Logarithms

4

1m	2m	3m	4m	5m	Total
1(K)	–	1(U)	–	1(A)	9

1 MARK QUESTIONS

(Knowledge)

Express the following in logarithmic form.

1. $2^4 = 16$
2. $5^3 = 125$
3. $5^{-2} = 0.04$
4. $2^{-3} = \frac{1}{8}$
5. $9^2 = 81$
6. $6^2 = 36$
7. $2^{-5} = \frac{1}{32}$
8. $3^4 = 81$
9. $6^{-3} = \frac{1}{216}$
10. $10^2 = 100$

Express the following in exponential form.

11. $\log_5 25 = 2$
12. $\log_{10} 0.01 = -2$
13. $\log_2 ½ = -1$
14. $\log_3 27 = 3$
15. $\log_4 16 = 2$
16. $\log_2 0.625 = -4$
17. $\log_7 49 = 2$
18. $\log_2 16 = +4$
19. $\log_3 ⅓ = -1$
20. Find the value of $\log_2 8$.
21. Find the value of $\log_{\sqrt{3}} 27$.
22. Find the value of $\log_4 16$.
23. Solve for 'x' : $\log_x 625 = 4$.
24. Solve for 'x' : $\log_{0.1} 10 = x$.
25. Solve for 'x' : $\log_x 81 = 3$.
26. Solve for 'x' : $\log_x 48 = 3$.
27. Solve for 'x' : $\log_{\sqrt{3}} 81 = x$.

3 MARKS QUESTIONS

(Understanding)

1. Find the value of $\log\left(\frac{9}{8}\right) + \log\left(\frac{4}{9}\right) + \log\left(\frac{16}{4}\right)$.

2. $\log\left(\frac{12}{15}\right)+2\log\frac{6}{8}+\frac{1}{3}\log\frac{8}{27}$.

3. Find the value of $\log\frac{9}{5}+\log\frac{15}{9}-\log\frac{3}{2}$.

4. Find the value of $2\log\left(\frac{4}{7}\right)+\log\left(\frac{16}{49}\right)$.

5. Prove that $\log_{bc} a=\frac{\log_b a}{1+\log_b c}$.

6. Prove that $\left(\frac{1}{\log_b a}\right)\left(\frac{1}{\log_a b}\right)=1$.

7. Prove that $\log\sqrt{\frac{a}{b}}+\log\sqrt{\frac{b}{c}}+\log\sqrt{\frac{c}{a}}=0$.

8. If $\log_k x + \log_k y + \log_k z = 0$, show that $xyz = 1$.
9. Find the number of digits in the integral part of 5^{20}. **(Knowledge)**
10. Find the number of digits in the integral part of 3^{55}.
11. Find the number of digits in the integral part of 7^{44}.
12. Find the number of zeros between the decimal point and the first significant figure in (Part E) $(0.5)^{55}$
13. $(0.32)^{28}$ 14. $(0.73)^{46}$ 15. $(0.9)^{55}$

16. Prove that $\log_4 8.\log_2 32.\log_{16} 4 = \frac{15}{4}$. **(Understanding)**

17. Prove that $\log_y x^3.\log_x z^6.\log_z y^4 = 72$.

18. Prove that $\frac{1}{\log_2 4}+\frac{1}{\log_8 4}+\frac{1}{\log_{16} 4}=4$.

19. Show that $X^{\log y - \log z}.Y^{\log z - \log x}.Z^{\log x - \log y} = 1$.
20. Solve: $\log x+\log(x+1)=\log 6$.
21. Solve: $\log x+\log(x+2)=\log 15$.
22. Solve: $\log_2 x+\log_4 x=3$.
23. If $x = \log_2 9$, $y = \log_9 7$, $z = \log_7 4$, show that $xyz = 2$.
24. If $x = \log_4 9$, $y = \log_9 5$, $z = \log_5 8$, find the value of xyz.

25. Prove that $\frac{1}{\log_{a^2b^2}(abc)}+\frac{1}{\log_{b^2c^2}(abc)}+\frac{1}{\log_{c^2a^2}(abc)}=4$.

(Understanding)

26. If $\log_a(bc) = x$, $\log_b(ca) = y$, $\log_c(ab) = z$. Show that $\frac{1}{x+1}+\frac{1}{y+1}+\frac{1}{z+1}=1$.
27. If $m^2 + n^2 = 20mn$, show that $2\log(m + n) = \log 2 + \log 11 + \log m + \log n$.
28. If $m^2 + n^2 = 17mn$, show that $2\log(m - n) = \log 15 + \log m + \log n$.
29. If $\log\left(\frac{a-b}{4}\right)=\log\sqrt{a}+\log\sqrt{b}$ show that $(a + b)^2 = 20ab$.
30. Solve for x: $\log_9 x + 2\log_{27} x + 3\log_3 x = 25$.
31. Solve for x: $2\log_2 x + 3\log_4 x + 5\log_8 x = 62$.

5 MARKS QUESTIONS

(Application)

1. Using log table find the value of $\frac{614.78\times 3.434}{2.123}$.
2. Using log table find the value of $\frac{\sqrt{8.43}\times 0.6289}{(14.893)^{\frac{3}{2}}}$.
3. Using log table find the value of $\frac{734.82\times\sqrt{256.3}}{3489.3}$.
4. Using log table find the value of $\frac{0.5392\times 62.42}{926.34}$.
5. Using log table find the value of $\frac{\sqrt{14.5}\times\sqrt[3]{8.571}}{(16.751)^{\frac{2}{3}}}$.
6. Using log table find the value of $\frac{(452.3)^{\frac{2}{3}}}{904.8\times 26.13}$.
7. Using log table find the value of $\frac{0.5269\times 0.0123}{428.9}$.
8. Using log table find the value of $\frac{946.8\times 0.023}{0.0453}$.
9. Using log table find the value of $\frac{4523.1\times 724.3}{826.1\times 264.46}$.

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