Exercise 2.2

Q No 2 :-

Convert the form of the following equations i.e. from exponential form to logarithmic form and vice versa

(i) $\log_6 216 = 3$

$6^3 = 216$

(ii) $7^4 = 2401$

$\log_7 2401 = 4$

(iii) $\log_5 x = 5$

$5^5 = x$

(iv) $b^{-3/4} = \frac{1}{27}$

$\log_{b^{\frac{x}{3}}} \frac{1}{27} = -\frac{3}{4}$

(v) $125^{\frac{x}{3}} = 25$

$\log_{125} 25 = \frac{x}{3}$

(vi) $\log_{10} 10^{12} = y$

$10^{y} = 10^{12}$

(vii) $(256)^{\frac{x}{4}} = \frac{1}{64}$

$\log_{256} \frac{1}{64} = \frac{x}{4}$

(viii) $\log_{3} (x^{3}+1) = 2$

$3^{2} = x^{3}+1$

(ix) $\log_{5} (2x-3) = 1$

$5^{1} = 2x-3$

(x) $2x+1 = 2^{3}$

$2^{3} = 2x+1$

$\log_{2} 2x+1 = 3$

Q3: Find the value of x in the following questions.

(i) $\log_x 3 = 1$

$x^1 = 3$

$\boxed{x = 3}$

(ii) $\log_{x+1} 9 = 2$

$(x+1)^2 = 9$

Taking Under Root on both sides

$\sqrt{(x+1)^2} = \sqrt{9}$

$x + 1 = 3$

$x = 3 - 1$

$\boxed{x = 2}$

(iii) $\log_3 81 = x$

$3^x = 81$

$3^x = 3 \times 3 \times 3 \times 3$

$3^x = 3^4$

3	81
3	27
3	9
3	3
	1

$x = 4$

(iv) $\log_2 64 = x+1$

$2^{x+1} = 64$

2	64
2	32
2	16
2	8
2	4
2	2
	1

$2^{x+1} = 2\times2\times2\times2\times2\times2$

$2^{x+1} = 2^6$

$x+1 = 6$

$x = 6-1$

$x = 5$

$\log_2 x = 4$

$2^4 = x$

$16 = x$

$x = 16$

$\log_2 (x^2-1) = 3$

$2^3 = x^2-1$

$8 = x^2-1$

$8+1 = x^2$

$9 = x^2$

$\sqrt{9} = \sqrt{x^2}$

$3 = x$

Q4: Find the unknowns appeared in the question 2

(i) $\log_5 x = 5$.

$5^5 = x$

$3125 = x$

$x = 3125$

(ii) $b^{-\frac{3}{4}} = \frac{1}{27}$

$b^{-3/4} = \frac{1}{3 \times 3 \times 3}$

3	27
3	9
3	3
	1

$b^{-3/4} = \frac{1}{3^3}$

$b^{-3/4} = 1 \times 3^{-3}$

$b^{-3/4} = 3^{-3}$

$b^{(1/4)^{-3}} = 3^{-3}$

$b^{1/4} = 3$

$b^{\frac{1}{4} \times 4} = 3^4$

$b = 81$ →

(iii) $125^{x/3} = 25$

$(5\times5\times5)^{x/3} = 5\times5$

$(5^3)^{\frac{x}{3}} = 5^2$

$5^x = 5^2$

$\boxed{x = 2}$

5	125
5	25
5	5
	1

(iv) $\log_{10} 10^{12} = y$

$10^y = 10^{12}$

$\boxed{y = 12}$

(v) $(256)^{\frac{x}{4}} = \frac{1}{64}$

$(4\times4\times4\times4)^{\frac{x}{4}} = \frac{1}{4\times4\times4}$

$4^{4\times\frac{x}{4}} = \frac{1}{4^3}$

$4^x = 4^{-3}$

$\boxed{x = -3}$

4	256
4	64
4	16
4	4
	1

4	64
4	16
4	4
	1

(vi) $\log_3 (x^3+1) = 2$

$3^2 = x^3 + 1$

$9 = x^3 + 1$

$9 - 1 = x^3$

$8 = x^3$

$\sqrt[3]{8} = \sqrt[3]{x^3}$

$2 = x$

$\boxed{x = 2}$

(vii) $\log_5 2x - 3 = 1$

$5^1 = 2x - 3$

$5 + 3 = 2x$

$8 = 2x$

$\frac{8}{2} = x$

$4 = x$

$\boxed{x = 4}$

(viii) $2x + 1 = 2^3$

$2x + 1 = 8$

$2x = 8 - 1$

$2x = 7$

$\boxed{x = \frac{7}{2}}$