Unit 3

Logarithms

Exercise 3.1

Q1. Express each of the following numbers in scientific notation.

(1) 5700 **(2) 49,800,000**

(3) 96,000,000 **(4) 416.9**

(5) 83,000 **(6) 0.00643**

(7) 0.0074 **(8) 60,000,000**

(9) 0.00000000395 **(10)** $\frac{275,000}{0.0025}$

Note:

A number written in the form $a \times 10^n$,where $1 \leq a \geq 10$ and n is an integer, is called scientific notation.

Solution:

1) 5700

$$\frac{5700}{1000} \times 1000 = 5.70 \times 10^3$$

2) 49,800,000

$$\frac{49,800,000}{10000000} \times 10000000 = 4.98 \times 10^7$$

3) 96,000,000

$$\frac{96,000,000}{10000000} \times 10000000 = 9.6 \times 10^7$$

4) 416.9

$$\frac{416.9}{10} = 4169 \times 10^{-1}$$

5) 83,000

$$\frac{83{,}000}{10000} \times 10000 = 8.3 \times 10^4$$

6) 0.00643

$$\frac{0.00643}{100000} \times 643 \times 10^{-5}$$

$$\frac{643}{100} \times 100 \times 10^{-5} = 6.43 \times 10^{2-5} = 6.43 \times 10^{-3}$$

7) 0.0074

$$\frac{0074}{10000} = 74 \times 10^{-4}$$

$$\frac{74}{10} = 10 \times 10^{-4} = 7.4 \times 10^{1-4} = 7.4 \times 10^{-3}$$

8) 60,000,000

$$\frac{60000000}{10000000} \times 10000000 = 6.0 \times 10^7$$

9) 0.00000000395

$$\frac{00000000395}{100000000000} = 395 \times 10^{-11}$$

$$\frac{395}{100} \times 100 \times 10^{-11} = 3.95 \times 10^{2-11} = 3.95 \times 10^{-9}$$

10) $\frac{275{,}000}{0{,}0025}$

$$= \frac{275{,}000}{0{,}0025}$$

$$= \frac{275 \times 10^3}{25 \times 10^{-4}}$$

$$= 11 \times 10^{3+4}$$

$=1.1 \times 10^8$

Q2 Express the following numbers in ordinary notation

(1) 6.4×10^{-4}

(2) 5.06×10^{10}

(3) 9.018×10^{-6}

(4) 7.865×10^8

Solution:

1) 6.4×10^{-4}

$6.4 \times 10^{-4} = \frac{6}{10^{10}}$

$\frac{6}{10000} = 0.0006$

2) 5.06×10^{10}

5.06×10^{10}

$= \frac{506}{100} \times 10^{10} = 506 \times 10^{10-2}$

$506 \times 10^8 = 50{,}600{,}000{,}000$

3) 9.018×10^{-6}

$= \frac{9.018}{1000} \times 10^{-6} = 9018 \times 10^{-6-3}$

$= 9018 \times 10^{-9} = \frac{9018}{100000000}$

$= 0.000009018$

4) 7.865×10^8

$$= \frac{7.865}{1000} \times 10^8 = 7865 \times 10^{8-3}$$

$$= 7865 \times 10^5 = 785{,}500{,}000$$