Project REACH CALABARZON

ONLINE REVIEW

MECHANICAL-TECHINICAL REASONING

OUTLINE

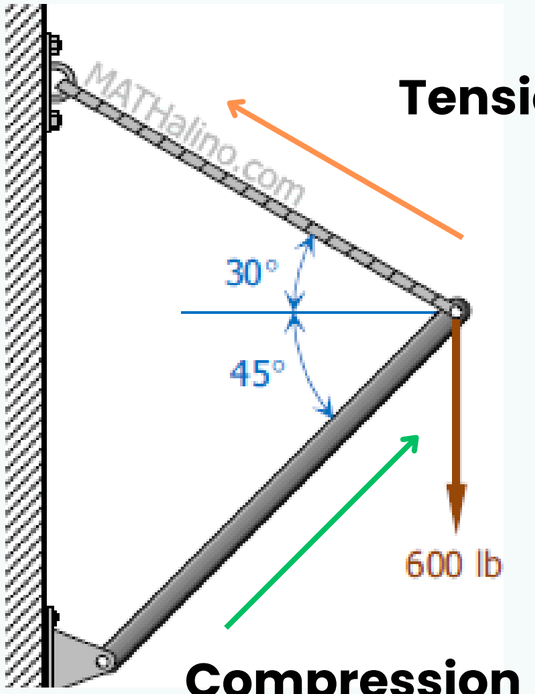
- Forces and Motion
- Simple CIrcuits
- Levers
- Simple Machines

Word of the Day

ANALYZE

Forces and Motion

Forces



Tension

Compression

Normal F

Friction F

Affecting Forces

Gravitational F/Weight

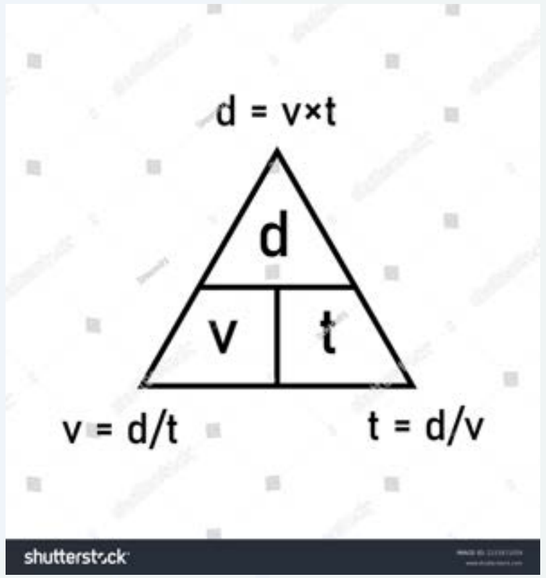
Kinematics

Kinematic Equations

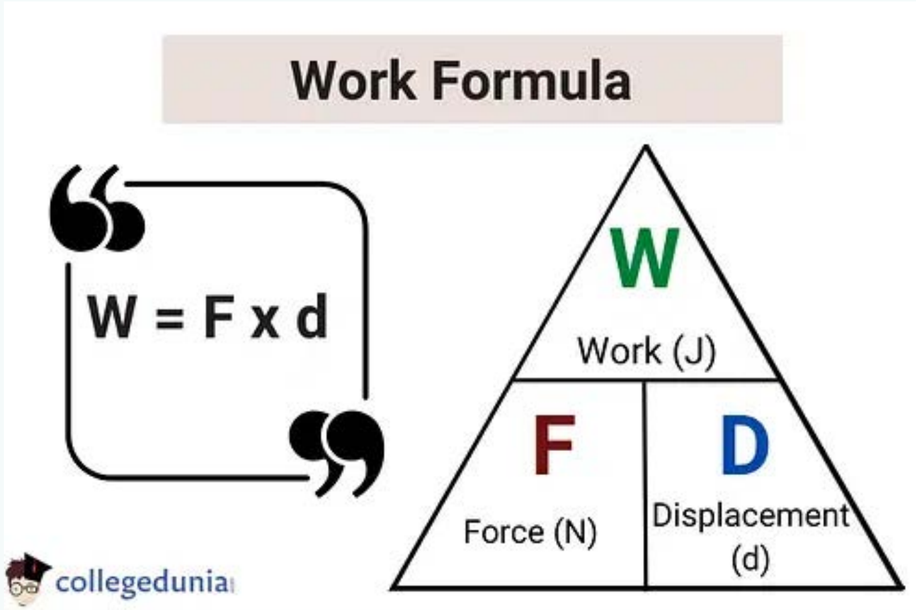
$$v_f = v_i + at \qquad v_f^2 = v_i^2 + 2a\,\Delta x$$

$$\Delta x = v_i t + \frac{1}{2} a t^2 \qquad \Delta x = \frac{1}{2}(v_i + v_f)t$$

$$c^2 = a^2 + b^2$$



Work, Energy and Power



$$PE = m \cdot g \cdot h$$

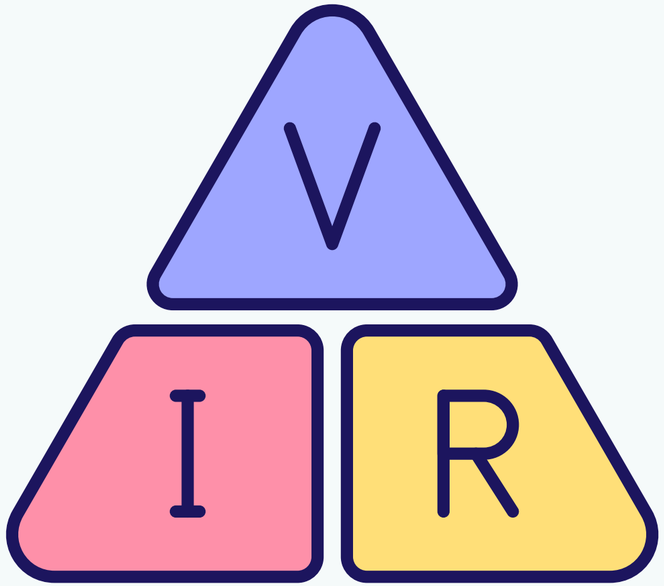
$$KE = \frac{1}{2} m v^2$$

$$F = m \cdot a$$

$$\textbf{Power(P)} = \frac{Work(W)}{Time(T)} \quad \text{OR} \quad \frac{Energy(E)}{Time(T)}$$

Simple Circuits

Electricity

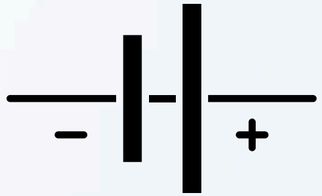


v = Voltage (Pressure) ; v
I = Current (Flow); Amps or A
R = Resistance (Friction); Ohms Ω

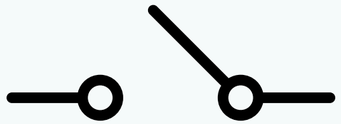
Simple Components

Resistor

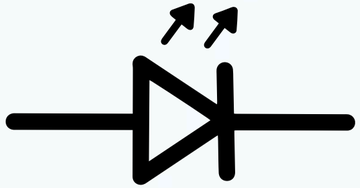
Capacitor



Battery



Switch

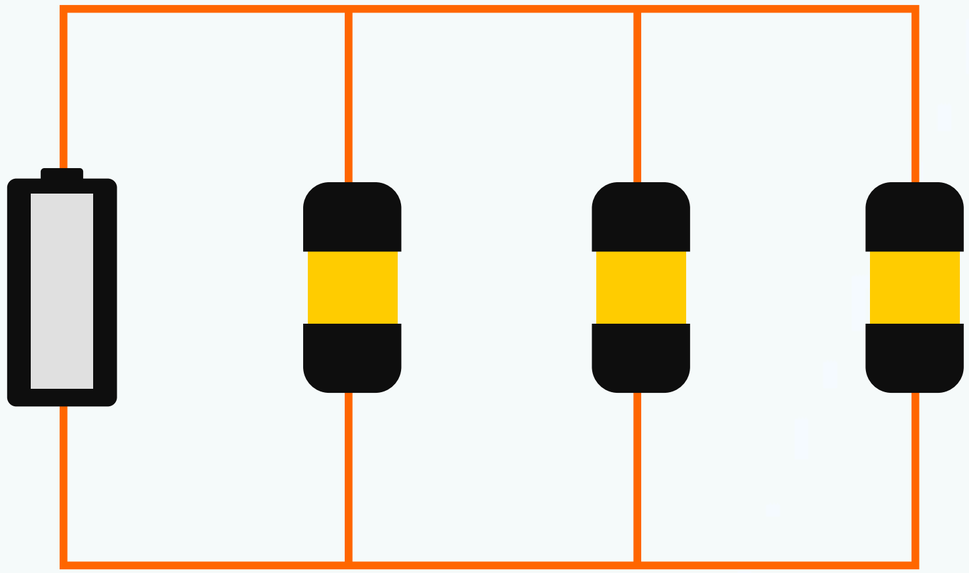


LED

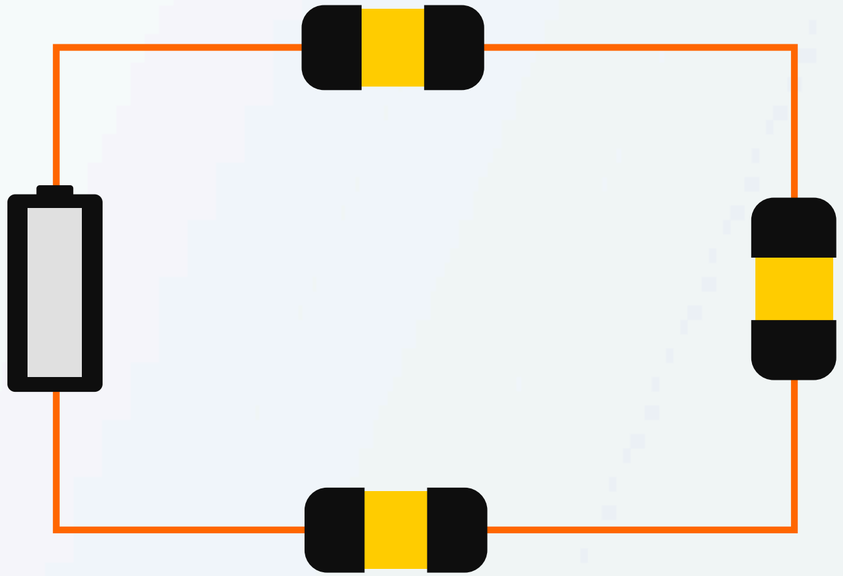
Wire

CIrcuits

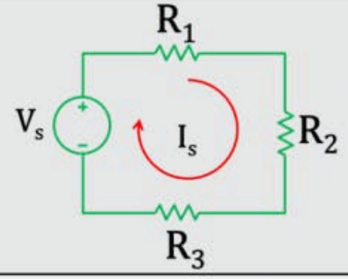
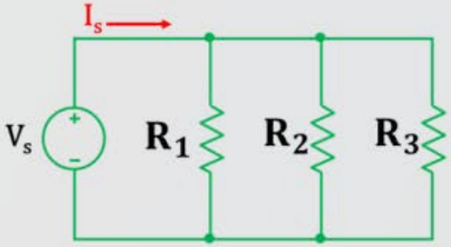
Parallel



Series

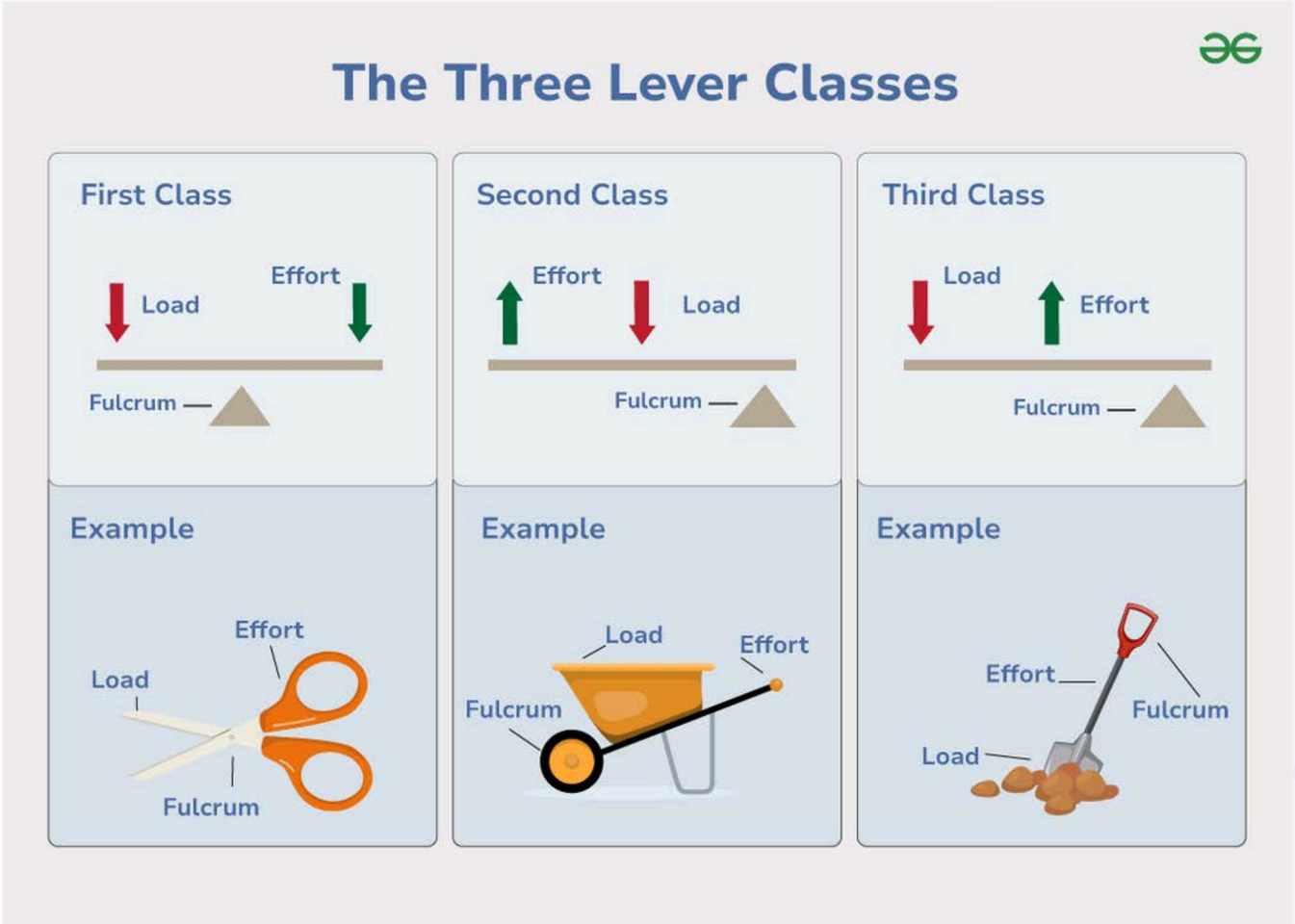


CIrcuits

	Series	Parallel
How it looks		
Voltage	$V_s = V_1 + V_2 + V_3$ $V_1 = I_s R_1; V_2 = I_s R_2; V_3 = I_s R_3$	$V_s = V_1 = V_2 = V_3 = I_s R_{eq}$
Current	$I_s = I_1 = I_2 = I_3 = \frac{V_s}{R_{eq}}$	$I_s = I_1 + I_2 + I_3$ $I_1 = \frac{V_s}{R_1}; I_2 = \frac{V_s}{R_2}; I_3 = \frac{V_s}{R_3}$
Resistance	$R_{eq} = R_1 + R_2 + R_3$	$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$
Features	If one components burns, the circuit becomes inactive and current flow stops	If one component burns current stops only through that branch rest part works fine

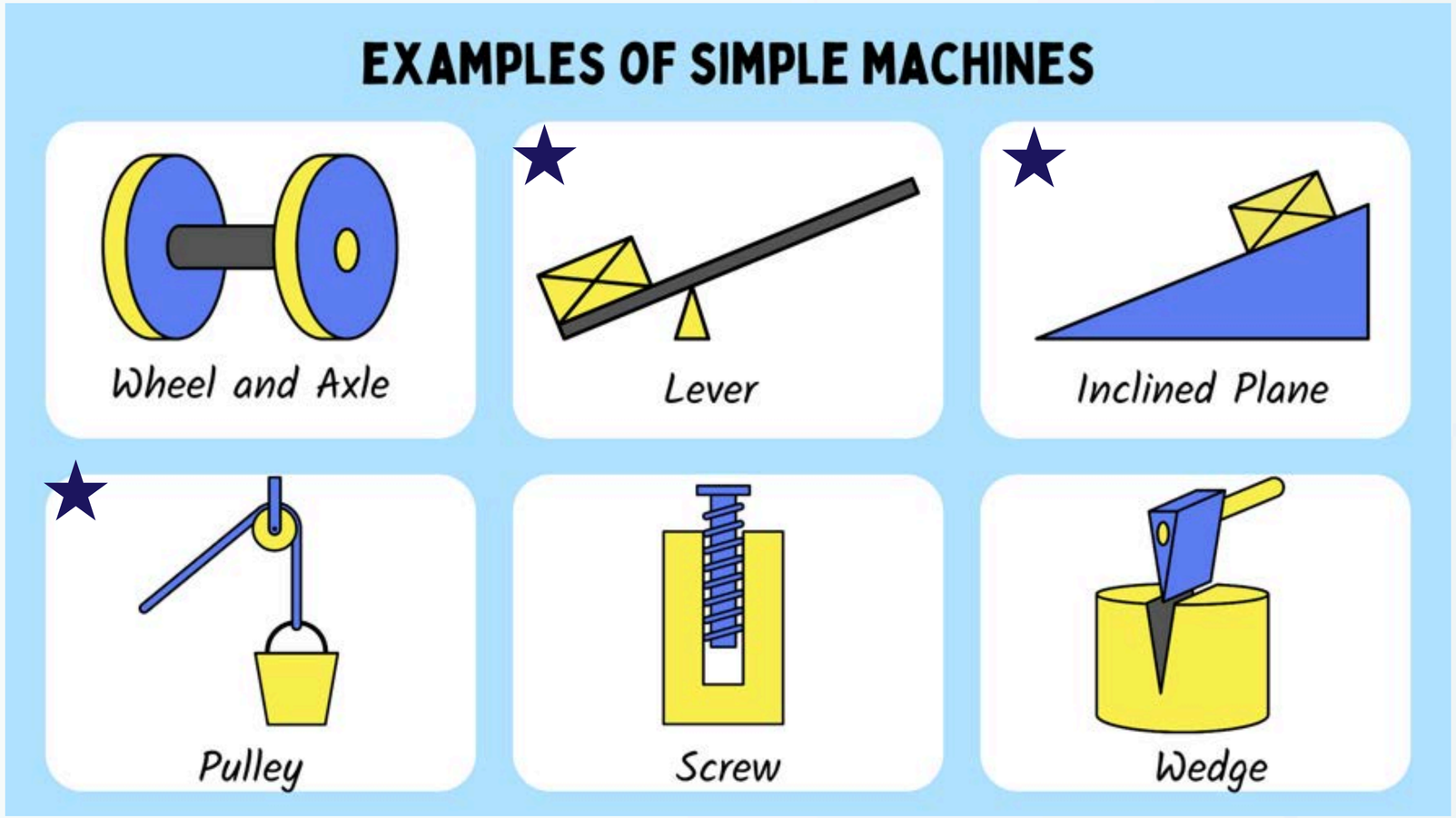
Levers

Levers


The Three Lever Classes
First Class
Load
Effort
Fulcrum
Second Class
Effort
Load
Fulcrum
Third Class
Load
Effort
Fulcrum
Example
Effort
Load
Fulcrum
Example
Load
Effort
Fulcrum
Example
Effort
Fulcrum
Load

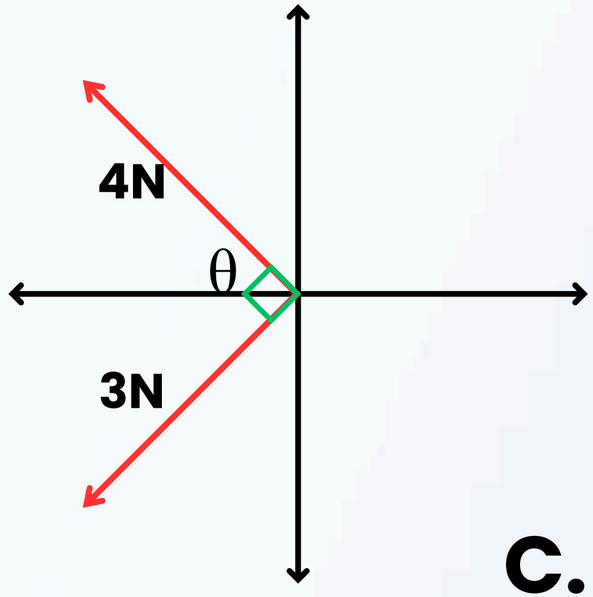
Simple Machine

Simple Machines



Mechanical-Technical Reasoning

Find the Resultant R. Clue: Imagine the plane is a wheel



θ = 45 degrees

A. 5N

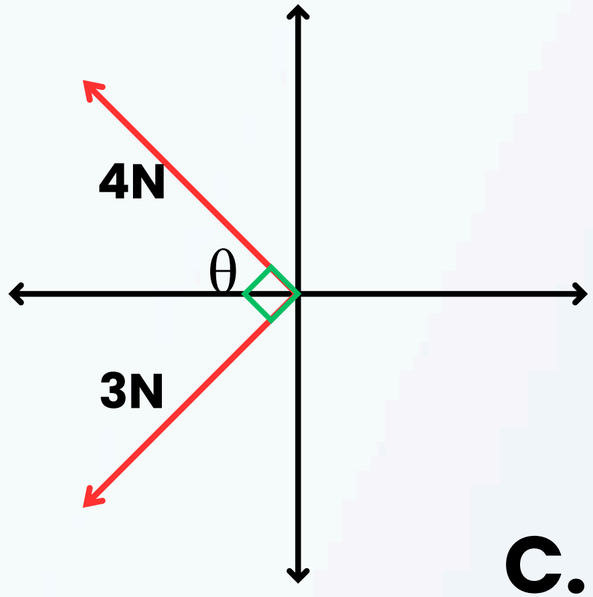
B. 4N

C. 6N

D. 71N

Mechanical-Technical Reasoning

Find the Resultant R



θ = 45 degrees

A. 5N

B. 4N

C. 6N

D. 71N

Mechanical-Technical Reasoning

A car is initially traveling at 15 meters per second and comes to a stop with a constant acceleration of -3 meters per second squared. How long does it take for the car to stop?

A. 5s

B. 4s

C. 16s

D. 7s

Mechanical-Technical Reasoning

A car is initially traveling at 15 meters per second and comes to a stop with a constant acceleration of -3 meters per second squared. How long does it take for the car to stop?

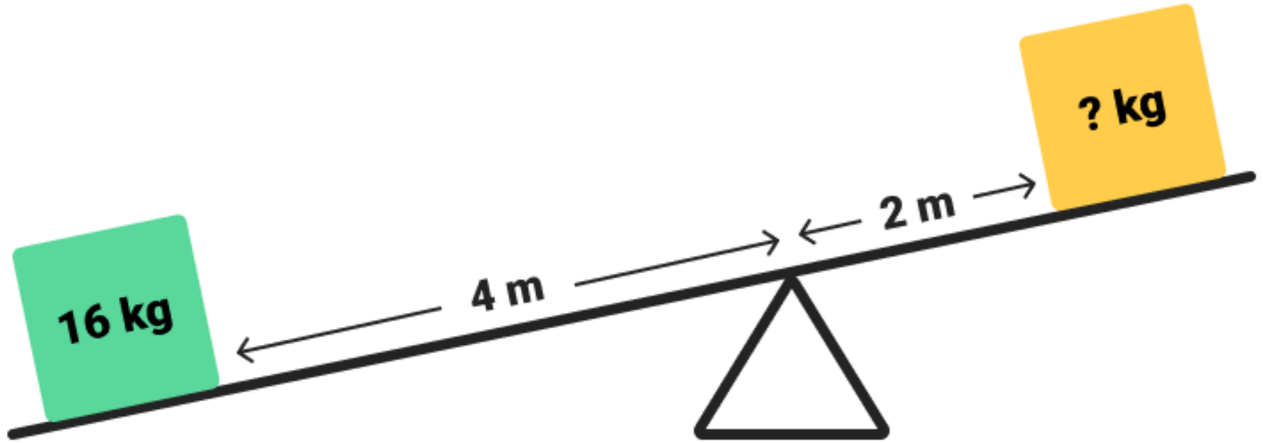
A. 5s

B. 4s

C. 16s

D. 7s

Mechanical-Technical Reasoning



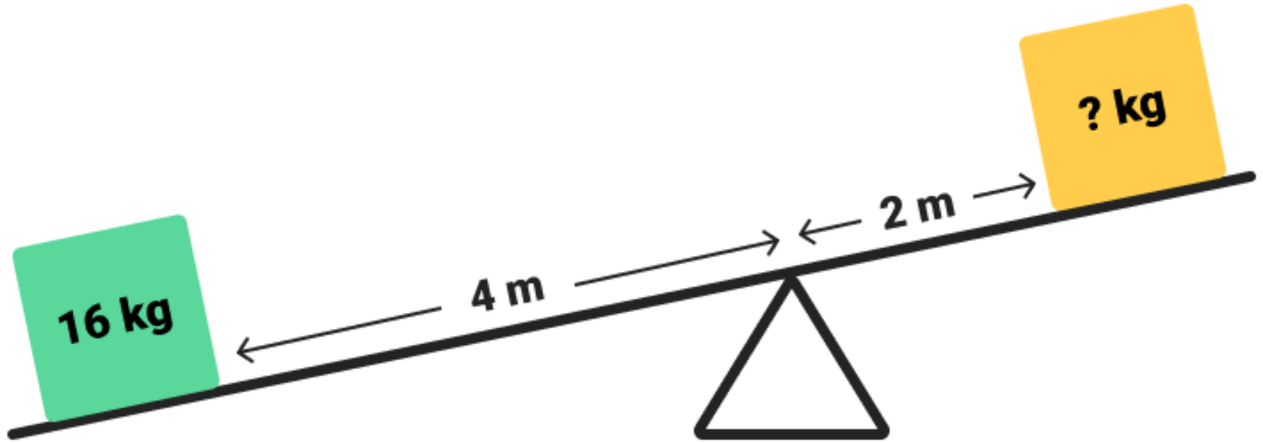
A. 23kg

B. 32kg

C. 33kg

D. 29kg

Mechanical-Technical Reasoning



A. 23kg

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C. 33kg

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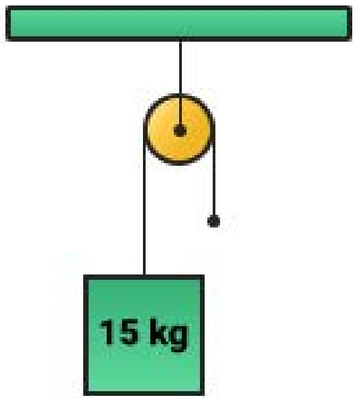
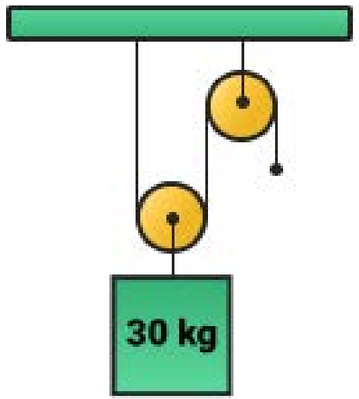
Mechanical-Technical Reasoning

Which system requires the least amount of force



A



B

A. B

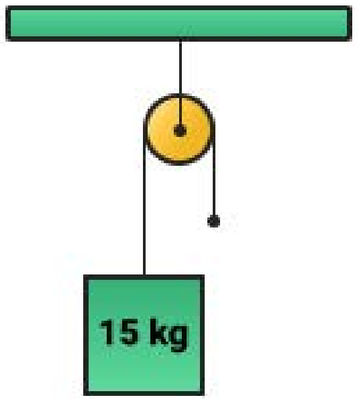
B. System A and B

C. A

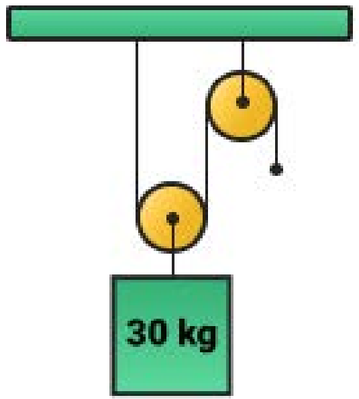
D. None

Mechanical-Technical Reasoning

Which system requires the least amount of force



A



B

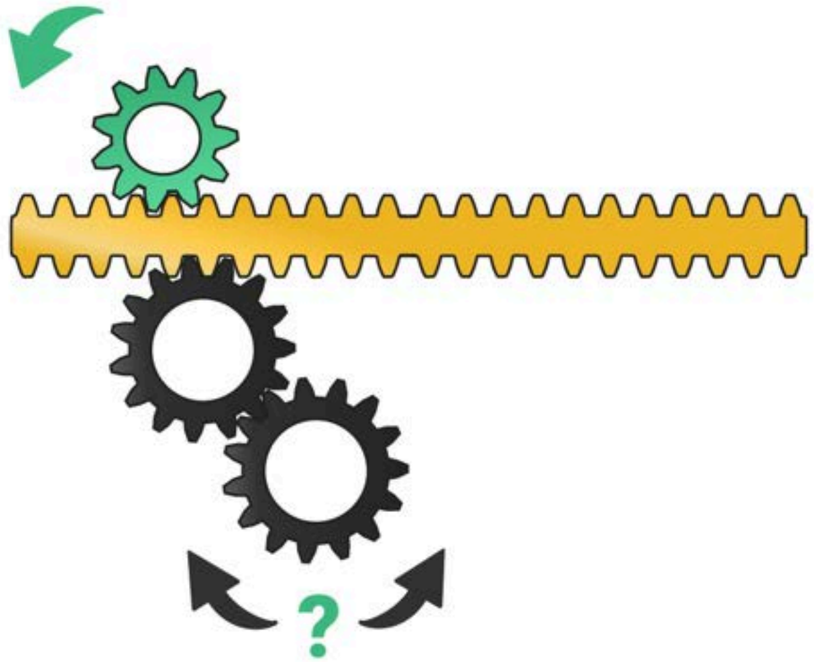
A. B

B. System A and B

C. A

D. None

Mechanical-Technical Reasoning



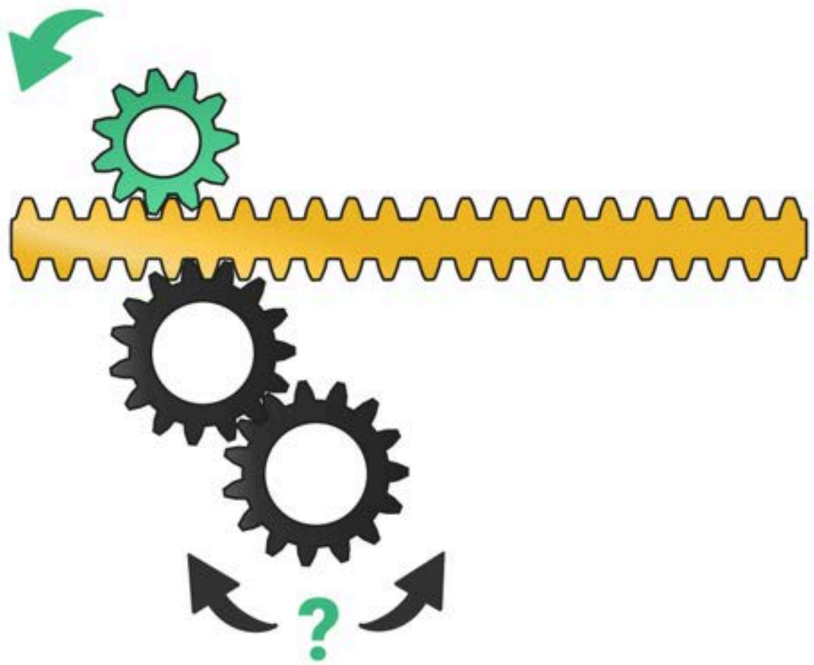
A. CW

B. CC

C. Both

D. Static

Mechanical-Technical Reasoning



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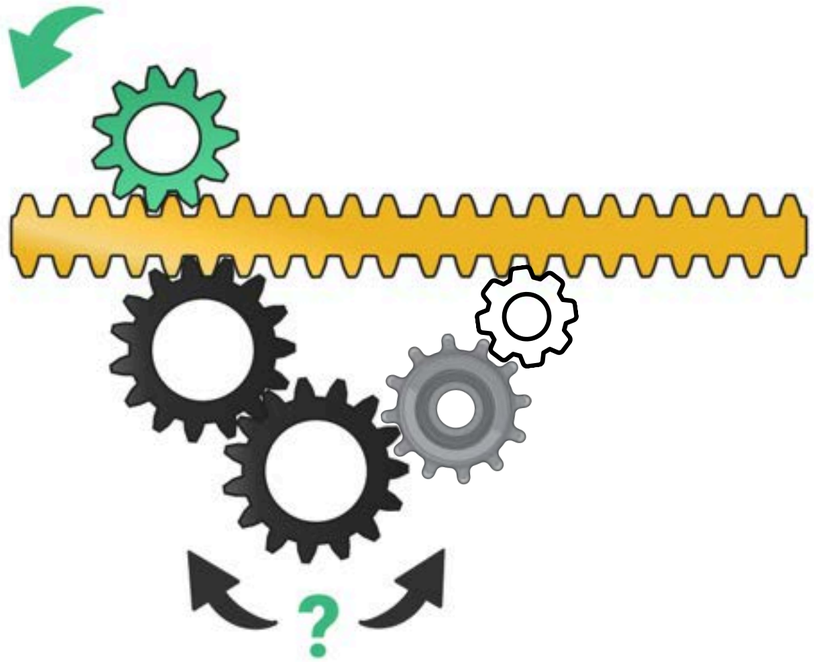
Mechanical-Technical Reasoning



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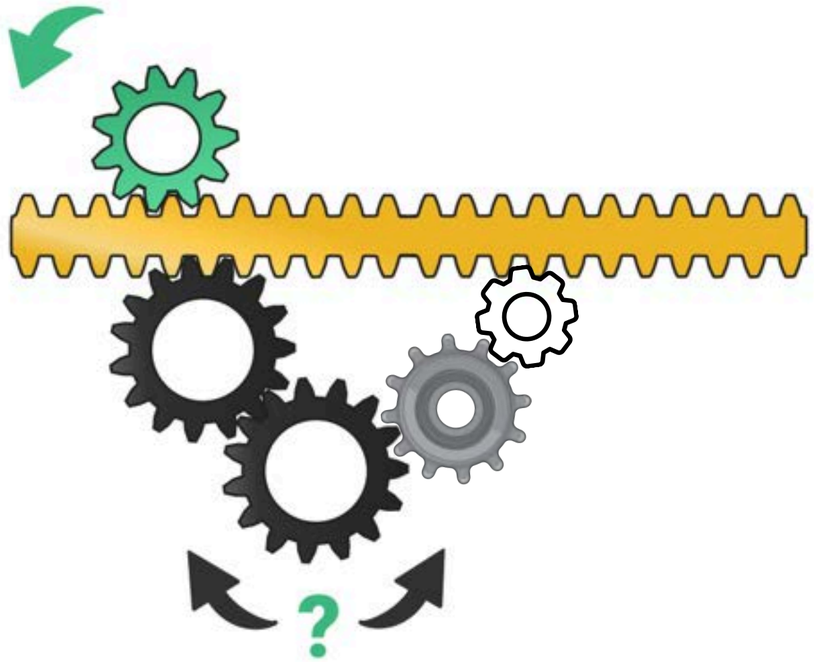
B. CC

C. Both

D. Static

Mechanical-Technical Reasoning



A. CW

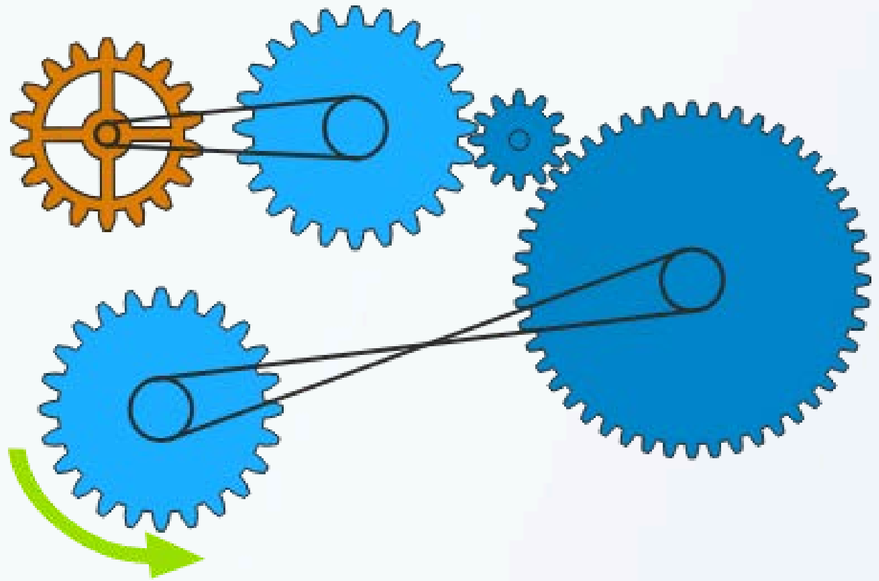
B. CC

C. Both

D. Static

Mechanical-Technical Reasoning

Find the rotation occuring in the orange gear



A. CW

B. CC

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D. Static

Mechanical-Technical Reasoning

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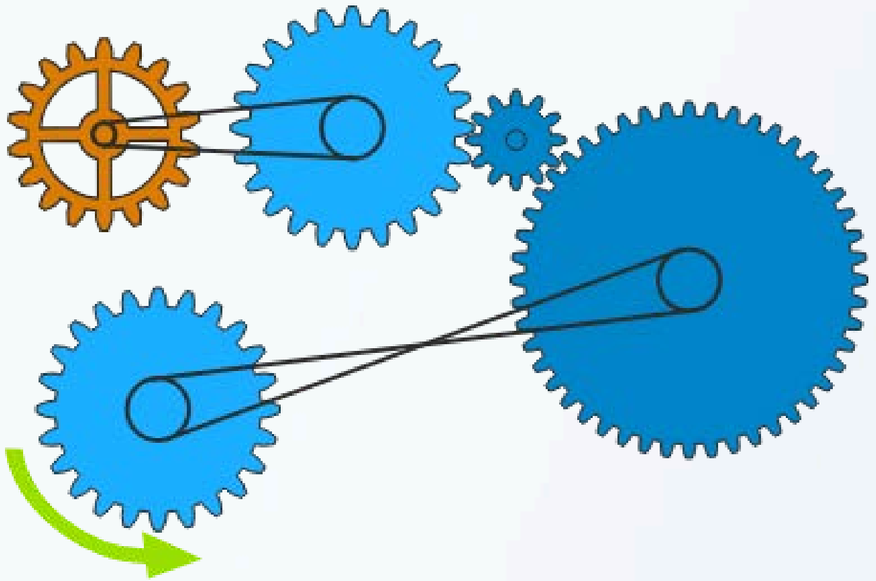


A. CW

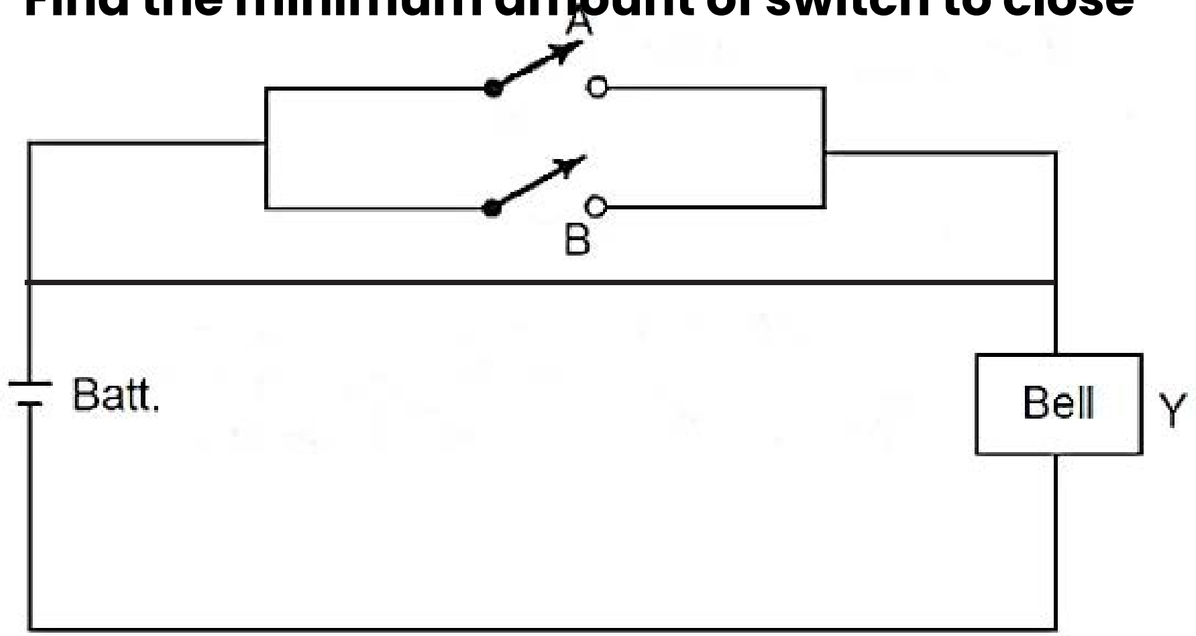
B. CC

C. Both

D. Static

Mechanical-Technical Reasoning

Find the minimum amount of switch to close



A. 1

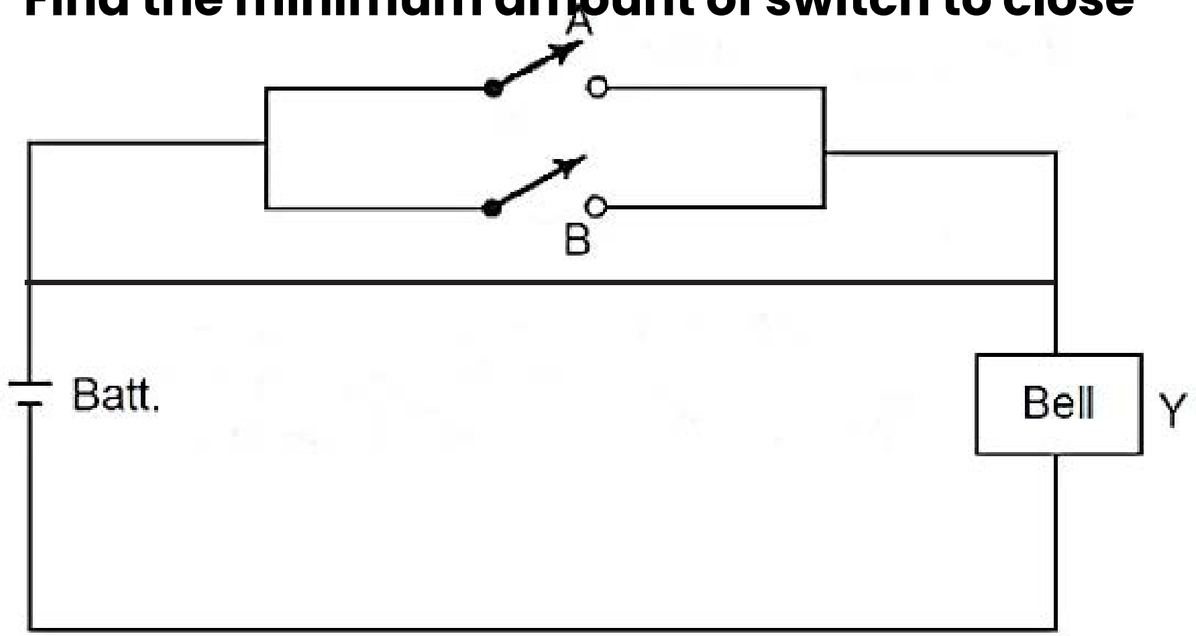
B. 2

C. 3

D. 0

Mechanical-Technical Reasoning

Find the minimum amount of switch to close



A. 1

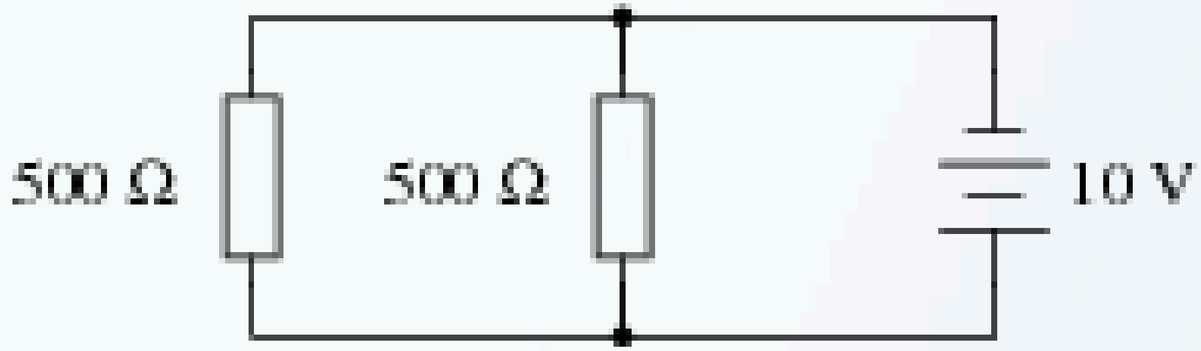
B. 2

C. 3

D. 0

Mechanical-Technical Reasoning

Find the total current



A. 4mA

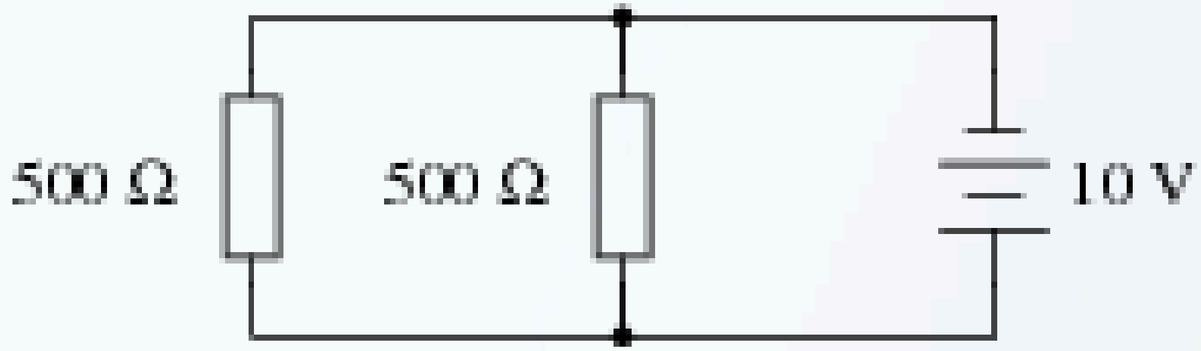
B. 400mA

C. 40mA

D. 40A

Mechanical-Technical Reasoning

Find the total current



A. 4mA

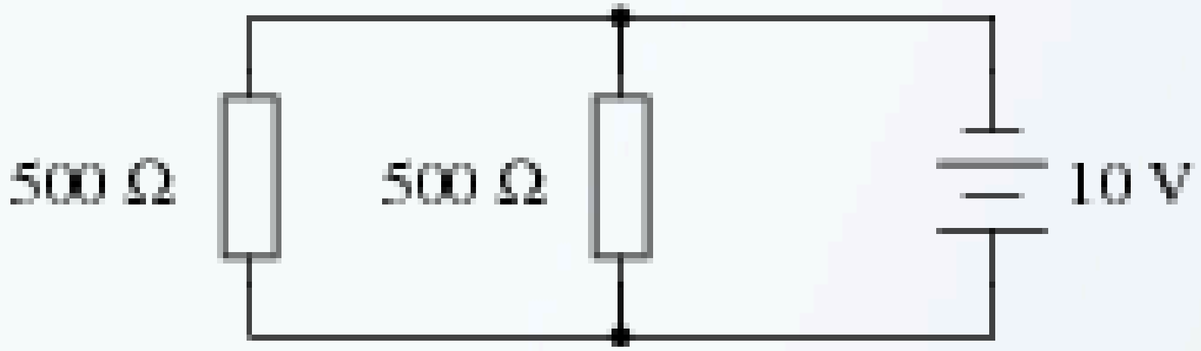
B. 400mA

C. 40mA

D. 40A

Mechanical-Technical Reasoning

Find the total resistance



A. 25 ohms

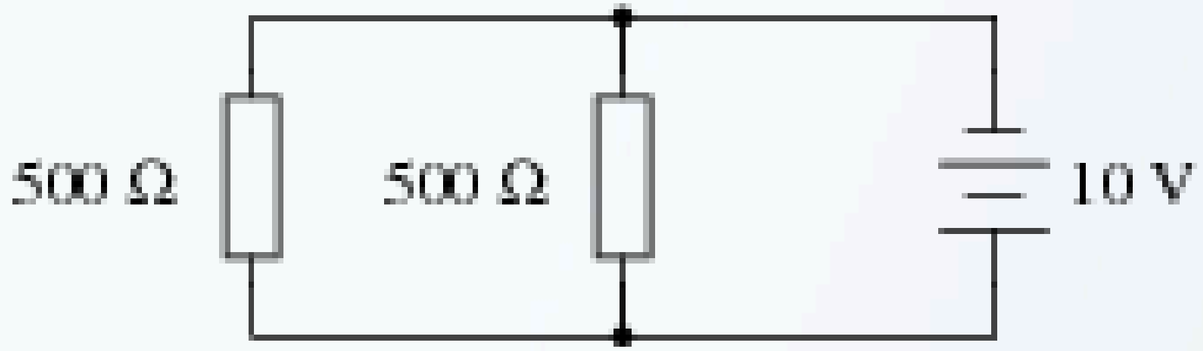
B. 2.4 ohms

C. 250 ohms

D. 240ohms

Mechanical-Technical Reasoning

Find the total resistance



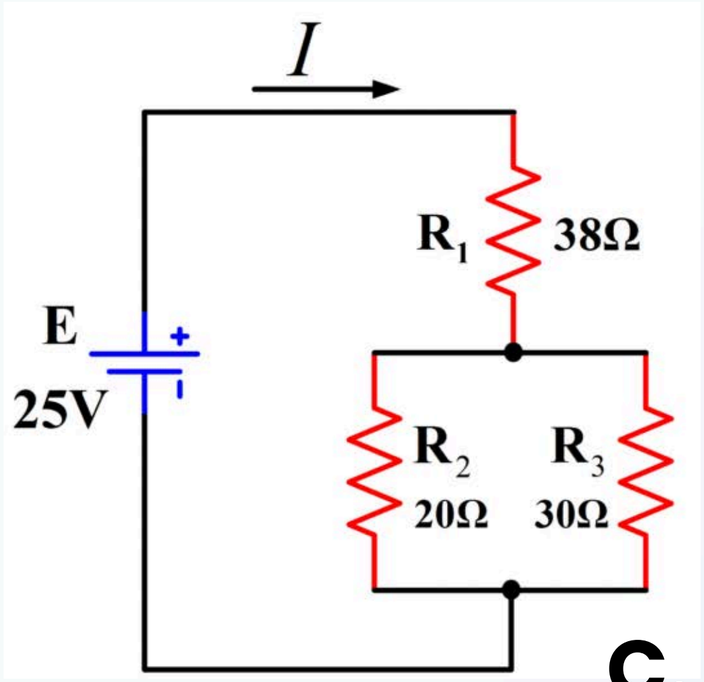
A. 25 ohms

B. 2.4 ohms

C. 250 ohms

D. 240ohms

Mechanical-Technical Reasoning



Find the total resistance

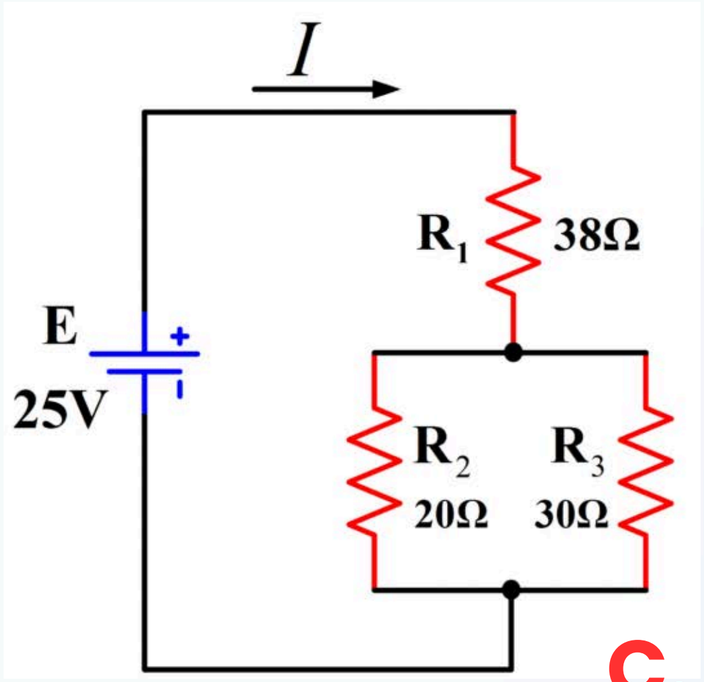
A.60 ohms

B. 75 ohms

C. 50 ohms

D. 55ohms

Mechanical-Technical Reasoning



Find the total resistance

A.60 ohms

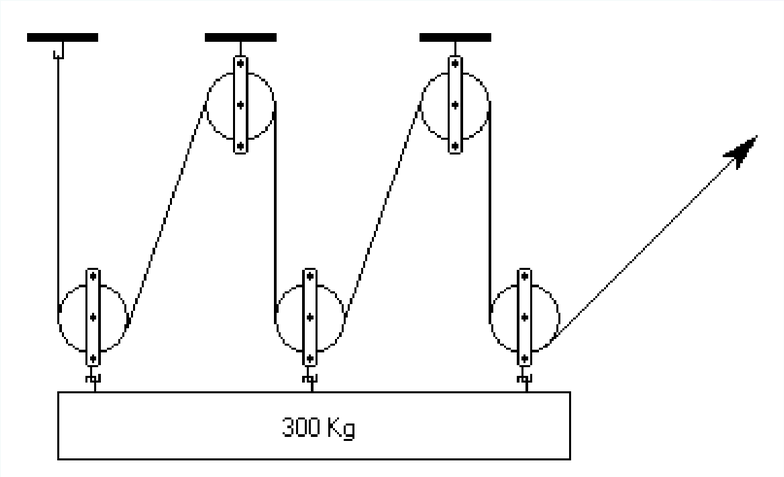
B. 75 ohms

C. 50 ohms

D. 55ohms

Mechanical-Technical Reasoning

What's the minimum amount of force needed to pull the cable. g=10m/s



A.500N

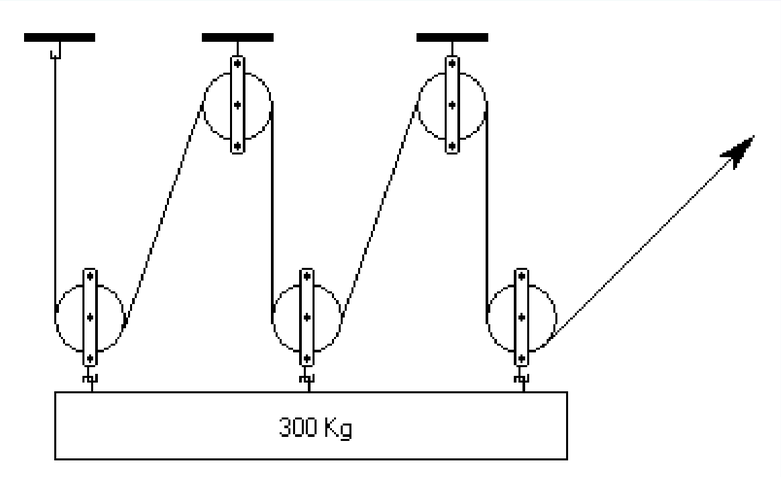
B. 50N

C. 600N

D. 60kg

Mechanical-Technical Reasoning

What's the minimum amount of force needed to pull the cable



A.500N

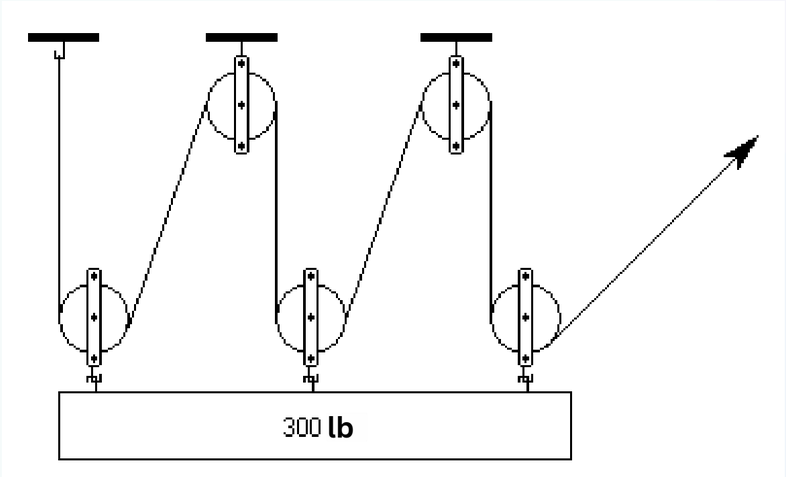
B. 50N

C. 600N

D. 60kg

Mechanical-Technical Reasoning

What’s the minimum amount of force needed to pull the cable



A.500lb

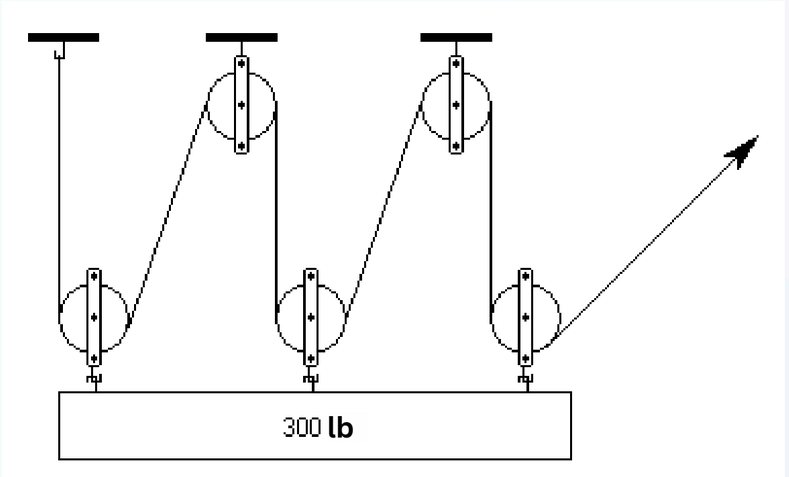
B. 50lb

C. 600lb

D. 60lb

Mechanical-Technical Reasoning

What's the minimum amount of force needed to pull the cable



A.600N

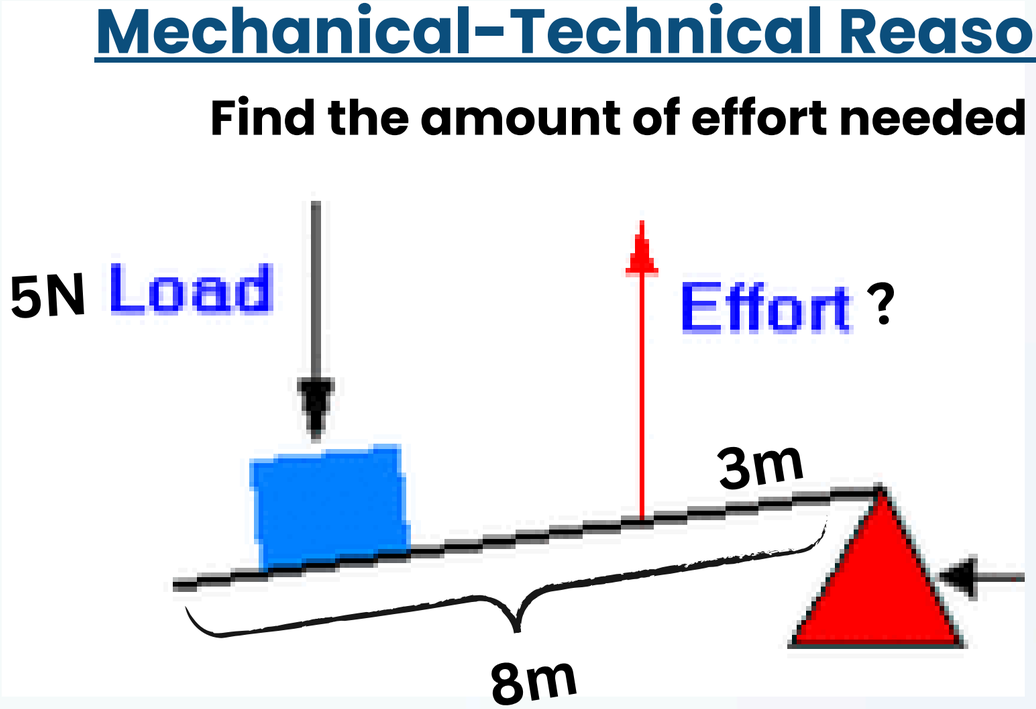
B. 60N

C. 600lb

D. 60lb

Mechanical-Technical Reasoning

Find the amount of effort needed



A.13.33N

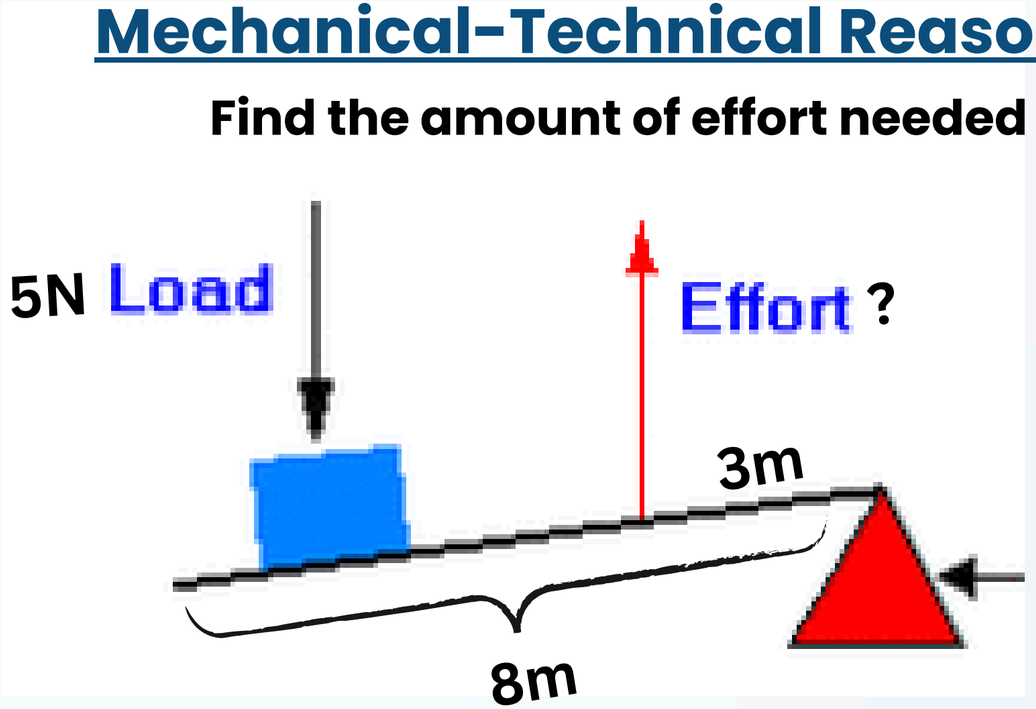
B. 13.32N

C. 13N

D. 13.34N

Mechanical-Technical Reasoning

Find the amount of effort needed



A.13.33N

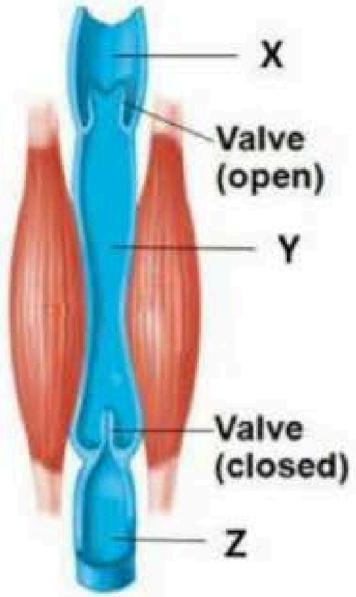
B. 13.32N

C. 13N

D. 13.34N

Mechanical-Technical Reasoning Integration

16. The figure below shows a vein and contracted muscles surrounding the vein in the leg of a normal person.



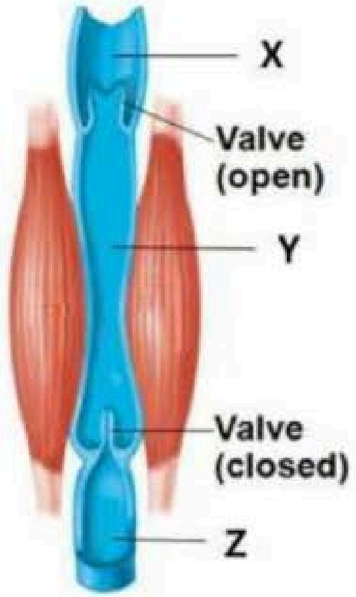
Which of the following chooses all and only the correct statements from the box below?

1. The blood pressure at Y is higher than at X in this situation.
2. The blood flows from X to Y when the muscles relax.
3. The blood flows from Y to Z when the muscles contract.

A. 1 B. 2 C. 1 & 3 D. 2 & 3 E. 1 & 2 & 3

Mechanical-Technical Reasoning Integration

16. The figure below shows a vein and contracted muscles surrounding the vein in the leg of a normal person.



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1. The blood pressure at Y is higher than at X in this situation.
2. The blood flows from X to Y when the muscles relax.
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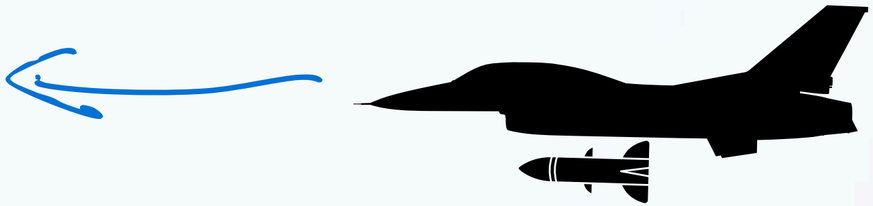
A. 1 B. 2 C. 1 & 3 D. 2 & 3 E. 1 & 2 & 3

Mechanical-Technical Reasoning



Find the direction of the bomb

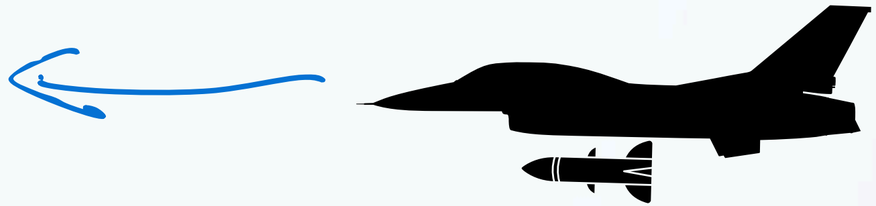
A. ↓

B ←

C. →

D. ↘

Mechanical-Technical Reasoning



Find the direction of the bomb

A. ↓

B ←

C. →

D.

Mechanical-Technical Reasoning

If a rope is attached below the jet's body while travelling, what will be the rope look like?

A.

C.

B

D.

Mechanical-Technical Reasoning

If a rope is attached below the jet's body while travelling, what will be the rope look like?

A.

C.

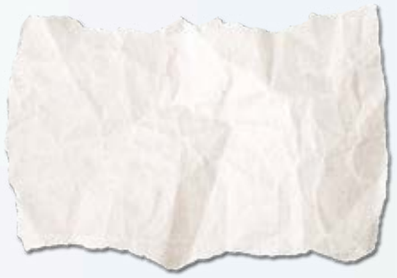
B

D.

Mechanical-Technical Reasoning

Which will fall quicker in an open space at Earth assuming gravity is 10 m/s

5 grams metal ball



5 grams thin paper

A. metal ball

B. thin paper

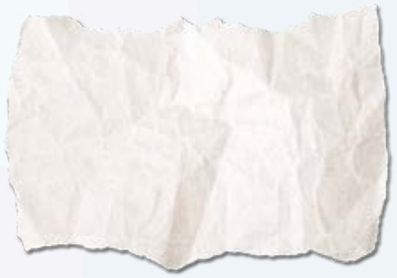
C. both will fall at the same time

D. both will float

Mechanical-Technical Reasoning

Which will fall quicker in an open space here on Earth assuming gravity is 10 m/s

5 grams metal ball



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