Measurements (English Medium)

Exercise 30:

Solution 1(a):

The glass which is completely filled with water appears to be heavy.

Solution 1(b):

The glass which is filled with sand appears to be heavier.

Solution 2(a):

The mass of water in the completely filled glass is more than the mass of water in the half filled glass.

Solution 2(b):

The mass of different types of substances having the same volume is different. Since, the two glasses are filled with different types of substances, i.e. water and sand, the glass filled with sand appears heavy as its mass is more.

Exercise 31:

Solution 1(a):

This can be done by filling one glass with milk and the other with oil. The glass filled with milk appears heavy. So, it is heavier than the glass filled with oil. Hence milk has a higher mass than oil.

Solution 1(b):

Physical balances are used by grocers to weigh commodities. They are also used by goldsmiths to find the mass of gold and silver ornaments.

Solution 1(c):

A physical balance is used to accurately measure the mass of a small quantity of a material in a laboratory. It is kept in a glass box to prevent the effect of our respiration or breeze in the laboratory on the measurement value of the material.

Exercise 32:

Solution 1(a):

To weigh 500 g of some substance we will keep adding the substance to be measured in the other pan (left side) till the pans become horizontally aligned and the pointer of the balance points to zero.

Solution 1(b):

To measure the mass of wheat poured on the left side of the balance, known masses are added in the other pan (right side) of the balance till both the pans become horizontally aligned.
The total mass in the right pan will give the mass of wheat.

Exercise 34:

Solution 1(a):

The unit of mass is kilogram or gram.

Solution 1(b):

The unit of weight is Newton (1 N = 1 kg m/sec^2).

Solution 1(c):

S.No.	Name of friend	Mass (kg)	Weight (N)
1.	Aisha	30	30 × 9.8 = 294
2.	Seema	25	25 × 9.8 = 245
3.	Rahul	35	35 × 9.8 = 343
4.	Khushal	37	37 × 9.8 = 362.6
5.	Shikha	40	40 × 9.8 = 392

Exercise 35:

Solution 1(a):

S.No.	Object	Weight (N)

1.	Stone	2
2.	Compass box	1.6
3.	Book	2.1
4.	Pliers	2.07
5.	An iron piece	8.3
6.	School bag	50
7.	Geometry box	2.5

Solution 1(b):

Mass	Weight
The quantity of matter possessed by a substance is known as the mass of the substance	The gravitational force acting on a substance at any place on the Earth is known as the weight of the substance at that place.
The unit of mass is kilogram (kg)	The unit of weight is Newton (N)
The mass of a substance is calculated using a physical balance.	The weight of a substance is calculated using a spring balance.
The mass of a substance remains unchanged at all places on the Earth.	The weight of a substance is different at different heights.

Exercise 36:

Solution 1(a):

More grains of mung are required to fill the bowl as compared to the number of peas. This is because the volume of a pea is more as compared to that of a grain of mung.

Solution 1(b):

Volleyball occupies more space than a cricket ball.

Solution 1(c):

The textbook of science and technology occupies more space than the compass box.

Exercise 37:

Solution 1(a):

These measuring vessels are usually used to measure the volume of kerosene.

Exercise 38:

Solution 1(a):

These measuring vessels are used to measure the volumes of liquids like milk and oil.

Solution 1(b):

S.No.	Vessel	Volume of water
1.	Bucket	10 l
2.	Jug	2 l
3.	Cup	500 ml
4.	Earthen pot	4 l
5.	Water bottle	1.5 l

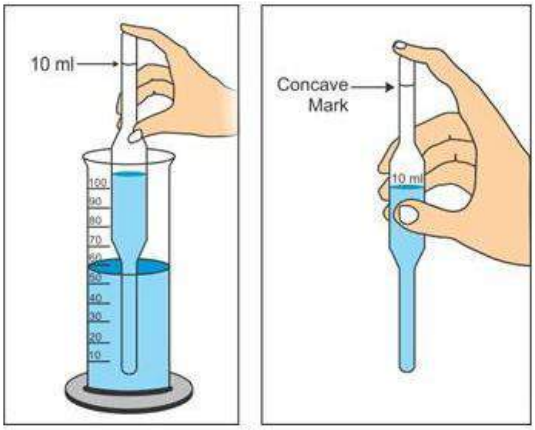
Solution 1(c):

1. **Measuring cylinder:** It is used to measure the volume of liquids in a laboratory.
2. **Burette:** It is used in laboratories during experiments to find the volume of liquids.
3. **Pipette:** It is used to take a definite volume of a liquid in the laboratory.
4. **Measuring cup:** It is used to measure medicines.

Exercise 39:

Solution 1(a):

The pipette shown can measure 10 ml of a liquid.



Solution 1(b):

The volume of water in the measuring cylinder is, V = 20 ml

Exercise 40:

Solution 1(a):

The reading of the water level is 28 ml.

Solution 1(b):

Accurate measurements can be taken only when the measuring cylinder is kept in a horizontal position on a flat surface.

Solution 1(c):

Three different positions of the eye are shown in the figure. Correct measurement can be made only when the eye is in the middle position, i.e. at the same level as that of the surface of the liquid.

Solution 1(d):

There are 5 divisions between 0 ml to10 ml. Each division marks 2 ml.

Exercise 41:

Solution 1(a):

$$\text{The least count of the given measuring cylinder} = \frac{10 \text{ ml}}{5} = 2 \text{ ml}$$

Exercise 42:

Solution 1(a):

S.No.	Name of object	Length l (cm)	Breadth b (cm)	Height h (cm)	Volume V (cm^3)
1.	Book	20	14	1.5	420
2.	Iron block	5	3	2	30
3.	Eraser	2	1.5	1	3
4.	Match box	4	2	1	8
5.	Dice	1.5	1.5	1.5	3.375
6.	Brick	18	10	8	1440
7.	Bar magnet	5.5	1	1	5.5

Exercise 43:

Solution 1(a):

The level of water in the measuring cylinder, V_1= 36 ml.

Solution 1(b):

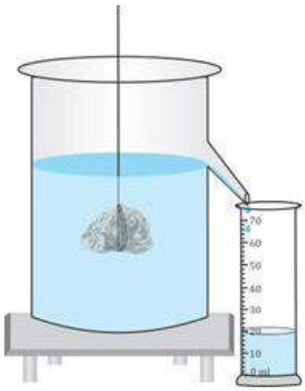
When the stone is immersed in the measuring cylinder the water level in the cylinder rises.
The new level of water in the cylinder, V_2 = 52 ml

Solution 1(c):

The volume of the stone = $V_2 - V_l$= (52 – 36) ml
= 16 ml

Exercise 44:

Solution 1(a):



Water is displaced from the displacement vessel in the measuring vessel placed besides it.

Solution 1(b):

The volume of water collected in the measuring cylinder = 20 ml

Solution 1(c):

The volume of the water displaced is the volume of stone.
The volume of stone = 20 ml i.e. 20 cm^3

Solution 1(d):

The key sinks into the water while the pen cover floats on the surface.
This is because the density of the pen cover is less than the density of the water and so it floats, while the key is denser than water and so sinks to the bottom of the bucket.

Exercise 45:

Solution 1(a):

The unit of mass is kilogram.

Solution 1(b):

The unit of volume is g/cm^3 or kg/m^3.

Solution 1(c):

S.No.	Name of the substance	Mass M (g)	Volume V (cm^3)	Density
1.	Eraser	3	2	1.5
2.	Key	68	8	8.5
3.	Stone	25	5	5
4.	Dice	0.8	1	0.8
5.	Water	20	20	1
6.	Oil	10	11.1	0.9
7.	Honey	14	10	1.2
8.	Bar magnet	120	20	6
9.	Glass balls	15	7	2.14
10.	Brick	4000	1450	2.75

Exercise 46:

Solution 1(a):

Dice and oil

Solution 1(b):

The dice and oil will float on the water while the others will sink.

Solution 1(c):

Eraser, key, stone, honey, bar magnet, glass balls and brick, have a density higher than that of water.

Solution 1(d):

Yes all these substances will either float or sink in water.

Solution 1.1:

Physical balance

Solution 1.2:

Measuring cylinder

Solution 1.3:

Newton

Exercise 47:

Solution 2:

A	B
1 kilogram	1000 gram
1 litre	1000 millilitre
1 millilitre	1 cubic centimetre
1 cubic metre	10,00,000 cubic centimetre

Solution 3:

The water tank sited in our village can store 1,20,000 litres of water. The value may vary depending upon the population of your village.

Solution 4:

Water tanks for homes are available in various sizes and can be bought depending on your usage. The water tank at home can store 1500 litres of water.

Solution 5:

The pot used in homes can store 2 to 3litres of water.

Solution 6:

While shopping in the bazaar, the items are measured in the following units:

1. All the vegetables, grains, sugar, etc. are measured in units of kilogram.
2. To measure liquids like milk, kerosene, petrol, oil, etc. liters is used.

3. The mass of silver and gold ornaments is measured in milligram or gram.
4. In wholesale markets, grains and pulses are measured in quintals.

Solution 7:

Correct measurements are useful while purchasing items like grains, fruits, vegetables, milk, oil, etc. from the market. They also help in purchasing articles as per the measurement. For example if we know the length and breadth of a quilt to be stitched, we can know the area of the cloth required.