Chapter # 2

LOGARITHMS

Exercise # 2.3

Question # 1: Find characteristic of the following numbers.

Characteristic is power of 10 when a number is in scientific notation
Mantissa is 'log' of coefficient/decimal part, of number in scientific notation

		Rough Work
(i) **5287**		
Characteristic $= 3$ (Answer)		5.287×10^3
(ii) **59.28**		
Characteristic $= 1$ (Answer)		5.928×10^1
(iii) **0.0567**		
Characteristic $= -2$ (Answer)		5.67×10^{-2}
(iv) **234.7**		
Characteristic $= 2$ (Answer)		2.347×10^2
(v) **0.000049**		
Characteristic $= -5$ (Answer)		4.9×10^{-5}
(vi) **145000**		
Characteristic $= 5$ (Answer)		1.45×10^5

Question # 2: Find logarithm of the following numbers.

$$\because \ log(Number) = Characteristic + Mantissa$$

Rough Work

(i) **43**

Characteristic $= 1$ Mantissa $= 0.6335$ $\qquad 4.3 \times 10^1$
$\log 43 = 1 + 0.6335$
$\log 43 = 1.6335$ (Answer)

(ii) **579**

Characteristic $= 2$ Mantissa $= 0.7627$ $\qquad 5.79 \times 10^2$
$\log 579 = 2 + 0.7627$
$\log 579 = 2.7627$ (Answer)

(iii) **1.982**

Characteristic $= 0$ Mantissa $= 0.2971$ $\qquad 1.982 \times 10^0$
$\log 1.982 = 0 + 0.2971$
$\log 1.982 = 0.2971$ (Answer)

(iv) **0.0876**

Characteristic $= -2$ Mantissa $= 0.9425$ $\qquad 8.76 \times 10^{-2}$
$\log 0.0876 = -2 + 0.9425$
$\log 0.0876 = -1.0575$ (Answer)

(v) **0.047**

Characteristic $= -2$ Mantissa $= 0.6721$ $\qquad 4.7 \times 10^{-2}$
$\log 0.047 = -2 + 0.6721$

$\log 0.047 = -1.3279$ (Answer)

(vi) 0.000354

Characteristic $= -4$ Mantissa $= 0.5490$

$\log 0.000354 = -4 + 0.5490$

$\log 0.000354 = -3.4510$ (Answer)

3.54×10^{-4}

Question # 3: If $log 3.177 = 0.5019$, then find:

Rough Work

(i) $\log 3177$

Characteristic $= 3$ Mantissa $= 0.5019$

$\log 3177 = 3 + 0.5019$

$\log 3177 = 3.5019$ (Answer)

3.177×10^{3}

(ii) $\log 31.77$

Characteristic $= 1$ Mantissa $= 0.5019$

$\log 31.77 = 1 + 0.5019$

$\log 31.77 = 1.5019$ (Answer)

3.177×10^{1}

(iii) $\log 0.03177$

Characteristic $= -2$ Mantissa $= 0.5019$

$\log 0.03177 = -2 + 0.5019$

$\log 0.03177 = -1.4981$ (Answer)

3.177×10^{-2}

Question # 4: Find the value of x.

(i) $\log x = 0.0065$

Characteristic $= 0$ Mantissa $= 0.0065$

$x = antilog\ (0.0065)$

$x = 1.015$ (Answer)

(ii) $\log x = 1.192$

Characteristic $= 1$ Mantissa $= 0.192$

$x = antilog\ (0.192)$

$x = 1.556$ $(Due\ to\ Charac = 1)$

$x = 15.56$ (Answer)

(iii) $\log x = -3.434$

Adding and subtracting '4'

$\log x = -4 + 4 - 3.434$

$\log x = -4 + 0.566$

Characteristic $= -4$ Mantissa $= 0.566$

$x = antilog\ (0.566)$

$x = 3.6813$ $(Due\ to\ Charac = -4)$

$x = 0.0003681$ (Answer)

(iv) $\log x = -1.5726$

Adding and subtracting '2'

$\log x = -2 + 2 - 1.5726$

$\log x = -2 + 0.4274$

Characteristic $= -2$ Mantissa $= 0.4274$

$x = antilog\ (0.4274)$

$x = 2.6755$ $(Due\ to\ Charac = -2)$
$x = 0.02675$ (Answer)

(v) $\log x = 4.3561$
Characteristic $= 4$ Mantissa $= 0.3561$
$x = antilog\ (0.3561)$
$x = 2.2704$ $(Due\ to\ Charac = 4)$
$x = 22704$ (Answer)

(vi) $\log x = -2.0184$
Adding and subtracting '3'
$\log x = -3 + 3 - 2.0184$
$\log x = -3 + 0.9816$
Characteristic $= -3$ Mantissa $= 0.9816$
$x = antilog\ (0.9816)$
$x = 9.5852$ $(Due\ to\ Charac = -3)$
$x = 0.009585$ (Answer)

Alternative Method (Question # 4)

(i) $\log x = 0.0065$
Taking 'Antilog' on both sides
$Antilog\ logx = Antilog\ (0.0065)$
          $x = 1.015$

(iii) $\log x = -3.434$
Taking 'Antilog' on both sides
$Antilog\ logx = Antilog\ (-3.434)$
          $x = 0.0003681$

(v) $\log x = 4.3561$
Taking 'Antilog' on both sides
$Antilog\ logx = Antilog\ (4.3561)$
          $x = 22704$

(ii) $\log x = 1.192$
Taking 'Antilog' on both sides
$Antilog\ logx = Antilog\ (1.192)$
          $x = 15.56$

(iv) $\log x = -1.5726$
Taking 'Antilog' on both sides
$Antilog\ logx = Antilog\ (-1.5726)$
          $x = 0.02675$

(vi) $\log x = -2.0184$
Taking 'Antilog' on both sides
$Antilog\ logx = Antilog\ (-2.0184)$
          $x = 0.009585$