Exam VSBO PBL

2025

period 1
Tuesday, may 20
7.30 - 9.30 a.m.

Physics and Chemistry 1

Candidate name _____ Candidate number _____

Write all answers in this assignment booklet.

This exam consists of 34 questions.
You can score a maximum of 56 points for this exam.
Before each question number, it is stated how many points can be scored with a correct answer.

Multiple-choice questions

– Circle the correct answer (example 1).
– Indicate corrections according to example 2 or 3.

(1) A (B) C D (2) A (A) (C) D (3) A B (A) (A) D

Physical quantities and units

3p **1** Jurickson drives to work in his SUV.

Below are three sentences about Jurickson and his SUV. In each sentence there three choice-units.

→ In each sentence, underline the unit that logically belongs there.

Sentence 1).

The mass of the SUV is 2.805

newtons.
grams.
kilograms.

Sentence 2).

The driving distance from his home to his work is 12.4

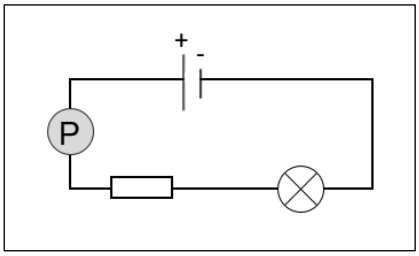
kilometers.
km/hr.
meters.

Sentence 3).

Jurickson's average driving speed is 60

m^2.
km/hr.
meters/hr.

1p **2** In the circuit shown on the right, P is a meter. This meter has been placed in a correct spot in the circuit.



→ Which unit belongs to the measurements of meter P?

A volt
B watt
C joule
D ampere.

1p **3** Quincy works as a messenger.

Quincy turns his van's radio on to FM1 **87.50 MHz**. Quincy knows that **Hertz** is the unit of frequency and that **MHz** is a multiple of Hertz.

→ How many **Hertz** is 87.50 **MHz**?

A 87500 Hertz
B 87500000 Hertz
C 87500000000 Hertz
D 87500000000000 Hertz

2p **4** At 7:01 in the morning, Quincy switched on the radio in the car. After 65 minutes, Quincy switches off the radio.

→ At what time did Quincy switch off the radio? Write down your calculation.

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Garbage at Tisha's

2p **5** The picture below shows three waste packages A, B and C.
A, B, and C are **extra garbage** and that is because of Tisha's party.

The volume of package A is 45 dm^3,
The volume of package B is 65 dm^3,
The volume of package C is 60 dm^3.

→ How much **extra garbage** is that in liters? Write down your calculation.

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Extra garbage is .....liters.

1p **6** Tisha calculated the pressure of one waste container on the ground. The result of her calculation is: 200.

Behind this result she still has to write down a correct ***unit***.

→ Which of the units below is a ***unit*** of pressure?

A N/dm^2
B N/dm^3
C dm^2/N
D dm^3/N

3p **7** The two containers of question 5 plus the three packages A, B and C together have a total mass of 80 kg. The wheels of the two containers with the edge combined have a contact surface with the ground of 6.13 cm^2.

Given is de formula: $\text{pressure} = \frac{\text{force}}{\text{surface}}$

→ Calculate the pressure on the ground of the containers plus the packages combined. Write down your calculation and round off to one decimal.

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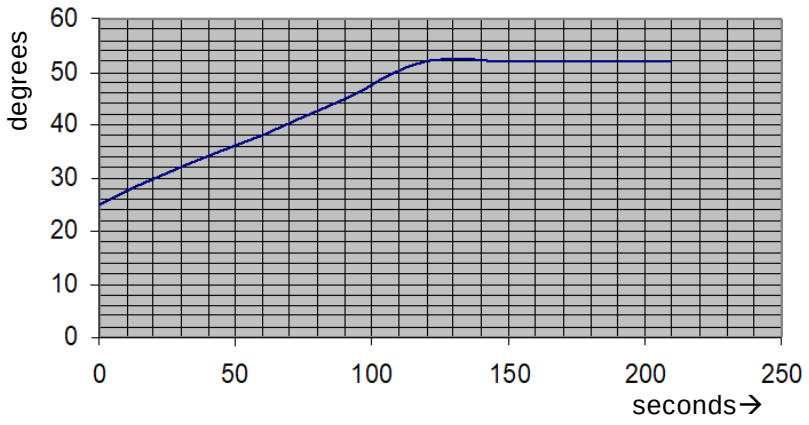
answer unit

Properties of materials and substances

2p **8** In a lab class, Aldo has to heat a collection of white stones until they melt. While heating, he has to keep track of the temperature and then draw the graph of the heating process. See the graph below.

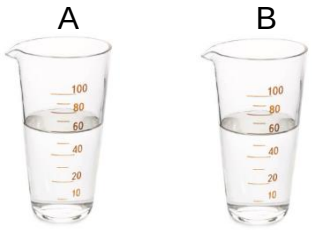


→ What is the **melting point** of this substance of the stones and what is the **name** of this substance? Use your BINAS information booklet where necessary.

The melting point of this substance is: .....

The name of this substance is: .....

2p **9** Each of the two beakers A and B below contains liquid.



Physics & Chemistry 1 teacher Vernon does NOT say whether both glasses contain the same liquid. Instead, he says:
"You have to determine that yourself, by means of the substance properties."

The students wonder which substance property in the table below is a wise choice to use as a means for their findings.

→ For each substance property, place an X-mark under ***wise*** or ***not wise.***

substance property	***wise***	***not wise***
odor (smell with caution)		
color		
taste		
boiling point		

1p **10** A drinking water pipeline is shown in the photo on the right. Above all, such a pipeline must not be toxic.

Four different materials are listed below. ***lead***, ***PVC***, ***copper*** and ***iron (steel)***.

→ Which is toxic?

A lead
B PVC
C copper
D iron (steel)

1p **11** The pictures below show two types of pipes: galvanized iron pipes and plastic pipes.

galvanized iron pipes

plastic pipes

Mistika has to install a new water pipeline. She has to choose between iron pipes and plastic pipes.

→ Which of the two materials is corrosion resistant?

A only iron
B only plastic
C both iron and plastic
D none of the two, neither iron nor plastic

1p **12** Three icons are shown below.

At Aaron's school, in the storage cupboard of the lab, there is one bottle on which all three of these pictograms are drawn.

→ Which substance is most likely in that bottle?

A beer
B syrup
C gasoline
D liquid soap

Bicycle parade

3p **13** The Helmin Magno Wiels Boulevard is 7.7 km long. The photo on the right shows one moment of a bicycle tour along this road.

This first part of the tour was 2.9 km. The cyclists rode this part of the tour in eight and a half (8.5) minutes.

→ Calculate in **m/s** the average speed of the cyclists, for this first part of the tour.

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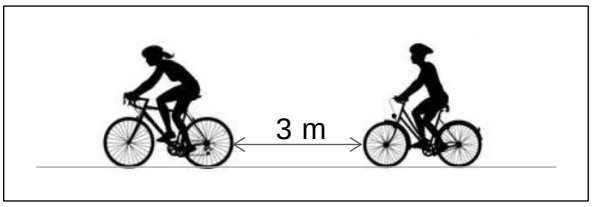
2p **14** Milo rode 3 m behind his wife Nagiera.



Suddenly Nagiera falls. Exactly 0.5 seconds later, Milo applies the brakes on his bicycle. Milo stopped just in time to avoid riding over Nagiera. Milo's braking distance was 2.1 m.

Given is the word formula:

stopping distance = reaction distance + braking distance

→ How great is Milo's **stopping distance** and how great is his **reaction distance**?

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	answer	unit
Stopping distance =	.....	.....
Reaction distance =	.....	.....

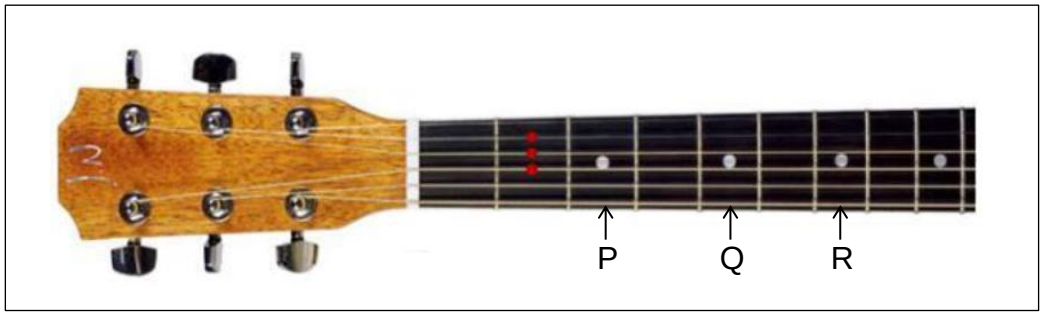
2p **15** A sound level meter is shown in the image on the right.
Shandra uses this meter to measure a sound.
The meter indicates 120 decibels.

→ Name two examples of the sound source in this measurement. Use the BINAS information booklet.

Example 1 of a sound source is .....

Example 2 of a sound source is .....

1p **16** Three places P, Q and R are marked on the guitar neck in the picture below.



While playing the guitar, Gillian changes the chord by moving his finger from P to Q to R and back to P.

The sound of the guitar has a ***frequency*** and a ***volume***.

→ What does Gillian change by moving his finger from P to Q to R and back to P?

Gillian changes …

A only the frequency.
B only the volume.
C both the frequency and the volume.
D none of the two, neither the frequency nor the volume.

1p **17** On December 31, “pagara” fireworks were set off near Gino’s home.
Gino thinks he’s a tough guy. He stays close to the ignited “pagara”.

Gino heard a noise of more than 130 dB.

→ How far was Gino standing from the exploding “pagara” according to the BINAS information booklet?

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3p **18** The photo on the right shows the cloud of smoke from an explosion at the gunpowder storage in Curaçao.
Laxiamara was standing **H** meters away from the gunpowder storage. There, she heard the bang 1.5 seconds after the explosion.

→ Use the BINAS information booklet and calculate distance **H** in meters. Write down your calculation.

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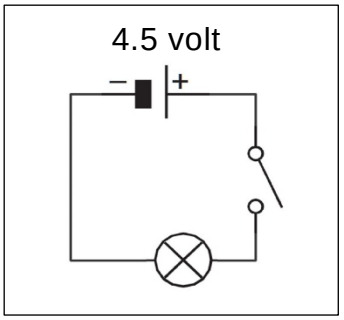
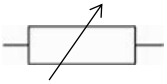
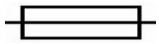
1p **19** Miranda wants to put a component in the circuit alongside with which she can cause the amperage through the circuit to change **continuously**.



→ With which component can she cause the amperage to change continuously?

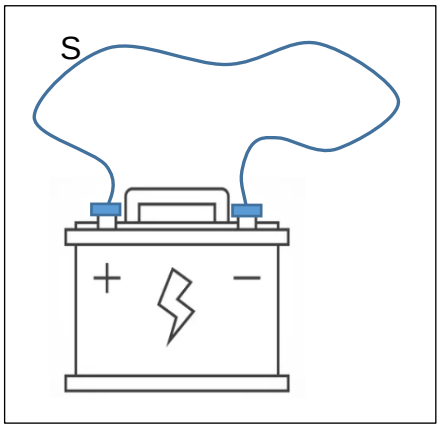
A 

B 

C 

D 

1p **20** According to Kamila, her car's battery is not working properly. Kamila has decided to check her battery herself and she does this with a cord S as shown in the illustration alongside.

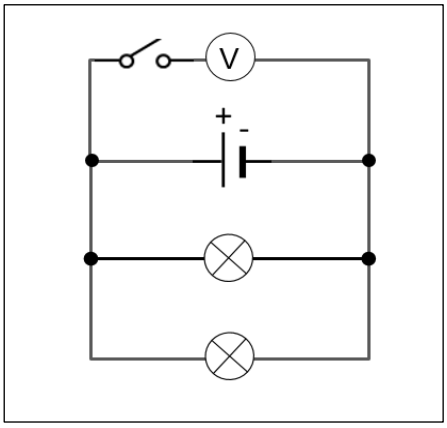


→ What does cord S do when Kamila connects it to the battery like this?

Cord S …

A measures the voltage difference.
B measures the magnitude of the amperage.
C measures the resistance.
D causes a short circuit.

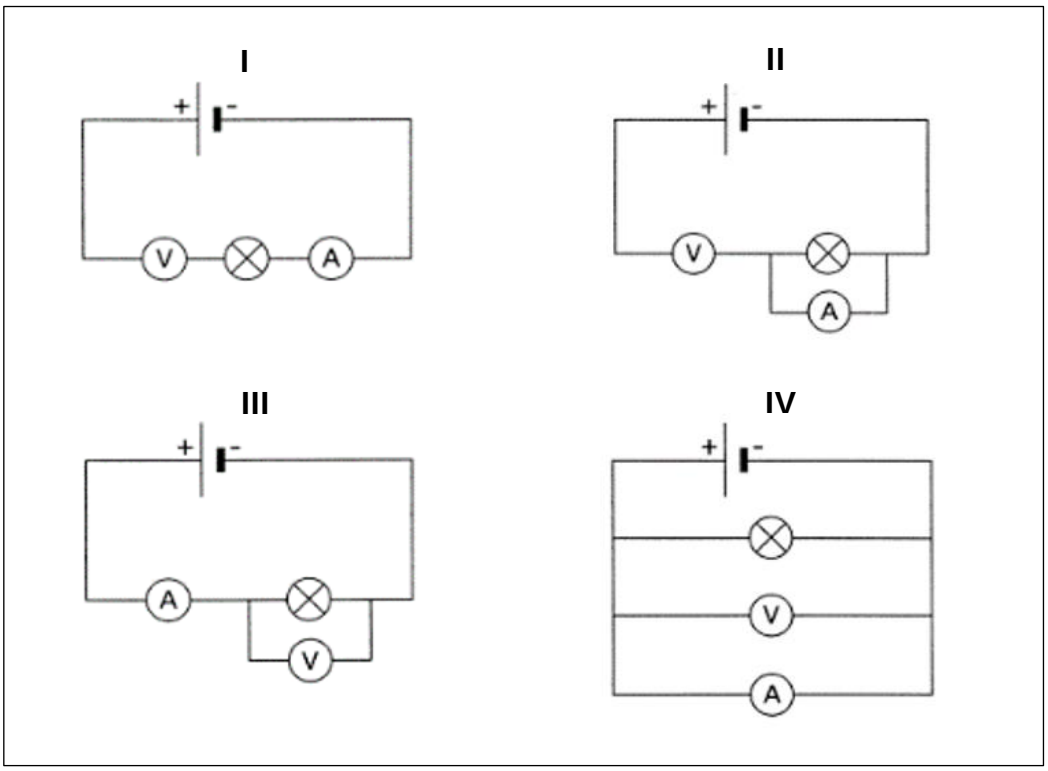
1p **21** An electrical circuit has been drawn alongside.



→ How many closed circuits does this circuit have?

A one
B two
C three
D four

1p **22** The figure below shows four drawings I, II, III and IV of electrical circuits. Four students have each made one of these four circuits.



→ In which circuit are both the voltmeter and the ammeter placed on the correct spot in the circuit?

A in circuit I
B in circuit II
C in circuit III
D in circuit IV

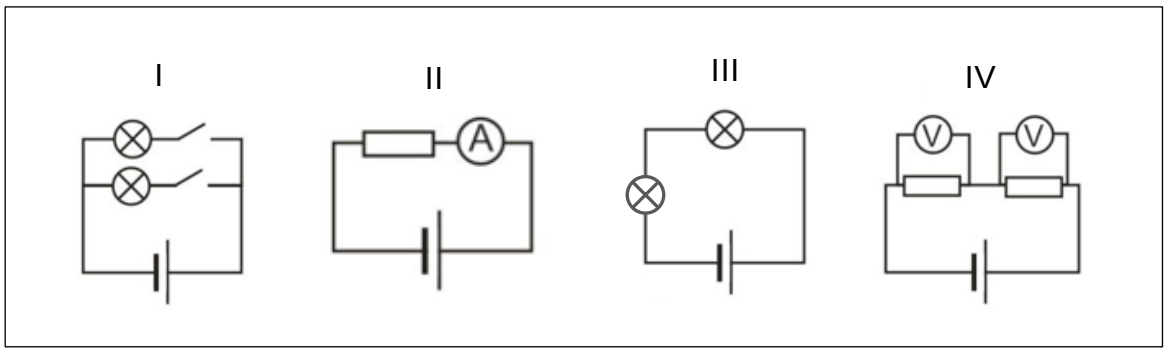
1p **23** A fuse is shown on the right. Such a fuse switches off a group in case of overload. A fuse also switches off the group in the event of a short circuit.

→ What is the substitute for the fuse nowadays?

A ground connection
B electricity meter
C double insulation
D circuit breaker

1p **24** Rowin is a DJ who has built his own electrical circuit. While DJing, he uses his circuit to change the mood continuously. He changes the color of the party light between the colors purple and yellow.

Four circuits I, II, III and IV are shown below.



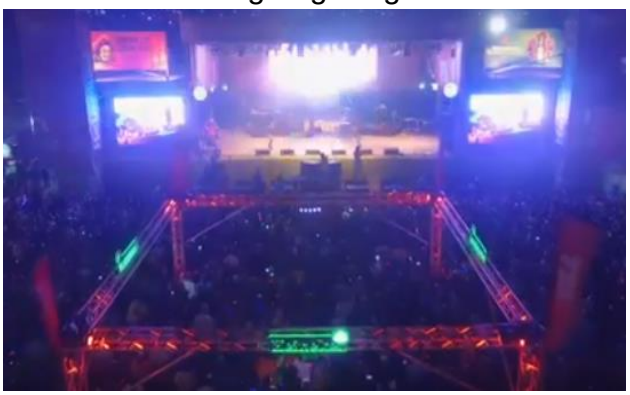
→ Which is Rowin's circuit?

A circuit I
B circuit II
C circuit III
D circuit IV

Concert

3p **25** The photo below shows the artist Claudius Philips during a performance.

stage lighting



The stage was lit up for 6.5 hours.
The electrical power of the lighting was 400 kW.

Given are the word formulas:

power = energy ÷ time **and** energy = power × time

1 kWh costs ANG 0.35.

→ Calculate the energy costs for the lighting.

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2p **26** Two strobe lights were used during the show.
Information about the two strobe lights is given below.

strobe light	strobe light 1	strobe light 2
	120 volts - 60 Hz 1400 watts ANG 190,-	117 volts - 60 Hz 1500 watts ANG 175,-

Use this information for the statements below.

→ For each statement, indicate with an X-mark whether the statement is ***true*** or ***false***.

statement	true	false
Strobe light 1 costs more than strobe light 2, ***so*** strobe light 1 gives more light than strobe light 2.		
Strobe light 1 is 1400 watts, strobe light 2 is 1500 watts, ***so*** strobe light 2 consumes more energy than strobe light 1.		
Both strobe light 1 and strobe light 2 operate on 60 hertz, ***so*** both strobe lights have a lifespan of 60 years.		

2p **27** A solar panel is shown in the image below.
Solar panels were also used in the concert stadium.
The box below explains how such a panel works.
Two words have been omitted in the explanation.

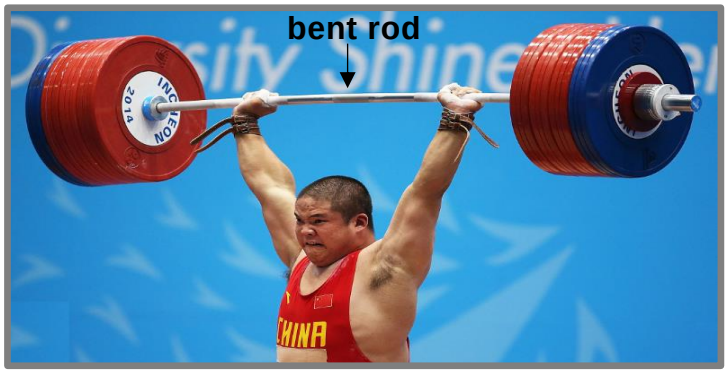
First the panel captures … (1) … -energy and in the panel this is converted to … 2) …-energy.

→ Write the two correct words for (1) and (2) below.

(1). ……

(2). ……

2p **28** Sometimes it seems as if something is going wrong in a weightlifting competition.



In this photo, for example, you can clearly see that the rod is bent.

Three types of forces occur in the situation above.

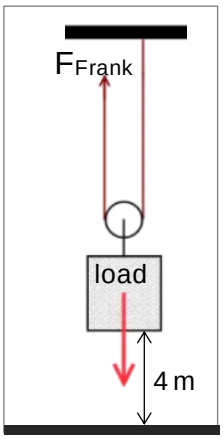
→ What three types of forces are they?

(1). .....

(2). .....

(3). .....

1p **29** See the illustration on the right. Frank lifts a load with a loose pulley. Frank has pulled the load up 4 meters.

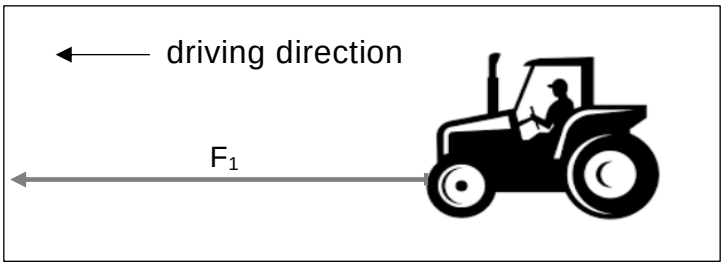


→ How many meters of rope has Frank pulled up?

A 2 meters of rope
B 4 meters of rope
C 8 meters of rope
D 12 meters of rope

Tractor

2p **30** The image below shows a tractor driving forward.

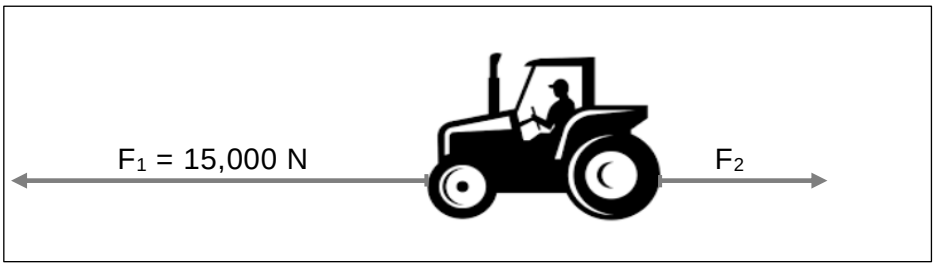


Two examples of forces acting on the tractor are:
gravity and the power of the engine F_1.

→ Name the two frictional forces that also act on the tractor.

(1). …… (2). ……

2p **31** The power of the engine F_1 = 15,000 newtons.
In the image below, there is also a force F_2 drawn.



Fn is the net force on the tractor.
Fn = 12,500 newtons.
Fn is not drawn.

F_2 is ***the sum*** of the frictional forces.

→ Calculate the magnitude of force F_2.

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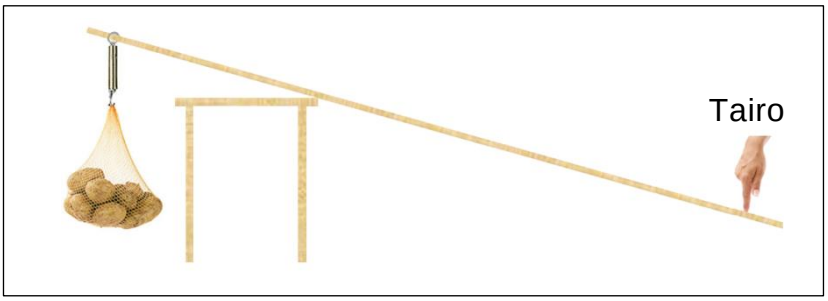
F_2 = …… newtons.

Lever

2p **32** See the image below. Tairo pushes a board with his finger.



That is how Tairo uses the board to hold the **2.5**-kilogram bag of potatoes suspended in the air. Tairo says: "I'm using the ***lever method*** to do this."

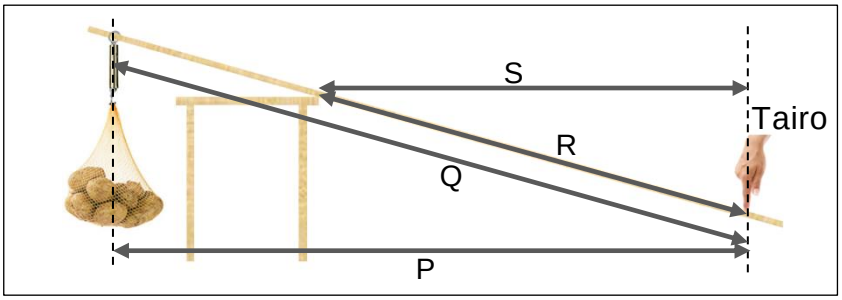
Below, Tairo explains what he means by the ***lever method***.

"I use a force that is … (1) … than … (2)… newtons to keep the board with the bag of potatoes in balance."

→ Write below what should be in (1) and (2) in order to complete Tairo's explanation correctly.

(1). …… (2). ……

1p **33** The force of a lever comes with an arm.

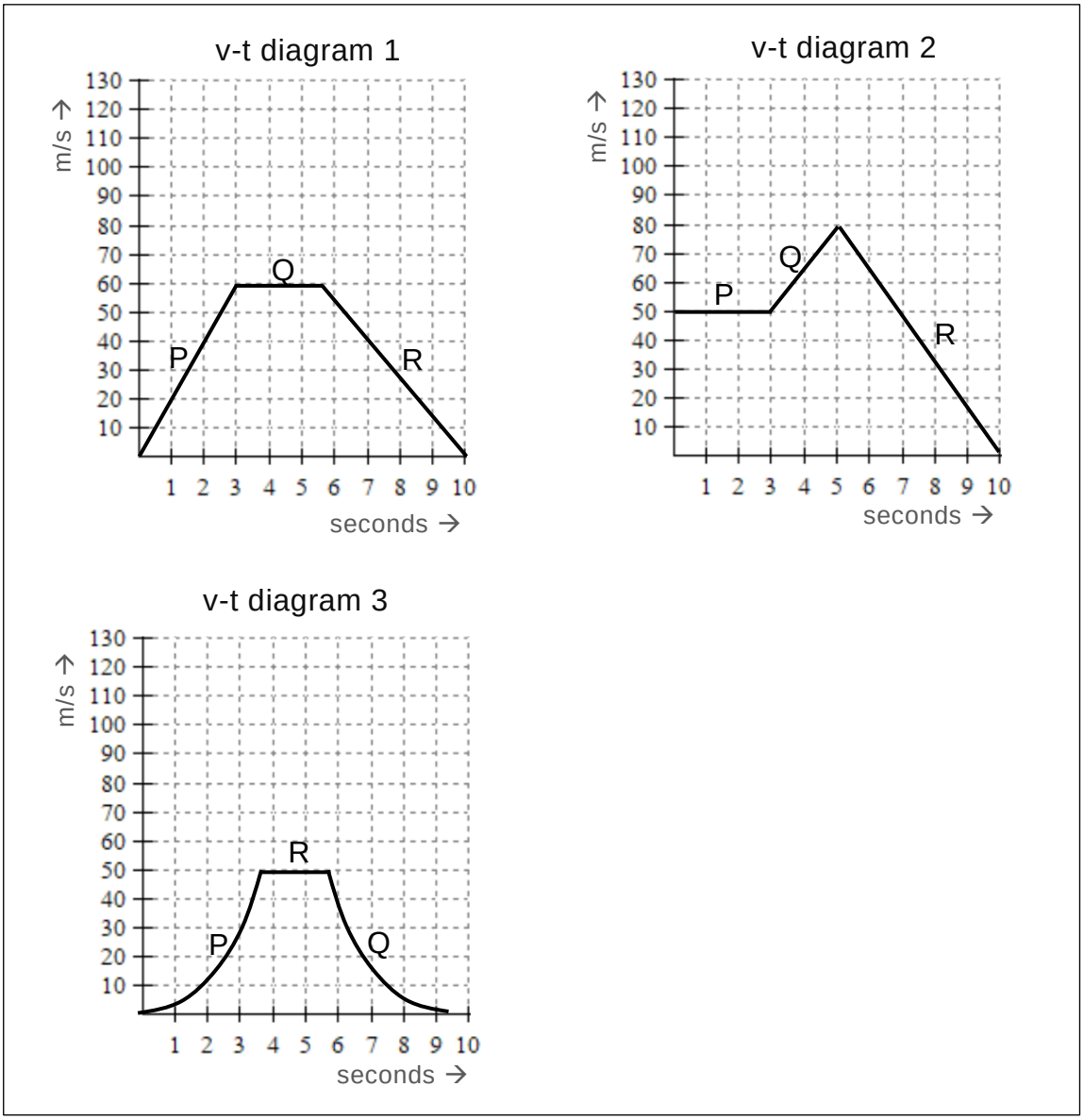


Tairo's lever has an arm.
Four line segments are drawn in the image above. The line segments P, Q, R and S.

→ Which line segment is the **arm** of Tairo's force on the board?

A segment P
B segment Q
C segment R
D segment S

1p **34** Three v-t diagrams are drawn below.



Each diagram consists of three parts P, Q and R.
There are three types of motion: ***uniformly accelerated, constant*** and ***uniformly decelerated***.

→ In which diagram are all three of these types of movements drawn?

A only in v-t diagram 1

B only in v-t diagram 2

C only in v-t diagram 1 and in v-t diagram 2

D in v-t diagram 1, in v-t diagram 2 and in v-t diagram 3