Ques(1) Calculate coefficient of correlation from the following informations

$n = 10$, $\Sigma X = 100$, $\Sigma Y = 150$, $\Sigma (X-10)^2 = 180$

$\Sigma (Y-15)^2 = 215$ and $\Sigma (X-10)(Y-15) = 60$.

Solution: Here, $\bar{X} = \frac{\Sigma X}{n} = \frac{100}{10} = 10$, $\bar{Y} = \frac{\Sigma Y}{n} = \frac{150}{10} = 15$

Therefore, we have $\Sigma (X-\bar{X})^2 = 180$, $\Sigma (Y-\bar{Y})^2 = 215$

$\Sigma (X-\bar{X})(Y-\bar{Y}) = 60$.

$$r = \frac{\Sigma (X-\bar{X})(Y-\bar{Y})}{\sqrt{\Sigma (X-\bar{X})^2} \cdot \sqrt{\Sigma (Y-\bar{Y})^2}}$$

$$= \frac{60}{\sqrt{180} \times \sqrt{215}} = \frac{60}{13.42 \times 14.66} = \frac{60}{196.74} = 0.305 \text{ Ans}$$

Ques(2) Find the coefficient of correlation between X and Y for the following data

$n = 25$, $\Sigma X = 125$, $\Sigma Y = 100$, $\Sigma X^2 = 650$, $\Sigma Y^2 = 436$, $\Sigma XY = 520$

Solution: The correlation coefficient r is given by

$$r = \frac{n \Sigma XY - \Sigma X \Sigma Y}{\sqrt{n \Sigma X^2 - (\Sigma X)^2} \sqrt{n \Sigma Y^2 - (\Sigma Y)^2}}$$

$$= \frac{25 \times 520 - 125 \times 100}{\sqrt{25 \times 650 - (125)^2} \cdot \sqrt{25 \times 436 - (100)^2}}$$

$$= \frac{13000 - 12500}{\sqrt{16250 - 15625} \times \sqrt{10900 - 10000}}$$

$$= \frac{500}{\sqrt{625} \times \sqrt{900}} = \frac{500}{25 \times 30} = \frac{500}{750} = \frac{2}{3}$$

$r = 0.67$ Ans

Ques (3) Find the coefficient of correlation between x and y for the following data

$n=10,\ \Sigma x=55,\ \Sigma y=40,\ \Sigma x^2=385,\ \Sigma y^2=192,\ \Sigma xy=185$

Ques (4) Find the coefficient of correlation, from the following data

X :	6	2	10	4	8
Y :	9	11	5	8	7

Solution: Here, we have $n=5$

X	$x=X-\bar{X}$	$x^2=(X-\bar{X})^2$	Y	$y=Y-\bar{Y}$	$y^2=(Y-\bar{Y})^2$	$xy=(X-\bar{X})(Y-\bar{Y})$
6	6-6 = 0	0	9	9-8 = 1	1	0
2	2-6 = -4	16	11	11-8 = 3	9	-12
10	10-6 = 4	16	5	5-8 = -3	9	-12
4	4-6 = -2	4	8	8-8 = 0	0	0
8	8-6 = -2	4	7	7-8 = -1	1	-2
$\Sigma x=30$		$\Sigma x^2=40$	40		$\Sigma y^2=20$	-26

$$\Sigma x=30 \Rightarrow \bar{X}=\frac{\Sigma x}{n}=\frac{30}{5}=6$$

$$\Sigma Y=40 \Rightarrow \bar{Y}=\frac{\Sigma y}{n}=\frac{40}{5}=8$$

$$r=\frac{\Sigma(x-\bar{X})(Y-\bar{Y})}{\sqrt{\Sigma(x-\bar{X})^2}\sqrt{\Sigma(Y-\bar{Y})^2}}=\frac{\Sigma xy}{\sqrt{\Sigma x^2}\cdot\sqrt{\Sigma y^2}}=\frac{-26}{\sqrt{40}\cdot\sqrt{20}}$$

$$=\frac{-26}{6.32\times 4.47}=\frac{-26}{28.25}=-0.92 \text{ Ans}$$

Ques (5) The following table gives the supply and price figures for a commodity for 6 days. Calculate correlation coefficient between price and supply

Days:	Mon	Tue	Wed	Th	Fri	Sat
price :	22	30	25	20	15	8
Supply:	10	12	15	20	23	28