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Technology Grade 8

SECTION A. DESIGN PROCESS SKILLS. (40 MARKS).

QUESTION 1.

Study the following picture and answer the questions that follow.



FIGURE 1: CHILDREN CROSSING THE RIVER

1.1 Identify the problem encountered in the picture above. (2)

1.2 Suggest TWO ways in which this problem can be solved. (2)

1.3 What is the indigenous/oldest ways of solving a problem like this? (2)

1.4 You are now requested to design something permanent, stationary and modern that can span over the river and allow people and cars to cross over. Write a design brief for your solution. (3)

1.5 Write two reasons why crossing rivers like in Figure 7 is dangerous (4)

- a) _____
- _____
- b) _____
- _____

1.6 List FIVE SPECIFICATIONS of your design solution (5)

- a) _____
- b) _____
- c) _____
- d) _____
- e) _____

1.7 List THREE CONSTRAINTS on the design solution. (6)

- a) _____
- b) _____
- c) _____

1.8 List THREE MATERIALS to be used make a structure to enable people to cross safely. (3)

a) _____

b) _____

c) _____

1.9 Name and explain TWO TYPES OF FORCES that the deck of the structure should be able to withstand when people walk on it. (4)

a) _____

b) _____

1.10 Draw your design solution for the problem show on figure 1. (9)
Label any **THREE** parts.



MARKS OBTAINED

40

SECTION B (24 MARKS)

Question 2 (STRUCTURES- ELECTRICAL PYLONS)

[5 Marks]

2.1 Why do electrical pylons have to be very tall?

(2)

2.2 List THREE types of materials used to make electrical pylons.

(3)

2.2.1 _____

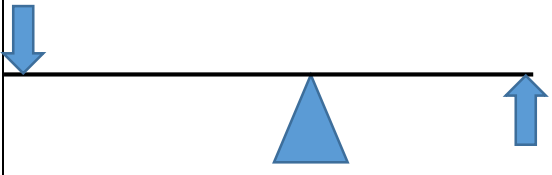
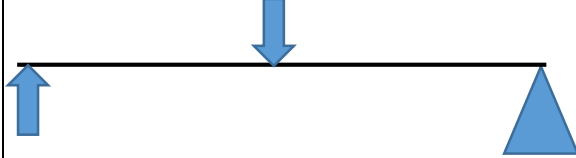
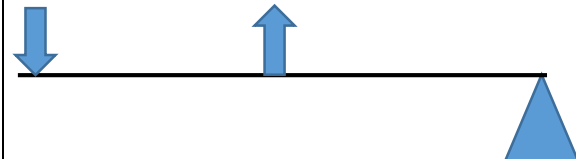
2.2.2 _____

2.2.3 _____

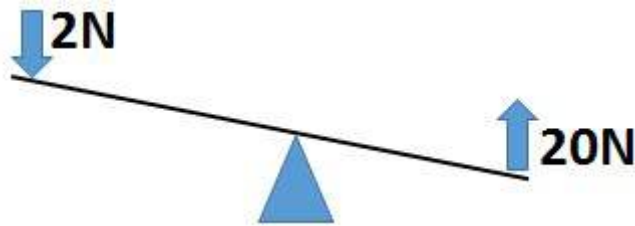
Question 3 (LEVERS AND LINKED LEVERS) (9 Marks)

3.1 Complete the table below. In the middle column label the Load (L), Fulcrum (F) and the Effort (E) for each class of lever. In the third column give an example of a linked lever for each class.

(6)

Type of lever	Insert your label (L,E,F)	Example of a lever
First – Class		
Second – Class		
Third – Class		

3.2 If a lever is used to move a load of 20N and the effort required is 2N,



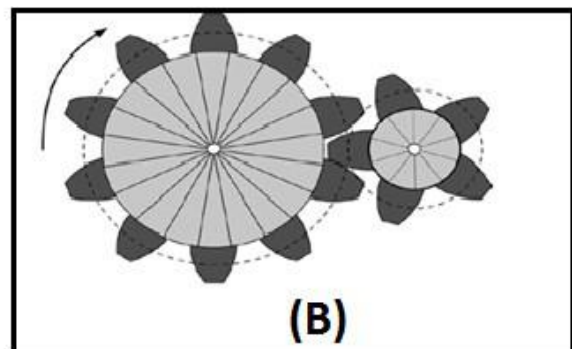
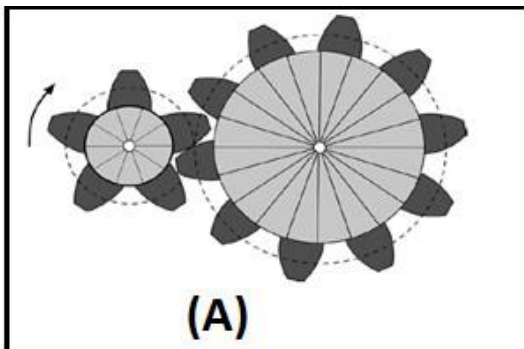
3.3 Calculate the mechanical advantage obtained by using the lever. $\left(MA = \frac{Effort}{Load}\right)$

Show all your calculations.

(3)

Question 4 (GEARS AND MECHANICAL ADVANTAGE) [10 Marks]

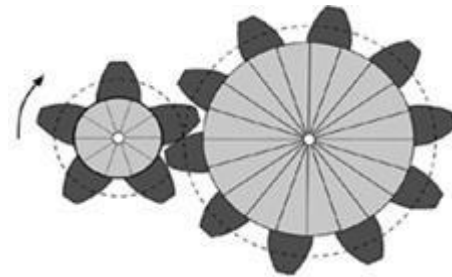
4.1 Study the TWO gear systems below and answer questions that follow.



4.1.1 Which of the TWO systems will increase the output speed and explain why?

(3)

4.2 If the driver gear in the gear train below rotates clock-wise, in which direction does the driven gear rotates? (1)



4.3 A driver gear has 15 teeth and transfers a force to a larger driven gear with 30 teeth. Calculate the mechanical advantage of the system $\left(MA = \frac{\text{Driven}}{\text{Driver}} \right)$. Show all your calculations. (3)

4.4 When Gear A rotates 20 times it causes Gear B to rotate 10 times. Gear A has 40 teeth.

4.4.1 How many teeth does Gear B have? (1)

4.4.2 State which is the drive gear (1)

4.4.3 State which is the driven gear (1)

MARKS OBTAINED

24

SECTION C (16 MARKS) IMPACT OF TECNOLOGY

Question 5 [7 Marks]

State whether the following statements are **True** or **False** and if False, state why.

5.1 Natural or raw materials are found in plants and animals

5.2 Plastic bags are made from oil which is a renewable resource.

5.3 Plastic bags are popular with customers because they are cheap, lightweight, moisture resistant and hygienic.

5.4 Leather and silk are plant fibres used to manufacture shoe insoles and banknotes respectively.

5.5 The result of structural failure is due to poor designing, fatigue or use of inferior materials.

Question 6 [9 Marks]

	Plastic shopping bags	Cars	Cellphones
Positive impact			
Negative impact			
How to counteract or compensate for negative impact			

MARKS OBTAINED

16

TOTAL MARKS 80 .

Technology Grade 8

SECTION A. DESIGN PROCESS SKILLS. (40 MARKS).

QUESTION 1.

Study the following picture and answer the questions that follow.



FIGURE 1: CHILDREN CROSSING THE RIVER

1.1 Identify the problem encountered in the picture above. (2)

Learners are forced to cross a flooded stream/river when going to and from school.

1.2 Suggest TWO ways in which this problem can be solved. (2)

a) Cross the river using a raft/canoe b) Build a permanent bridge to be used for crossing

1.3 What is the indigenous/oldest ways of solving a problem like this? (2)

Using huge stones/boulders as stepping stones to cross or using canoe.

1.4 You are now requested to design something permanent, stationary and modern that can span over the river and allow people and cars to cross over. Write a design brief for your solution. (3)

I am going to design a bridge that will be used by cars and people to cross the flooded river.



1.5 Write two reasons why crossing rivers like in Figure 7 is dangerous (4)

- a) People can slip and get injured.**
- b) People can be swept away down in the river.**

1.6 List FIVE SPECIFICATIONS of your design solution (5)

- a) Must be strong enough to be used by pedestrians and motorists**
- b) Must be built using local labour**
- c) Must not displace the local community**
- d) Must be easily accessible by all**
- e) Must not be expensive and add burden to the community**

1.7 List THREE CONSTRAINTS on the design solution. (6)

- a) Cost of material may be high**
- b) Lack of skilled manpower to build a good structure**
- c) The area might be far from supply sources

1.8 List THREE MATERIALS to be used make a structure to enable people to cross safely. (3)

- a) Steel beams**
- b) Concrete**
- c) wood



1.9 Name and explain TWO TYPES OF FORCES

that the deck of the structure should be able to withstand when people walk on it. (4)

a) Compression Force – crushing force

b) Tension Force – Pulling or stretching force

1.10 Draw your design solution for the problem show on figure 1. (9) Label any **THREE** parts.

DESIGN SOLUTION

POOR	0 – 2 marks
AVERAGE	3 – 4 marks
GOOD	5 – 6 marks

LABELS 3 X 1 MARK EACH

SECTION B (24 MARKS)

Question 2 (STRUCTURES- ELECTRICAL PYLONS)

[5 Marks]

2.1 Why do electrical pylons have to be very tall? (2)

So that people and animals are not harmed ✓ by the dangerous electricity being carried by the electrical cables at the top of the pylons. Contact with electrical cable could lead to death. ✓

2.2 List THREE types of materials used to make electrical pylons. (3)

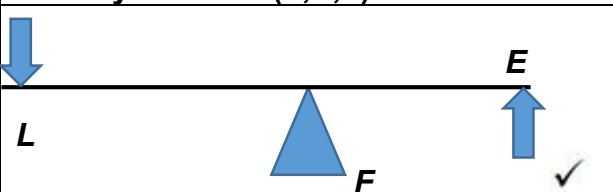
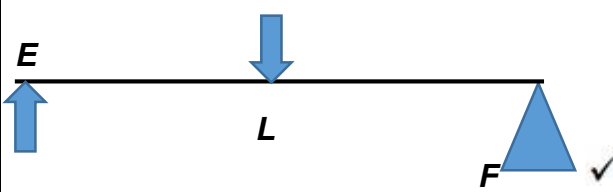
Wood✓

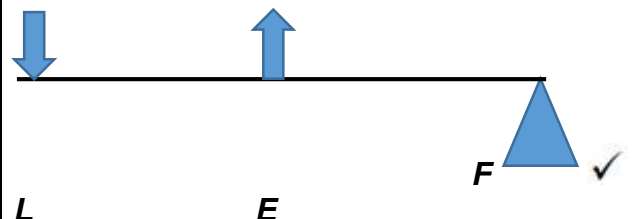
Steel ✓

Concrete✓

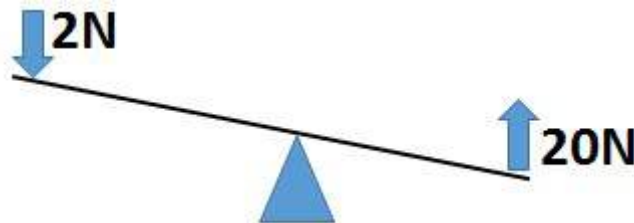
Question 3 (LEVERS AND LINKED LEVERS) (9 Marks)

3.1 Complete the table below. In the middle column label the Load (L), Fulcrum (F) and the Effort (E) for each class of lever. In the third column give an example of a linked lever for each class. (6)

Type of lever	Insert your label (L,E,F)	Example of a lever
First – Class		<i>Scissors; secateurs ✓</i>
Second – Class		<i>Office puncher, heavy duty stapler. ✓</i>

Third – Class		Tweezers; tongs ✓
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3.2 If a lever is used to move a load of 20N and the effort required is 2N,



Calculate the mechanical advantage obtained by using the lever. $\left(MA = \frac{\text{Effort}}{\text{Load}} \right)$

Show all your calculations.

(3)

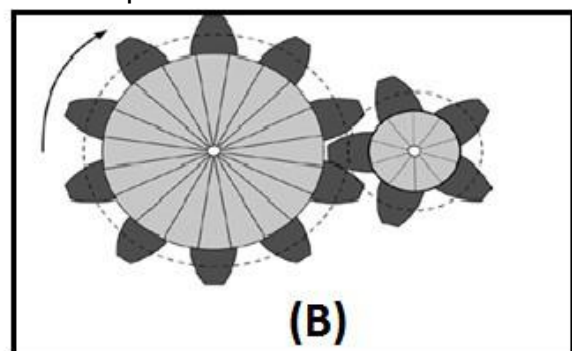
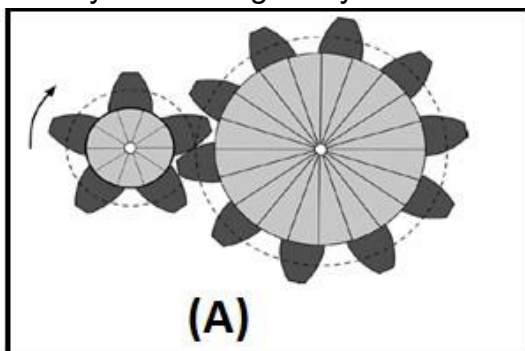
$$MA = \frac{E}{L}$$

$$MA = \frac{2}{20} \quad \checkmark$$

$$MA = \frac{1}{10} \text{ or } 0,1 \quad \checkmark$$

Question 4 (GEARS AND MECHANICAL ADVANTAGE) [10 Marks]

4.1 Study the TWO gear systems below and answer questions that follow.

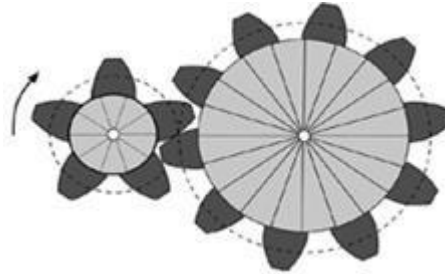


4.1.1 Which of the TWO systems will increase the output speed and explain why?

(3)

The gear system (B) because the driver gear has twice the number of teeth as compared to the driven gear ✓ which will make the driven gear to rotate twice for one full rotation of the driver gear. ✓

4.2 If the driver gear in the gear train below rotates clock-wise, in which direction does the driven gear rotates? (1)



Anti-clockwise ✓

4.3 A driver gear has 15 teeth and transfers a force to a larger driven gear with

30 teeth. Calculate the mechanical advantage of the system ($MA = \frac{\text{Driven}}{\text{Driver}}$). Show all your calculations. (3)

$$MA = \frac{\text{Driven}}{\text{Driver}}$$

$$MA = \frac{30}{15} \checkmark$$

$$MA = 2 \checkmark$$

4.4 When Gear A rotates 20 times it causes Gear B to rotate 10 times. Gear A has 40 teeth.

4.4.1 How many teeth does Gear B have? (1)

80 Teeth ✓

4.4.2 State which is the drive gear (1)

Gear A ✓

4.4.3 State which is the driven gear (1)

Gear B ✓



SECTION C (16 MARKS) IMPACT OF TECNOLOGY

Question 5 State whether the following statements are **True** or **False** and if False, state why.

1.1 Natural or raw materials are found in plants and animals **True** ✓

1.2 Plastic bags are made from oil which is a renewable resource. **False**
– oil is a non – renewable resource ✓

1.3 Plastic bags are popular with customers because they are cheap, lightweight, moisture resistant and hygienic.

True ✓

1.4 Leather and silk are plant fibres used to manufacture shoe insoles and banknotes respectively.

False – leather and silk are animal fibres ✓

1.5 The result of structural failure is due to poor designing, fatigue or use of inferior materials.

True ✓

Question 6

[9 Marks]

Complete the table below.

	Plastic Bags	Cars	Cell phones
Positive impact	Light and easy to use hygienic. ✓	Transport, easy to go from place to place. ✓	Can communicate and find out information easily. ✓
Negative impact	Not biodegradable so litter the environment, fill up landfill sites. ✓	Give off poisonous gases that pollute the air. ✓	Not biodegradable, chemicals in batteries can pollute soil and water. ✓
Counteract or Compensate for negative impact	Reuse or recycle. ✓	Have better public transport, electric cars, lift clubs. ✓	Recycle batteries or parts of the phone. ✓



TOTAL 80 MARKS