Given $d = \alpha \beta^{t}$ - - - (1)

Comparing equ (1) to $y = mx + c$ to Converting it into a

near equation.

$$\log d = \log \alpha + t \log \beta$$

$$y = a_0 + a_1 x$$

Therefore $a_0 = \log \alpha$

$a_1 = \log \beta$

$x = t$

$y = \log d$

$Y = \log d$	$t = x$	xY	$d(m)$	x^2	Y^2
1) 0.301029996	0	0	0	0	0.09061…
2) 0.698970004	1	0.698970004	1	1	0.48855…
3) 1.248753601	2	2.557507202	2	4	1.6351…
4) 1.698970004	3	5.096910013	3	9	2.8864…
5) 2.178976947	4	8.715907789	4	16	4.7477…
6) 2.672097858	5	13.36048925	5	25	7.140106…
7) 3.156851909	6	18.94111441	6	36	9.765713…
8) 3.654369091	7	25.58058364	7	49	13.35441346
9) 4.11800007	8	32.8904[illegible]6	8	64	16.9068…
10) 4.614165911	9	41.5269532	9	81	21.2899…
11) 5.045405135	10	50.45405135	10	100	25.4561…

$\sum Y = 29.4113304$6

$\sum x = 55$

$\sum xY = 199.826839$

$\sum x^2 = 385$

$\sum Y^2 = 102.9620485$

$\Sigma Y = a_0 N + a_1 \Sigma X$

$29.41133046 = a_0(11) + a_1(55) \quad \ldots \text{(i)}$

$\Sigma XY = a_0 \Sigma X + a_1 \Sigma X^2$

$199.8268829 = a_0(55) + a_1(385) \quad \ldots \text{(ii)}$

Combining eqn (i) and (ii)

$29.41133046 = 11a_0 + 55a_1$

$199.8268829 = 55a_0 + 385a_1$

$$a_0 = \frac{\begin{bmatrix} 29.41133046 & 55 \\ 199.8268829 & 385 \end{bmatrix}}{\begin{bmatrix} 11 & 55 \\ 55 & 385 \end{bmatrix}}$$

$$a_0 = \frac{[29.41133046][385] - [55][199.8268839]}{[11 \times 385] - [55 \times 55]} = 0.24511$$

$$a_1 = \frac{\begin{bmatrix} 11 & 29.41133046 \\ 55 & 199.826835 \end{bmatrix}}{\begin{bmatrix} 11 & 55 \\ 55 & 385 \end{bmatrix}}$$

$$a_1 = \frac{[11 \times 199.8268835] - [29.41133046 \times 55]}{[11 \times 385] - [55 \times 55]}$$

$a_1 = 0.47973$

$a_0 = \log \alpha$

$0.29511 = \log \alpha$

$\alpha = 1.8841$

$\alpha = 1.8541$

0181

$a_1 = \log \beta$

$0.47293 = \log \beta$

$\beta = 3.0181$

Correlation Coefficient.

$$r = \frac{N\sum XY - [\sum X][\sum Y]}{\sqrt{(N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

$$r = \frac{[11 \times 199.82688839] - [55 \times 29.41133046]}{\sqrt{(11 \times 385 - 55^2) \times [(11 \times 103.960488)] - [29.41133046]^2}}$$

$r = 0.9998448312$

$R^2 = [0.9998448312]^2 = 0.9996896864$

for manual method

$R = 0.9998$

$R^2 = 0.9997$

from excel

$R = 0.99984483235763$

$R^2 = 0.999689688792257$

D

From the values of Correlation Coefficient obtained manually above: It can be seen that the Correlation Coefficient ranges between 0.8 - 1 i.e 0.9998. Therefore the variables log d and t Correlate effectively.