DPP-4

1. $\log_2 \left(\frac{1}{7^{\log_7 0.125}}\right) = \log_2 \left(\frac{1}{0.125}\right) = \log_2 8 = 3$

2. $\log_{\frac{1}{6}} 2 \cdot \log_5 36 \cdot \log_{17} 125 \cdot \log_{2^{-1/2}} 17$

$\frac{\log 2}{\log \frac{1}{6}} \cdot \frac{\log 6^2}{\log 5} \cdot \frac{\log 5^3}{\log 17} \cdot \frac{\log 17}{\log 2^{-1/2}} = \frac{2 \times 3}{-1(\frac{-1}{2})} = 12$

3. $\log_3 x = t (x \ne 1)$

$\therefore \log_3 \left(\frac{t}{2}\right) = \frac{\log_3 t}{2}$

$2[\log_3 t - \log_3 2] = \log_3 t \quad \log_3 t = 2\log_3 2 = \log_3 4 \Rightarrow t = 4$

$\therefore \log_3 x = 4 \Rightarrow x = 3^4 = 81$

4. $\log_2 (\log_3 (\log_4 x)) = 0 \Rightarrow \log_3 (\log_4 x) = 1 \Rightarrow \log_4 x = 3 \Rightarrow x = 4^3 = 64$

$y = 2^3 = 8$ and $z = 2^4 = 16$]

5. $\log_3 (\log_2 a) - \log_3 (\log_2 \frac{1}{b}) = 1$

$\frac{\log_2 a}{\log_2 (\frac{1}{b})} = 3 \Rightarrow \log_2 a = -3\log_2 b \Rightarrow a = b^{-3} \Rightarrow ab^3 = 1.$]

6. $\log (x + y) = \log 2\sqrt{xy} \Rightarrow x + y - 2\sqrt{x}\sqrt{y} = 0 \Rightarrow x = y$]

7. $\log_{abc} \sqrt{bc} + \log_{abc} \sqrt{ca} + \log_{abc} \sqrt{ab} \quad \Rightarrow \log_{abc} abc = 1.$]

8. $x^{\log_2 3} = 3^{\log_2 X} = y \Rightarrow 6y = 162 \Rightarrow y = 27 = 3^{\log_2 X} = 3^3$
$\log_2 x = 3 \Rightarrow x = 8$ then $\log_4 8 = 3/2$

9. $S = 56 + \sqrt{56 + \sqrt{56 + \sqrt{56 + \cdots \ldots \infty}}}$

$S = 56 + \sqrt{S} \Rightarrow (\sqrt{S} - 8)(\sqrt{S} + 1) = 0$

$\sqrt{S} = 8$ or $\sqrt{S} = -1$ (Rejected)

$S = 64$

$t = \sqrt{64 \sqrt{64 \sqrt{64 \ldots \ldots \infty}}} \Rightarrow t = \sqrt{64t} \Rightarrow \sqrt{t} = 8 \Rightarrow t = 64 \Rightarrow \log_{4/3} \left(\frac{64}{64}\right) = 0$

10. [Ans. (A) S : (B) R ; (C) Q ; (D) P]