



PHYSICS

BOOKS - ICSE

ENERGY

Solved Examples

1. A crowbar is of 125 cm length. Its fulcrum is at a distance of 25 cm from the load. Find out the mechanical advantage.



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2. If the mechanical advantage of a lever is 2.5, what will be the effort you need to apply to lift a load of 50 N?



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Questions Fill In The Blanks

1. A machine is a tool that makes our work
..... (difficult/easier).



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2. A vegetable peeler is an example of a
..... (simple/complex) machine.



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3. A (bicycle/bottle opener) is an example of a complex machine.



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Questions Choose The Correct Option

1. make our work easier.

A. Tables

B. Food

C. Machines

D. Cupboards

Answer:



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2. Ais a simple machine

A. laptop

B. bottle opener

C. car

D. fan

Answer:



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3. A ramp used in a hospital is an example of

A. an inclined plane

B. a screw

C. a wedge

D. a lever

Answer:



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4. Your front teeth are examples of

A. inclined planes

B. screws

C. wedges

D. ramps

Answer:



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5. A key ring is an example of

A. an inclined plane

B. a screw

C. a wedge

D. a lever

Answer:



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6. Moving up an object along an inclined plane requireslifting it vertically up

A. more effort than

B. less effort than

C. same effort as

D. none of these

Answer:



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7. A doorknob is an example of

- A. a pulley
- B. a wheel and axle
- C. an inclined plane
- D. a wedge

Answer:



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8. A/An is used to lift heavy objects.

A. wheel

B. axle

C. pulley

D. none of these

Answer:



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9. Flagpoles are examples of

A. pulley

B. wheel and axle

C. lever

D. none of these

Answer:



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10. Which of the following should be done to enhance the life of machines?

A. Machines should be oiled or greased regularly.

B. Parts made of iron should be painted.

C. Machines should be kept covered to protect them from dust.

D. All of the above

Answer:



Questions Observe The Figures And Answer The Questions



1.
 1. In the figure given above, what do A and B represent?
 2. What are the distances x and y called?
 3. For levers, it can be shown that

$$\frac{\text{Load}}{\text{Effort}} = \frac{\text{Length of effort arm}}{\text{Effort Length of load arm}}$$

Using this information, state the value of the ratio, load/effort, for the figure shown above.



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2.

Identify the class of lever in the figure.



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3.

Label the load arm and effort arm in the figure.



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4.

If the lever in the figure is 100 cm long and the length of the load arm is 20 cm, what would be the length of the effort arm?



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5.

Find out the mechanical advantage of this simple machine.



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6.

Explain how the workman is moving such a large rock



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Exercises Section I Name The Following

1. The class of lever in which the load is located between the fulcrum and the effort



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2. An inclined plane wound into a spiral around a straight rod



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3. A simple machine that consists of a flat sloping surface with one end higher than the other



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4. A simple machine that has a set of two inclined planes that meet at a sharp or pointed edge



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5. A tool that makes our work easier



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6. The distance of the fulcrum from the point at which the load acts



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7. The distance of the fulcrum from the point at which the effort is applied





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8. The force that one needs to apply on a machine to perform a task



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9. The ratio of the load to the effort



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10. The fixed point about which a lever can turn



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Exercises Section I Choose The Correct Option

1. Which of the following is not a part of a lever?

A. Fulcrum

B. Load

C. Effort

D. Crowbar

Answer:



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2. A stapler is an example of a class
lever.

A. one

B. two

C. three

D. four

Answer:



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3. A nutcracker is an example of a class
..... lever.

A. one

B. two

C. three

D. four

Answer:



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4. The MA of a class-one lever is

A. always less than 1

B. always greater than 1

C. greater than or less than 1

D. always equal to 1

Answer:



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5. The MA of a class-one lever is

A. always less than 1

B. always greater than 1

C. greater than or less than 1

D. always equal to 1

Answer:



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6. The MA for a lever if the load is 150 N and the effort is 100 N is

A. 1.5

B. 1500

C. 15

D. 10

Answer:



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7. A class-three lever has a length of 150 cm and the effort is applied at a distance of 50 cm from the fulcrum. The MA is

A. 15

B. 1.5

C. 0.3

D. 50

Answer:



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8. A is used to cut or split objects.

A. lever

B. wedge

C. screw

D. pulley

Answer:



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Exercises Section I Write T For True And F For False Correct The False Statements

1. A tool that makes our work easier



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2. Your front teeth are examples of



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3. A pair of tongs and a pair of scissors are levers of the same class.



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4. The human fore arm is an example of class-three lever.





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5. Mechanical advantage is greater than 1 when the load is greater than the effort.



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6. Mechanical advantage is less than 1 when the fulcrum is closer to the load than the effort.



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Exercises Section I Choose The Correct Option To Fill In The Blank

1. For a class-two lever, the effort arm is always (longer/shorter) than the load arm.



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2. Class one-levers always change the (magnitude/direction) of force.



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3. A movable pulley is used as:



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4. While loading or unloading a truck,
(an inclined plane/a wheelchair) is used.



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5. A screw driver and a door knob are examples
of a (screw/wheel and axle).



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Exercises Section I Circle The Odd One One Has Been Done For You

1. Wedge, Screw, Inclined plane, Rectangular plane



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2. Roller skates, Rolling pins, Knife, Skateboard



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3. A pair of scissors, Nutcracker, Key ring,
Wheelbarrow



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4. Ramp, Wheelbarrow, Winding road, Wooden
planks



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Exercises Section II Give Reasons For The Following

1. In a class-one lever, mechanical advantage can be either less than 1 or greater than 1.



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2. Class III levers have mechanical advantage less than 1. why are they then used ?



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3. Class-two levers are called force multipliers.



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4. We use inclined planes to push heavy things up to a certain height.



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5. When not in use, machines should be kept covered.



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Exercises Section Ii Explain The Following Terms With The Help Of Examples

1. Simple machines



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2. Class-two levers



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3. Mechanical advantage



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4. Inclined plane



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Exercises Section II Distinguish Between The Following

1. Class-one lever and class-three lever



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2. Pulley and wheel and axle



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Exercises Section II Short Answer Questions

1. Name any six simple machines that we use in daily life.



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2. The mechanical advantage of a machine is

2. What do you infer from this statement?



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3. What are the advantages of using a pulley?



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4. What are the advantages of using a screw?



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5. Give two examples where we use wedges as simple machines.



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1. By using a simple machine, the work done by a person remains the same, but it allows the person to use less force. Explain.



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2. Describe the three classes of levers with diagrams representing the positions of the effort, load, and fulcrum in each case.



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3. Describe an inclined plane and a screw with the help of examples where they are used in daily life.



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Exercises Section II Numerical Questions

1. The effort applied to lift a 60 N box using a simple machine is 45 N. Find the MA of the machine.



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2. If the effort arm is 1 m and the load arm is 150 cm long, find the MA.



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3. In a class two lever, the load arm is 80 cm long and the distance between the load and the effort is 120 cm. Find the MA.



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4. In a class three lever, the distance between the effort and the load is 40 cm and load arm is 1 m long. Find the length of the effort arm and then calculate MA.



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Picture Based Questions

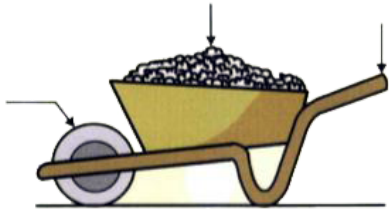


Fig. 1



Fig. 2

1.

The machines shown above are class-two levers . What does this mean ?



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Fig. 1



Fig. 2

2.

Put the relevant labels - load, fulcrum , and

effort on each figure.

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Fig. 1



Fig. 2

3.

What will always be true about the load/effort ratio of this type of lever ?

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2.

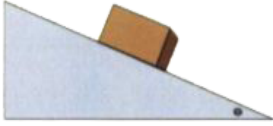


Fig. 1



Fig. 2



Fig. 3

4.

Identify the type of simple machines shown above.



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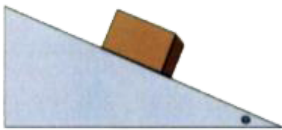


Fig. 1



Fig. 2



Fig. 3

5.

Explain how each of these machines work.



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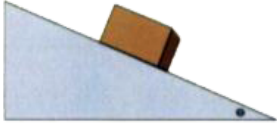


Fig. 1



Fig. 2



Fig. 3

6.

Give one more example each of such type of machines from our everyday life .



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Fig. 1



Fig. 2

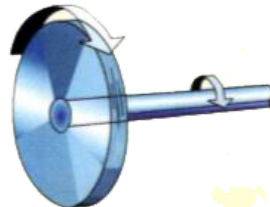


Fig. 3

7.

Although the effort in using a pulley is the

same as the load, what is the benefit of using a pulley ?

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Fig. 1



Fig. 2

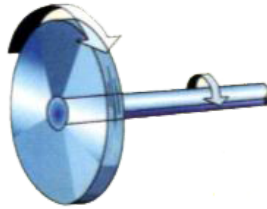


Fig. 3

8.

Explain how the wheel and axle is a force multiplier

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Fig. 1



Fig. 2

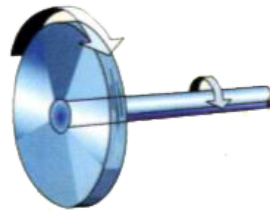


Fig. 3

9.

Where is the force usually applied in Figure 1 ?



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