Exercise 3.2

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

(1) 232.92 **(2) 29.326**

(3) 0.00032 **(4) 0.3206**

Solution:

(1) 232.92

232.92 can be rounded off as 232.9. The characteristic is 2 as there are 3 digits.

To find mantissa we follow the row of 23 and reach the column of 2 to get 3655. In the same row in the difference column of 9 we see 17. Add 3655 and 17 and get mantissa .3672

So, log 232.92 = 2.3672

(2) 29.326

29.326 can be rounded off as 29.33. The characteristic is 1 as there are 2 digits.

To find mantissa we follow the row of 29 and reach the column of 3 to get 4669. In the same row in the difference column of 3 we see 4. add 4669 and 4 to get mantissa .4673.

So, log 29.326 = 1.4673

(3) 0.00032

$\bar{4}$ to find mantissa we follow the row of 32 and reach the column of 0 to get 5051.so mantissa is 0.5051

So, log 0.00032 = $\bar{4}$ .5051

(4) 0.3206

The characteristics is -1 as which is written as

$\bar{1}$. To find the mantissa we follow the row of 32 and reach the column if 0 to get 505. In the same row in the difference column of 6 we see 8. Add 5051 and to get mantissa 0.505

So, log 0.3206 = $\bar{1}$.5059

Q2 If 31.09 or 1.4962. Find values of the following.

1) 31.09

2) 310.9

3) 0.003109

4) 0.3109

Solution:

1) 31.09

Given log 31.09 =1.4926

in log 3.109 the characteristics is 0 and mantissa is 0.4926

So, log 310.9 =0.4926

in log 310.9 the characteristics is 2 and mantissa is 0.4926

So, log 310.9 = 2.4926

3) 0.003109

in log 0.003109 the characteristics is

$\bar{3}$ and mantissa is 0.4926

So, log 0.003109 = $\bar{3}$.4926

4) 0.3109

in log 0.3109 the characteristics is

$\bar{1}$ and mantissa is 0.4926

So, log 0.3109= $\bar{1}$.4926

Q3. Find the numbers whose common logarithm are

(1) 3.5621

(2) 1.7427

Solution:

(i) 3.5621

Reading along the row corresponding to .56. we get 3648 at the intersection of this row and the column of 2. the number the intersection of this row and the mean difference column of 1 is 1.

Adding 3648 and 1 we get 3649.

Since the characteristics is 3 the number has four digits.

(ii) 1.7427

Reading along the row corresponding to 74 we get 5521 at the intersection of this row and the column of 2. The number at the intersection of this row and the mean difference column of 7 is 9.

Adding 5521 and 9 we get 5530.

Since the characteristics is 1.

So, the required number is 0.5530

Q4. What replacement for the unknown in each of following will make the statemen true?

(1) $log_3 81 = L$

(2) $log_a 6 = 0.5$

(3) $log_5 n = 2$

(4) $10^p = 4$

Solution:

(1) $log_3 81 = L$

$$3^L = 8$$

$$3^L = 3^4$$

$$L=4$$

(2) $log_a 6 = 0.5$

$a^{1/2} = 6$

$\sqrt{a}=6$

$a=36$

(3) $log_5 n = 2$

$5^2 = n$

$n=25$

(4) $10^p = 4$

Taking log on both sides

$Log10^p = log4$

$Plog10=log4$

$Px1=0.6021$

$P=0.62021$

Q5. Evaluate.

(i) $Log2\frac{1}{128} = x$

(ii) Log 512 to the base $2\sqrt{2}$

Solution:

(i) $Log2\frac{1}{128} = x$

exponential form

$$2^x = \frac{1}{128}$$

$$2^x = \frac{1}{128}$$

$$2^x = 2^{-7}$$

$$x = -7$$

(ii) Log 512 to the base $2\sqrt{2}$

exponential form:

$$(\sqrt[2]{2})^x = 512$$

$$(2 \times 2^{\frac{1}{2}})^x = 2^9$$

$$(2^{\frac{3}{2}})^x = 2^9$$

$$2^{\frac{3x}{2}} = 2^9$$

$$\left(1 + \frac{1}{2} = \frac{3}{2}\right)$$

$$\frac{3x}{2} = 9$$

$$x = \frac{9 \times 2}{3}$$

$$= \frac{18}{3}$$

$$= 6$$

Q6. Find the value of x from the following statement.

i. $\log_2 x = 5$

ii. $\log_8 19 = x$

iii. $\log_{64} 8 = \frac{x}{2}$

v. $\log_3 x = 4$

Solution:

(i) $\log_2 x = 5$

$(2)^5 = x$

$x = 32$

(ii) $\log_{81} 9 = x$

$(81)^x = 9$

$(9^2)^x = 9$

$9^{2x} = 9^1$

$2x = 1$

$x = \frac{1}{2}$

(iii) $\log_{64} 8 = \frac{x}{2}$

$(64)^{x/2} = 8$

$(8^2)^{x/2} = 8$

$8^x = 8^1$

$x = 1$

(iv) $\log_x 64 = 2$

$(x)^2 = 64$

$x^2 = 8^2$

(v) $\log_3 x = 4$

$(3)^4 = x$

$x = 3^4$

$x = 81$