteers	R238,99		
Total for labour			
Material	**Unit price**	**Quantity**	**Cost**
Steel sections	1 bar = R56,00		
Fittings	1 packet of 6 bolts and nuts = R89,90		
Steel cables	1 steel cable = R1223,00		
Cement	1 bag of cement = R115,00		
Bricks	1 brick = R3,30		
Total for material			
Transport	R25,00 per km		
Safety on site	R750,00 per day		
TOTAL COST			

3.2 List **AT LEAST THREE** tools that will be used. (3)

3.3List **ATLEAST THREE** materials needed. (3)

3.4 Draw a FLOW CHART on how to construct the model. (10)



3.5 Group build their models working scale model using safe working practices. (12)

Your model will be assessed according to the following criterion

The structure is build according to the design brief	2
The structure is safe	2
Show the compartment for carrying workers	2
Shows the compartment for carrying the load	2
Show mechanism of how it will move to and from the work level	2
Finishing and neatness	2

TOTAL	12

GRAND TOTAL: 70