Measurement

Exercise-1

1. **(a)** 1 km = 1000 m

$\therefore$ 12 km = 12000 m

So, 12 km 400 m = (12000 + 400) m = 12400 m

(b) 1 m = 100 cm

$\therefore$ 45 m = 45 × 100 cm = 4500 cm

So, 45 m 20 cm = (4500 + 20) cm = 4520 cm

(c) 1 hm = 100 m

$\therefore$ 15 hm = 15 × 100 m = 1500 m

(d) 1 dam = 1000 cm

$\therefore$ 2 dam = 2000 cm

So, 2 dam 45 cm = (2000 + 45) cm = 2045 cm

(e) 1 g = 1000 mg

$\therefore$ 7.2 g = 7.2 × 1000 mg = 7200 mg

(f) 1 hg = 100 g

$\therefore$ 8 hg = 8 × 100 g = 800 g

So, 8 hg 40 g = (800 + 40) g = 840 g

(g) 1 kg = 1000 g

$\therefore$ 54 kg = 54 × 1000 g = 54000 g

So, 54 kg 800 g = (54000 + 800) g = 54800 g

(h) 1 g = 1000 mg

$\therefore$ 11 g = 11 × 1000 mg = 11000 mg

So, 11 g 900 mg = (11000 + 900) mg = 11900 mg

(i) 1 kℓ = 1000 ℓ

$\therefore$ 8 kℓ = 8 × 1000 ℓ = 8000 ℓ

(j) 45.5 ℓ = 45.5 × 1000 mℓ = 45500 mℓ

(k) 1 ℓ = 100 cℓ

$\therefore$ 25 ℓ = 25 × 100 cℓ = 2500 cℓ

So, 25 ℓ 15 cℓ = (2500 + 15) cℓ = 2515 cℓ

(l) 1 ℓ = 1000 mℓ

$\therefore$ $99\ \ell = 99000\ m\ell$

So, $99\ \ell\ 99\ m\ell = (99000 + 99)\ m\ell = 99099\ m\ell$

2. (a) $1\ m = 100\ cm \Rightarrow 1\ cm = \frac{1}{100}\ m = 0.01\ m$

$\therefore$ $725\ cm = 725 \times 0.01\ m = 7.25\ m$

(b) $1\ dam = 100\ dm \Rightarrow 1\ dm = \frac{1}{100}\ dam = 0.01\ dam$

$\therefore$ $3\ dam\ 80\ dm = 3\ dam + 80 \times 0.01\ dam$

$= 3\ dam + 0.8\ dam = 3.8\ dam$

(c) $1\ cm = 0.01\ m$

$\therefore$ $9\ m\ 76\ cm = 9\ m + 76 \times 0.01\ m$

$= 9\ m + 0.76\ m = 9.76\ m$

(d) $1\ km = 1000\ m \Rightarrow 1\ m = \frac{1}{1000}\ km = 0.001\ km$

$\therefore$ $978\ m = 978 \times 0.001\ km = 0.978\ km$

(e) $1\ dg = 100\ mg \Rightarrow 1\ mg = \frac{1}{100}\ dg = 0.01\ dg$

$\therefore$ $1575\ mg = 1575 \times 0.01\ dg = 15.75\ dg$

(f) $1\ g = 1000\ mg \Rightarrow 1\ mg = \frac{1}{1000}\ g = 0.001\ g$

$\therefore 15\ g\ 950\ mg = 15\ g + 950 \times 0.001\ g = 15\ g + 0.95\ g = 15.95\ g$

(g) $8505\ mg = 8505 \times 0.001\ g = 8.505\ g$

(h) $1\ kg = 1000\ g \Rightarrow 1\ g = \frac{1}{1000}\ kg = 0.001\ kg$

$\therefore$ $2850\ g = 2850 \times 0.001\ kg = 2.85\ kg$

(i) $1\ da\ell = 100\ d\ell \Rightarrow 1\ d\ell = \frac{1}{100}\ da\ell = 0.01\ da\ell$

$\therefore$ $3\ da\ell\ 50\ d\ell = 3\ da\ell + 50 \times 0.01\ da\ell$

$= 3\ da\ell + 0.5\ da\ell = 3.5\ da\ell$

(j) $1\ k\ell = 1000\ \ell \Rightarrow 1\ \ell = 0.001\ k\ell$

$\therefore$ $2950\ \ell = 2950 \times 0.001\ k\ell = 2.95\ k\ell$

(k) $1\ \ell = 100\ c\ell \Rightarrow 1\ c\ell = \frac{1}{100}\ \ell = 0.01\ \ell$

$\therefore$ $9\ \ell\ 38\ c\ell = 9\ \ell + 38 \times 0.01\ \ell = 9\ \ell + 0.38\ \ell = 9.38\ \ell$

(l) $1\ k\ell = 1000\ \ell \Rightarrow 1\ \ell = \frac{1}{1000}\ k\ell = 0.001\ k\ell$

$\therefore$ $735\ \ell = 735 \times 0.001\ k\ell = 0.735\ k\ell$

Exercise-2

1. **(a)** 9.61 kg + 6.75 kg

= 16.360 kg

$$\begin{array}{r} {\scriptstyle (1)\,(1)} \\ 9.61\ \text{kg} \\ +\ 6.75\ \text{kg} \\ \hline 16.36\ \text{kg} \end{array}$$

(b) Convert the given measures into kg using decimal notation,

1 g = 0.001 kg, 660 g = 0.66 kg, 85 g = 0.085 kg

∴ 9 kg 660 g = 9.66 kg, 18 kg 85 g = 18.085 kg

$$\begin{array}{r} {\scriptstyle (1)\ (1)} \\ 9.660\ \text{kg} \\ +\ 18.085\ \text{kg} \\ \hline 27.745\ \text{kg} \end{array}$$

∴ 9 kg 660 g + 18 kg 85 g = 27.745 kg

(c) 1 ℓ = 0.001 kℓ, 35 ℓ = 0.035 kℓ, 10 ℓ = 0.010 kℓ

∴ 79 kℓ 35 ℓ = 79.035 kℓ

95 kℓ = 95.000 kℓ

80 kℓ 10 ℓ = 80.010 kℓ

$$\begin{array}{r} {\scriptstyle (2)\,(1)} \\ 79.035\ \text{k}\ell \\ 95.000\ \text{k}\ell \\ +\ 80.010\ \text{k}\ell \\ \hline 254.045\ \text{k}\ell \end{array}$$

So, 79 kℓ 35 ℓ + 95 kℓ + 80 kℓ 10 ℓ = 254.045 kℓ

(d) 1 mm = 0.1 cm, 8 mm = 0.8 cm, 6 mm = 0.6 cm, 5 mm = 0.5 cm

∴ 9 cm 8 mm = 9.8 cm

6 mm = 0.6 cm

10 cm 5 mm = 10.5 cm

$$\begin{array}{r} {\scriptstyle (1)\,(1)} \\ 9.8\ \text{cm} \\ 0.6\ \text{cm} \\ +\ 10.5\ \text{cm} \\ \hline 20.9\ \text{cm} \end{array}$$

∴ 9 cm 8 mm + 6 mm + 10 cm 5 mm = 20.9 cm

(e) 1 m = 0.001 km, 63 m = 0.063 km

∴ 85.93 km + 63 m = 85.993 km

$$\begin{array}{r} 85.930\ \text{km} \\ +\ 0.063\ \text{km} \\ \hline 85.993\ \text{km} \end{array}$$

(f) 1 mℓ = 0.001 ℓ, 65 mℓ = 0.065 ℓ, 90 mℓ = 0.090 ℓ, 86 mℓ = 0.086 ℓ

∴ 99 ℓ 65 mℓ = 99.065 ℓ

90 mℓ = 0.090 ℓ

10 ℓ 86 mℓ = 10.086 ℓ

∴ 99 ℓ 65 mℓ + 90 mℓ + 10 ℓ 86 mℓ = 109.241 ℓ

	①	②①
	99.065	ℓ
	0.090	ℓ
+	10.086	ℓ
	109.241	ℓ

2. (a) 9.69 kg − 6.75 kg

= 2.94 kg

	⑧	⑯
	~~9.6~~9	kg
−	6.75	kg
	2.94	kg

(b) 1 m = 0.001 km, 625 m = 0.625 km, 125 m = 0.125 km

∴ 10 km 625 m = 10.625 km

12 km 125 m = 12.125 km

∴ 12 km 125 m − 10 km 625 m = 1.500 km

	①	⑪
	12.~~1~~25	km
−	10.625	km
	1.500	km

(c) 1 cm = 0.01 m, 89 cm = 0.89 m, 5 cm = 0.05 m

∴ 2 m 5 cm = 2.05 m

2 m 5 cm − 89 cm = 1.16 m

		①	
	①	⑩	⑮
	2	~~.0~~	~~5~~ m
−	0	. 8	9 m
	1	. 1	6 m

(d) 1 mℓ = 0.001 ℓ, 56 mℓ = 0.056 ℓ

∴ 10 ℓ 56 mℓ = 10.056 ℓ

20 ℓ = 20.000 ℓ

∴ 20 ℓ − 10 ℓ 56 mℓ = 9.944 ℓ

	⑨	⑨	⑨		
	①	⑩	⑩	⑩	⑩
	~~2~~	~~0~~	. ~~0~~	~~0~~	0 ℓ
−	10	. 0	5	6	ℓ
	9	. 9	4	4	ℓ

(e) 1 g = 0.001 kg, 390 g = 0.390 kg, 160 g = 0.160 kg

∴ 1 kg 160 g = 1.160 kg

∴ 1 kg 160 g − 390 g = 0.770 kg

		⑩	
	⑨	~~5~~	⑯
	~~1~~	~~.1~~	~~6~~0 kg
−	0	. 3	9 0 kg
	0	. 7	7 0 kg

(f) $1 \text{ mg} = 0.001 \text{ g}$, $690 \text{ mg} = 0.690 \text{ g}$, $150 \text{ mg} = 0.150 \text{ g}$

$\therefore$ $8 \text{ g } 690 \text{ mg} = 8.690 \text{ g}$

$20 \text{ g } 150 \text{ mg} = 20.150 \text{ g}$

$\therefore$ $20 \text{ g } 150 \text{ mg} - 8 \text{ g } 690 \text{ mg} = 11.460 \text{ g}$

$$\begin{array}{r} 20.150 \text{ g} \\ -\ 8.690 \text{ g} \\ \hline 11.460 \text{ g} \end{array}$$

3. Total length of the cloth $= 6 \text{ m } 25 \text{ cm} + 1 \text{ m } 75 \text{ cm} + 8 \text{ m } 50 \text{ cm}$

$= 6.25 \text{ m} + 1.75 \text{ m} + 8.50 \text{ m}$

$= 16.50 \text{ m}$

$$\begin{array}{r} 6.25 \text{ m} \\ 1.75 \text{ m} \\ +\ 8.50 \text{ m} \\ \hline 16.50 \text{ m} \end{array}$$

1 cm	= 0.01 m
25 cm	= 0.25 m
75 cm	= 0.75 m
50 cm	= 0.50 m

4. Total distance travelled by Ali $= 18 \text{ km } 200 \text{ m} + 12 \text{ km } 600 \text{ m} + 3 \text{ km } 425 \text{ m}$

$= 18.200 \text{ km} + 12.600 \text{ km} + 3.425 \text{ km}$

$= 34.225 \text{ km}$

$$\begin{array}{r} 18.200 \text{ km} \\ 12.600 \text{ km} \\ +\ 3.425 \text{ km} \\ \hline 34.225 \text{ km} \end{array}$$

1 m	= 0.001 km
200 m	= 0.200 km
600 m	= 0.600 km
425 m	= 0.425 km

5. Total weight of the fruits $= 4 \text{ kg } 200 \text{ g} + 2 \text{ kg } 800 \text{ g} + 5 \text{ kg } 750 \text{ g}$

$= 4.200 \text{ kg} + 2.800 \text{ kg} + 5.750 \text{ kg}$

$= 12.750 \text{ kg}$

$$\begin{array}{r} 4.200 \text{ kg} \\ 2.800 \text{ kg} \\ +\ 5.750 \text{ kg} \\ \hline 12.750 \text{ kg} \end{array}$$

1 g	= 0.001 kg
200 g	= 0.200 kg
800 g	= 0.800 kg
750 g	= 0.750 kg

Thus, the total weight of fruits bought by Maya is 12.750 kg.

6. The weight of a box full of dry fruits $= 12.650 \text{ kg}$

The weight of dry fruits $= 9 \text{ kg } 800 \text{ g} = 9.800 \text{ kg}$

The weight of empty box $= (12.650 - 9.800) \text{ kg}$

$= 2.850 \text{ kg}$

$= 2.850 \times 1000 \text{ g}$

$= 2850 \text{ g}$

$$\begin{array}{r} 12.650 \text{ kg} \\ -\ 9.800 \text{ kg} \\ \hline 2.850 \text{ kg} \end{array}$$

7. Quantity of oil left $= 7\ \ell - 2\ \ell\ 355\ m\ell$

$= 7\ \ell - 2.355\ \ell$

$= 4.645\ \ell$

$= 4\ \ell\ 645\ m\ell$

$1\ m\ell$	$= 0.001\ \ell$
$355\ m\ell$	$= 0.355\ \ell$

8. Quantity of water left in the tank at the end of the day

$= 300\ \ell - 87\ \ell\ 225\ m\ell$

$= 300\ \ell - 87.225\ \ell$

$= 212.775\ \ell$

$= 212\ \ell\ 775\ m\ell$

$1\ m\ell$	$= 0.001\ \ell$
$225\ m\ell$	$= 0.225\ \ell$

Exercise-3

1. The length of cloth required to make one shirt $= 2\ m\ 40\ cm$

∴ The length of cloth required to make 10 shirts $= 2\ m\ 40\ cm \times 10$

$= 2.40\ m \times 10$

$= 24\ m$

Thus, 24 m cloth is required to make 10 shirts.

2. The total weight of 7 tins of biscuits $= 1\ kg\ 750\ g \times 7$

$= 1.750\ kg \times 7$

$= 12.250\ kg$

3. The length of the ribbon $= 8\ m\ 54\ cm = 8.54\ m$

It is cut into 7 equal pieces.

The length of each piece $= 8.54\ m \div 7 = \frac{854}{100}\ m \div 7$

$1\ cm$	$= 0.01\ m$
$54\ cm$	$= 0.54\ m$

$= \left(\frac{854}{100} \div 7\right) m = \left(\frac{\cancel{854}^{122}}{100} \times \frac{1}{\cancel{7}}\right) m = \frac{122}{100}\ m$

$= 1.22\ m$

Thus, the length of each piece is 1.22 m.

4. The quantity of rice, each family will get $= 48\ kg\ 700\ g \div 5$

$= 48.700\ kg \div 5$

1 g	= 0.001 kg
700 g	= 0.700 kg

$= \left(\frac{48700}{1000} \div 5\right)$ kg $= \left(\frac{\overset{9740}{\cancel{48700}}}{1000} \times \frac{1}{\cancel{5}}\right)$ kg

$= \frac{9740}{1000}$ kg $= 9.740$ kg

5. Total quantity of soup $= 8\,\ell\ 785\,m\ell$

$= 8.785\,\ell$

It was distributed equally among 7 people.

The quantity of soup was given to each person $= 8.785\,\ell \div 7$

1 mℓ	= 0.001 ℓ
785 mℓ	= 0.785 ℓ

$= \left(\frac{8785}{1000} \div 7\right)\ell = \left(\frac{\overset{1255}{\cancel{8785}}}{1000} \times \frac{1}{\cancel{7}}\right)\ell$

$= \frac{1255}{1000}\ell = 1.255\,\ell = 1\,\ell\ 255\,m\ell$

Thus, $1\,\ell\ 255\,m\ell$ soup was given to each person.

Review Exercise

1. (a) $9.325\text{ kg} = 9.325 \times 1000\text{ g} = 9325\text{ g}$

(b) $14\,\ell\ 525\,m\ell = 14\,\ell + 525 \times 0.001\,\ell$

$= 14\,\ell + 0.525\,\ell$

$= 14.525\,\ell$

1 mℓ	= 0.001 ℓ
525 mℓ	= 0.525 ℓ

(c) $1\text{ dam} = \frac{1}{100}\text{ km} = 0.01\text{ km}$

$\therefore\ 5\text{ km }25\text{ dam} = (5 + 25 \times 0.01)\text{ km}$

$= (5 + 0.25)\text{ km} = 5.25\text{ km}$

(d) $1\,\ell = \frac{1}{1000}\,k\ell = 0.001\,k\ell$

$\therefore\ 7365\,\ell = 7365 \times 0.001\,k\ell = 7.365\,k\ell$

(e) $23\text{ km }50\text{ m} = (23 \times 1000 + 50)\text{ m} = (23000 + 50)\text{ m} = 23050\text{ m}$

(f) $1\text{ cm} = 0.01\text{ m}$

$\therefore\ 9356\text{ cm} = 9356 \times 0.01\text{ m} = 93.56\text{ m}$

2. The distance covered by bus in 1 hour = 122 km 100 m ÷ 6

1 m	= 0.001 km
100 m	= 0.100 km

$= \left(\frac{1221}{10} \div 6\right)$ km $= \left(\frac{1221}{10} \times \frac{1}{6}\right)$ km

= 122.1 km ÷ 6

= 20.35 km

3. The total weight of the items = 10 kg 400 g + 15 kg 500 g + 4 kg 600 g

1 g	= 0.001 kg
400 g	= 0.400 kg
500 g	= 0.500 kg
600 g	= 0.600 kg

= 10.400 kg + 15.500 kg + 4.600 kg

= 30.5 kg

$$\begin{array}{r} {\scriptstyle (1)\,(1)} \\ 10.400 \text{ kg} \\ 15.500 \text{ kg} \\ +\ 4.600 \text{ kg} \\ \hline 30.500 \text{ kg} \end{array}$$

Thus, Mrs Anwar bought 30.5 kg of the items.

4. The mango juice bought by Rohini = 5.5 ℓ

The mango juice consumed = 3 ℓ 925 mℓ = 3.925 ℓ

The quantity of juice left = 5.5 ℓ − 3.925 ℓ

= 1.575 ℓ

1 mℓ	= 0.001 ℓ
925 mℓ	= 0.925 ℓ

$$\begin{array}{r} {\scriptstyle (14)\,(9)} \\ {\scriptstyle (4)\ (4)\,(10)\,(10)} \\ \cancel{5}.\cancel{5}\cancel{0}\cancel{0}\ \ell \\ -\ 3.925\ \ell \\ \hline 1.575\ \ell \end{array}$$

The quantity of juice left with Rohini is 1.575 ℓ.

HOTS

A box has 4 red bottles, 5 blue bottles and 3 green bottles of capacity 500 mℓ, 625 mℓ and 750 mℓ respectively.

(a) 4 red bottles each of capacity 500 mℓ.

∴ Total capacity of 4 red bottles = 4 × 500 mℓ

= 2000 mℓ

5 blue bottles each of capacity 625 mℓ.

∴ Total capacity of 5 blue bottles = 5 × 625 mℓ

= 3125 mℓ

3 green bottles each of capacity 750 mℓ.

$\therefore$ Total capacity of 3 green bottles $= 3 \times 750\ m\ell$

$= 2250\ m\ell$

So, the individual capacity of red, blue and green bottles are 2000 $m\ell$, 3125 $m\ell$ and 2250 $m\ell$ respectively.

(b) Total capacity of all bottles $= 2000\ m\ell + 3125\ m\ell + 2250\ m\ell$

$= 7375\ m\ell$

$= 7375 \times 0.001\ \ell$

$= 7.375\ \ell$

Thus, the total capacity of all bottles in the box is 7.375 ℓ.