

**CHAPTER – 12**  
**EXPONENTS AND POWERS**  
**EXERCISE – 12.2**

**Question – 1**

Express the following numbers in standard form.

- (i) 0.00000000000085
- (ii) 0.000000000000942
- (iii) 6020000000000000
- (iv) 0.00000000837
- (v) 31860000000

Answer:

- (i)  $0.00000000000085 = 85 \times 10^{-13} = 8.5 \times 10^{-12}$
- (ii)  $0.000000000000942 = 942 \times 10^{-14} = 9.42 \times 10^{-12}$
- (iii)  $6020000000000000 = 602 \times 10^{13} = 6.02 \times 10^{15}$
- (iv)  $0.00000000837 = 837 \times 10^{-11} = 8.37 \times 10^{-9}$
- (v)  $31860000000 = 3186 \times 10^7 = 3.186 \times 10^{10}$

**Question – 2**

Express the following numbers in usual form.

- (i)  $3.02 \times 10^{-6}$
- (ii)  $4.5 \times 10^4$
- (iii)  $3 \times 10^{-8}$
- (iv)  $1.0001 \times 10^9$

(v)  $5.8 \times 10^{12}$

(vi)  $3.61492 \times 10^6$

Answer:

**We know by simple indices that:**

**$a^m = a \times a \times a \times a \dots m \text{ times}$**

**So,  $2^5 = 2 \times 2 \times 2 \times 2 \times 2$**

**And also that**

$$(a)^{-m} = \frac{1}{a \times a \times a \dots m \text{ times}}$$

(i)

$$3.02 \times 10^{-6} = 3.02 \times \frac{1}{1000000}$$

*Place the decimal behind the digit of 3.02 up to how many zeroes are there in denominator*

$$3.02 \times 10^{-6} = 0.00000302$$

(ii)

$$4.5 \times 10^4 = 4.5 \times 10000$$

*Now place the decimal after the digits up to the number of zeroes*

$$4.5 \times 10^4 = 45000$$

(iii)  $3 \times 10^{-8} = 3/100000000 = .00000003$

(iv)  $1.001 \times 10^9 = 1.0001 \times 1000000000 = 1000100000$

(v)  $5.8 \times 10^{12} = 5.8 \times 1000000000000 = 5800000000000$

$$(vi) 3.61492 \times 10^6 = 3.61492 \times 1000000 = 3614920$$

### Question – 3

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

$$(i) 1 \text{ micron is equal to } \frac{1}{10000000} m$$

(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

Answer:

$$(i) 1 \text{ Micron} = 10^{-6} m$$

$$(ii) 0.000,000,000,000,000,000,16 \text{ Coulomb}$$

$$= 16/1000000000000000000$$

$$= 16 \times 10^{-18} = 1.6 \times 10^{-19} \text{ Coulomb}$$

$$(iii) 0.0000005 m$$

$$= 5/10000000 = 5 \times 10^{-7} m$$

$$(iv) 0.00001275 m$$

$$= 1275 / 100000000 = 1275 \times 10^{-8}$$

$$= 1.275 \times 10^{-5}$$

$$(v) 0.07 \text{ mm}$$

$$= 7/100 \text{ mm} = 7 \times 10^{-2} \text{ mm}$$

#### **Question – 4**

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

Answer:

Thickness of 1 book = 20 mm

Thickness of 5 books =  $5 \times 20 \text{ mm} = 100 \text{ mm}$

Thickness of 1 page = 0.016 mm

Thickness of 5 pages =  $5 \times 0.016 = 0.08 \text{ mm}$

Total Thickness = Thickness of 5 books + Thickness of 5 pages

Total Thickness =  $100 + 0.08$

Total Thickness = 100.08 mm