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Chapter-4

Energy- simple machines

1- One word for the following.

1- The point about which a lever can turn
fulcrum

2- force applied to a machine
Effort

3- Useful work done by the machine
output

4- A combination of two or more inclined planes
wedge

5- Distance through which a screw advances in one complete rotation
pith

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a. Define these terms

1- Mechanical advantage :- Ratio of the load to to the effort

2- Input :- Work done (or energy supplied) on a machine.

3- Output :- Work done (energy imparted) by a machine

4- Efficiency of a machine :- Ratio of output to input.

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Checkpoint - 1

Answer these question.

(a) What is simple machine ?

Ans A simple machine is a tool that help us in doing our work more easily and efficiently.

(b) Can a machine change the speed? If yes, give an example.

Ans Yes, machine like bicycle can change the speed.

(c) Name three simple machine

Ans Lever, wedge, pulley

(d) In which class of lever is the mechanical advantage is always less than one.

Ans III class lever.

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Checkpoint - 1

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(d) In which class of lever is the mechanical advantage is always less than one.

Ans III class levers.

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Check point - 2

Answer these question.

1 Give any two applications of inclined plane.

Ans
- A gang plank is provided to unload the cargo from a sailing ship.
- The playground slide is yet another example of the inclined plane.

2- What is a wedge ?

Ans A wedge is a simple machine that has two or more inclined surfaces which taper either to form a sharp edge or a pointed edge.

3- Which simple machine is used while loading goods in a truck or in a railway wagon?

Ans Inclined plane.

4- Is a plough an example of an inclined plane or a wedge ?

Ans wedge

Check point-3

Answer these question.

1- Name different types of pulleys?

Ans (a) Single fixed pulley
(b) Single movable pulley.
(c) A combination of fixed and movable pulley.

2- What do you mean by a pitch of a screw?

Ans Space between the two consecutive threads in a screw is called pitch.

3- What you turn the door knob of your house?

Ans Wheel and axle

4- Why should machine be lubricated regularly?

Ans Regular lubrication of machine reduce noise and wear and tear of the machine.

5- How can a machine be protected from dust and moisture?

Ans It should be covered when not in use.

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Differentiate between the following

1- Second class	Third class
In a second class lever load lies between the fulcrum and the effort	In the third class, The effort lies between the load and fulcrum.
2- Simple machine	complex machine
A simple machine is a tool that helps us in doing our work more easily and efficiently It has no energy of it's own and so it can not do work by itself. When we per-form action on a machine, then the machine will, inturn, perform work on some other object	There are machine in which two or more simple machine work together. Such machines are called complex machine.

3- Inclined plane

A inclined plane is a sloping surface which makes our work easier and faster.

Screw

A screw is a inclined plane wrapped in a spiral thread around a rod or a shaft.

4- Single fixed pulleys

The simplest form of pulleys is called the single fixed pulleys. In this pulleys, the axle is fixed to a rigid support called the block. The load to be raised is attached to the one end of rope and effort is applied at other end.

Single movable

Another simple form of pulleys is the single movable pulley. In this type of pulley, one end of the rope is fixed to the rigid support and the effort is applied at the ~~another~~ end of the rope. The load is attached to the pulley.

E- Answer these question

Ques-1 State any three functions of simple machine?

Ans
- A machine multiplies force.
- A machine can change the speed.
- A machine helps to change the direction of the force.

Ques-2 List any four types of simple machines.

Ans Types of simple machine :-

- Screw
- Lever :- first class lever, Second class lever third class lever
- Inclined plane
- Wedge
- Pulley :- fixed pulleys, Movable pulleys
- Wheel and axle

Ques-3 What is the principal of lever? Write expression for it's mechanical advantage.

Ans According to the principal of a lever, the turning effect of the effort at the fulcrum should be equal to the turning effect of the load at the fulcrum. In a simpler form.

Effort x Effort arm = Load x Load arm

Mechanical advantage, MA = $\frac{\text{Effort arm}}{\text{Load arm}}$ (a) (b)

Ques-4 Describe the three types of levers.?

Ans First class lever :- When the fulcrum of a lever lies between the load and the effort, it is called first class lever. ex-
Second class lever :- When the load on a lever lies between the fulcrum and effort, it is called a second class lever. ex-
Third class lever :- When the effort on a lever lies between the fulcrum and the load, it is called a third class lever. ex-

Ques-5 Name any two simple machine in each case in which we.
(a) multiply force - Screw jack, inclined plane.
(b) apply force in a convenient direction :- Pulley, Lemon squezer
(c) apply force at a convenient point - Pair of scissor
Screw driver.

Ques-6 Give few examples where the concept of an inclined plane is used to multiply force?

Ans
- A gang plank is provided to unload the cargo from a sailing ship.
- The playground slide is yet another example of the inclined plane.

Ques-7 State the construction of a single fixed pulley How does it help us ?

Ans A pulley is a flat, mettalic or wooden circular disc with a groove on it's edge. A rope pases through the groove. The pulley is capable of rotataing around its central axis called an axle. The main advantage of the pulley is that it allows us to apply effort in convenient downward direction for pulling a load in upward direction.

Ques-8 What is the principle of screw ? Give any two examples of screw.

Ans When the screw makes one complete rotation, it advances a distance equal to the space between the two consecutive threads.

- Screw are used to fit doors in door frames.
- A cork screw is used to pull out the cork from a sealed bottle.

Ques-9 Give three examples of wheel and axle.

Ans Three examples are :-

- Bicycle pedal
- Water tap
- Door Knob

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Ques-10 List the ways by which proper maintainance of machines can be ensured ?

Ans ▸ Iron parts of a machine should be painted to prevent rusting.

- It is desirable to adjust the moving parts of a machine from time to time.
- Machines should be regularly cleaned and check up for any deficiency.

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Give odd one out

1- Beam Balance, handle of a handpump, spade and crowbar.

Ans Spade is a third class levers and others are first class lever.

2- Nut cracker, wheel barrow, bottle-opener, a pair of ~~plier~~ pliers.

Ans Plier is a first class lever and other are second class lever.

3- Inclined plane, lever, screw jack, pulley, watch

Ans Watch is a complex machine and other are simple machines

4- Ramp, wooden plank, winding, hill road, screw driver.

Ans Screwdriver is an example of wheel and axle machine others are inclined plane.

5- Iron nail, sewing needle, screw, axe and chisel

Ans Screw is a simple machines and other are wedge type of machines.