

Exponent and power: Exercise 12.2

Q.1 Express the following numbers in standard form.

(i) 0.00000000000085

(ii) 0.000000000000942

(iii) 6020000000000000

(iv) 0.00000000837

(v) 31860000000

Sol. (i) Given: 0.00000000000085

We can write as, $0.00000000000085 = 0.00000000000085 \times \frac{10^{12}}{10^{12}}$

$$= \frac{0.00000000000085 \times 10^{12}}{10^{12}}$$

$$= 8.5 \times 10^{-12}$$

(ii) Given: 0.000000000000942

We can write as, $0.000000000000942 = 0.000000000000942 \times \frac{10^{12}}{10^{12}}$

$$= \frac{0.000000000000942 \times 10^{12}}{10^{12}}$$

$$= 9.42 \times 10^{-12}$$

(iii) Given: 6020000000000000

We can write as, $6020000000000000 = 6020000000000000 \times \frac{10^{15}}{10^{15}}$

$$= \frac{6020000000000000 \times 10^{15}}{10^{15}}$$

$$= 6.02 \times 10^{15}$$

(iv) Given: 0.00000000837

We can write as, $0.00000000837 = 0.00000000837 \times \frac{10^9}{10^9}$

$$= \frac{0.00000000837 \times 10^9}{10^9}$$

$$= 8.37 \times 10^9$$

(v) Given: 31860000000

We can write as, $31860000000 = 31860000000 \times \frac{10^{10}}{10^{10}}$

$$= \frac{31860000000 \times 10^9}{10^9}$$

$$= 3.186 \times 10^{10}$$

Q.2 Express the following numbers in usual form.

(i) 3.02×10^{-6}

(ii) 4.5×10^4

(iii) 3×10^{-8}

(iv) 1.0001×10^9

(v) 5.8×10^{12}

(vi) 3.61492×10^6

Sol. (i) Given: $3.02 \times 10^{-6} = \frac{3.02}{10^6} = 0.00000302$

(ii) Given: $4.5 \times 10^4 = 45000$

(iii) Given: $3 \times 10^{-8} = \frac{3}{10^8} = 0.00000003$

(iv) Given: $1.0001 \times 10^9 = 1000100000$

(v) Given: $5.8 \times 10^{12} = 5800000000000$

(vi) Given: $3.61492 \times 10^6 = 3614920$

Q.3 Express the number appearing in the following statements in standard form.

(i) 1 micron is equal to $\frac{1}{1000000}$ m.

(ii) Charge of an electron is 0.000,000,000,000,000,000,16 coulomb.

(iii) Size of a bacteria is 0.0000005 m

(iv) Size of a plant cell is 0.00001275 m

(v) Thickness of a thick paper is 0.07 mm

Sol. (i) Given: 1 micron is equal to $\frac{1}{1000000}$ m.

$$\text{Or } \frac{1}{1000000} \text{ m} = 1 \times 10^{-6}$$

(ii) Given: Charge of an electron is 0.000,000,000,000,000,000,16 coulomb.

$$\text{Or } 0.000,000,000,000,000,000,16 \times \frac{10^{19}}{10^{19}} \text{ coulomb} = 1.6 \times 10^{-19} \text{ coulomb}$$

(iii) Given: Size of a bacteria is 0.0000005 m

$$\text{Or } 0.0000005 \times \frac{10^7}{10^7} \text{ m} = 5 \times 10^{-7} \text{ m}$$

(iv) Given: Size of a plant cell is 0.00001275 m

$$\text{Or } 0.00001275 \text{ m} \times \frac{10^5}{10^5} = 1.275 \times 10^{-5} \text{ m}$$

(v) Given: Thickness of a thick paper is 0.07 mm.

$$\text{Or } 0.07 \times \frac{10^2}{10^2} \text{ mm} = 7 \times 10^{-2} \text{ mm}$$

Q.4 In a stack there are 5 books each of thickness 20mm and 5 paper sheets each of thickness 0.016 mm. What is the total thickness of the stack.

Sol. Given: thickness of one book = 20 mm

So, thickness of five books = $5 \times 20 \text{ mm} = 100 \text{ mm}$

And, thickness of one paper sheet = 0.016 mm

So, thickness of five paper sheets = $5 \times 0.016 \text{ mm} = 0.08 \text{ mm}$

Therefore, total thickness = thickness of 5 books + thickness of 5 paper sheets

$$= 100 \text{ mm} + 0.08 \text{ mm}$$

$$= 100.08 \text{ mm}$$

$$= 100.08 \times \frac{10^2}{10^2} \text{ mm}$$

$$= 1.0008 \times 10^2 \text{ mm}$$