S.No 4

FA-4

Khan, Mashiur Rahman
18-36303-1

11.1

x	y	xy	x^2	y^2
11.8	10.4	122.72	139.24	108.16
12.5	16.5	206.25	156.25	272.25
15.7	22.9	359.53	246.49	524.41
19.2	26.6	510.72	368.64	707.56
21.9	33.8	740.22	479.61	1142.44
23.3	42.8	997.24	542.89	1831.84

$\Sigma x = 104.4$

$\Sigma y = 153$

$\Sigma xy = 2936.68$

$\Sigma x^2 = 1933.12$

$\Sigma y^2 = 4586.66$

$n = 6$

a) $SS(x) = \Sigma x^2 - \frac{(\Sigma x)^2}{n}$

$= 116.56$

$SS(y) = \Sigma y^2 - \frac{(\Sigma y)^2}{n}$

$= 685.16$

$Sp(xy) = \Sigma xy - \frac{\Sigma x \Sigma y}{n}$

$= 274.48$

$r = \frac{Sp(xy)}{\sqrt{SS(x)\, SS(y)}} = 0.98$

∴ Strongly positive correlation

b) $H_0 : \rho = 0$ vs $H_A : \rho \neq 0$

$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} \sim t_{n-2}$

$= \frac{0.98\sqrt{4}}{\sqrt{1-(0.98)^2}}$

$= 9.84$

$|t| > t_4$ thus H_0 is rejected

c) $a = \bar{y} - b\bar{x} = \frac{\Sigma y}{n} - b\,\frac{\Sigma x}{n}$

$= \frac{153}{6} - b \cdot \frac{104.4}{6}$ ... ①

$b = \frac{Sp(xy)}{SS(x)} = \frac{274.48}{116.56} = 2.36$

∴ $a = -15.56$

fitted line : $\hat{y} = -15.56 + 2.36x$

d)

e) $H_0 : B = 0$ vs $B \neq 0$

$|t| = \frac{b}{\sqrt{\frac{s^2}{SS(x)}}}$

$s^2 = \frac{SS(y) - b\,Sp(xy)}{n-2} = 523.22$

∴ $|t| = 1.11$

$|t| < t_4$ ∴ H_0 is accepted.
Regression is not significant.