PROBLEMS ON LOGARITHMS

I.1 If $a^{10} = x^2$, $x > 0$, then $\log_a(x) =$
(a) $10^{1/2}$ (b) 100 (c) 20 (d) 5 (e) 50

III.26 If $\log_{10}2 = a$ and $\log_{10}3 = b$ then $\log_5 12 =$
(a) $(a + b)(1 + a)$ (b) $(2a + b)/(1 + a)$
(c) $(a + 2b)/(1 + a)$ (d) $(2a + b)/(1 - a)$
(e) $(a + 2b)/(1 - a)$

IV.19 Given that a and x are positive numbers which simultaneously satisfy the equations

$$2^{\log_a x} = 8 \text{ and } \log_6 x = \log_6 a + 1$$

then a = (a) $2^{3/2}$ (b) $6^{1/2}$ (c) $(2^{1/2} + 1)/6$
(d) $(2^{1/2} - 1)/6$ (e) 32

V.24 If $\log_2(\log_2(\log_3 x)) = \log_2(\log_3(\log_2 y)) = \log_3(\log_2(\log_2 z)) = 1$ then $x + y + z =$
(a) 36 (b) 64 (c) 324 (d) 656 (e) 849

VI.22 Given that $\log_3 8 = a$ and $\log_{16}5 = b$ then $\log_2 15 =$
(a) $(3 + 4ab)/a$ (b) $5a + b/3$ (c) $(a + 3b)/5$
(d) $(4a + 5b)/3$ (e) $(a + 5b)/4$.

VII.14 If $2^{(x^n)} = y$ then x is the following exponent of 2 (each log has base 2):
(a) $(\log y - 1)/n$ (b) $\log(\log y)/n$ (c) $\log(y/n)$
(d) $(\log y)/(\log n)$ (e) $\log(\log(ny + 1)$

VIII.19 If $\log_2 xy^2 = 4$, $\log_2(y/z) = 3$ and $\log_2 xz^3 = -4$ then $x + y + z =$ (a) 21/2 (b) 19/3 (c) 15/8 (d) 25/4 (e) is undefined

IX.19 If the integer w satisfies the equation $\log_2(\log_3(\log_2 w) = 1$ then the sum of the digits of w is
(a) 4 (b) 6 (c) 8 (d) 10 (e) 12

X.5 If $2^{4\log_2 x} = 3x^2$ then x = (a) $4(3)^{1/2}$ (b) 3 (c) $3^{1/2}$ (d) $42^{1/2}$ (e) $6^{1/2}/3$