Chapter # 2

LOGARITHMS

Exercise # 2.2

Question # 1: Express each of the following in logarithmic form.

(i) $10^3 = 1000$

$\log_{10} 1000 = 3$ (Ans)

(ii) $2^8 = 256$

$\log_2 256 = 8$ (Ans)

(iii) $3^{-3} = \frac{1}{27}$

$\log_3 \frac{1}{27} = -3$ (Ans)

(iv) $20^2 = 400$

$\log_{20} 400 = 2$ (Ans)

(v) $16^{-\frac{1}{4}} = \frac{1}{2}$

$\log_{16} \frac{1}{2} = -\frac{1}{4}$ (Ans)

(vi) $11^2 = 121$

$\log_{11} 121 = 2$ (Ans)

(vii) $p = q^r$

$q^r = p$

$\log_q p = r$ (Ans)

(viii) $(32)^{\frac{-1}{5}} = \frac{1}{2}$

$\log_{32} \frac{1}{2} = \frac{-1}{5}$ (Ans)

Question # 2: Express each of the following in exponential form.

(i) $\log_5 125 = 3$

$5^3 = 125$ (Ans)

(ii) $\log_2 16 = 4$

$2^4 = 16$ (Ans)

(iii) $\log_{23} 1 = 0$

$23^0 = 1$ (Ans)

(iv) $\log_5 5 = 1$

$5^1 = 5$ (Ans)

(v) $\log_2 \frac{1}{8} = -3$

$2^{-3} = \frac{1}{8}$ (Ans)

(vi) $\frac{1}{2} = \log_9 3$

$\log_9 3 = \frac{1}{2}$

$9^{\frac{1}{2}} = 3$ (Ans)

(vii) $5 = \log_{10} 100000$

$\log_{10} 100000 = 5$

$10^5 = 100000$ (Ans)

(viii) $\log_4 \frac{1}{16} = -2$

$4^{-2} = \frac{1}{16}$ (Ans)

Question # 3: Find the value of x in each of the following.

(i) $\log_x 64 = 3$

$x^3 = 64$

$x^3 = 4^3$

$x = 4$ (Ans)

4	64
4	16
4	4
	1

(ii) $\log_5 1 = x$

$5^x = 1$

$5^x = 5^0$

$x = 0$ (Ans)

(iii) $\log_x 8 = 1$

$x^1 = 8$

$x = 8$ (Ans)

(iv) $\log_{10} x = -3$

$10^{-3} = x$

OR,

$x = 10^{-3}$

$x = \frac{1}{10^3}$

$x = \frac{1}{1000}$ (Ans)

(v) $\log_4 x = \frac{3}{2}$

$4^{\frac{3}{2}} = x$

OR,

$x = 4^{\frac{3}{2}}$

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

$x = 2^3$

$x = 8$ (Ans)

(vi) $\log_2 1024 = x$

$2^x = 1024$

$2^x = 2^{10}$

$x = 10$ (Ans)

2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1