increases (decreases); (ii) they are inversely proportional, i.e. when one increases (decreases) the other decreases (increases); (iii) no relation. These three situations can be stated as follows statistically (i) positively correlated (ii) negatively correlated (iii) no-correlation.

SCATTER DIAGRAM

It is the simplest way of the diagrammatic representation of bivariate data. Let X and Y be the two variables under study with n observation each. If we plot $(X_1, Y_1), (X_2, Y_2), \ldots, (X_n, Y_n)$ on a graph sheet, the resulting diagram gives us a vague idea about the correlation between these two variables X and .

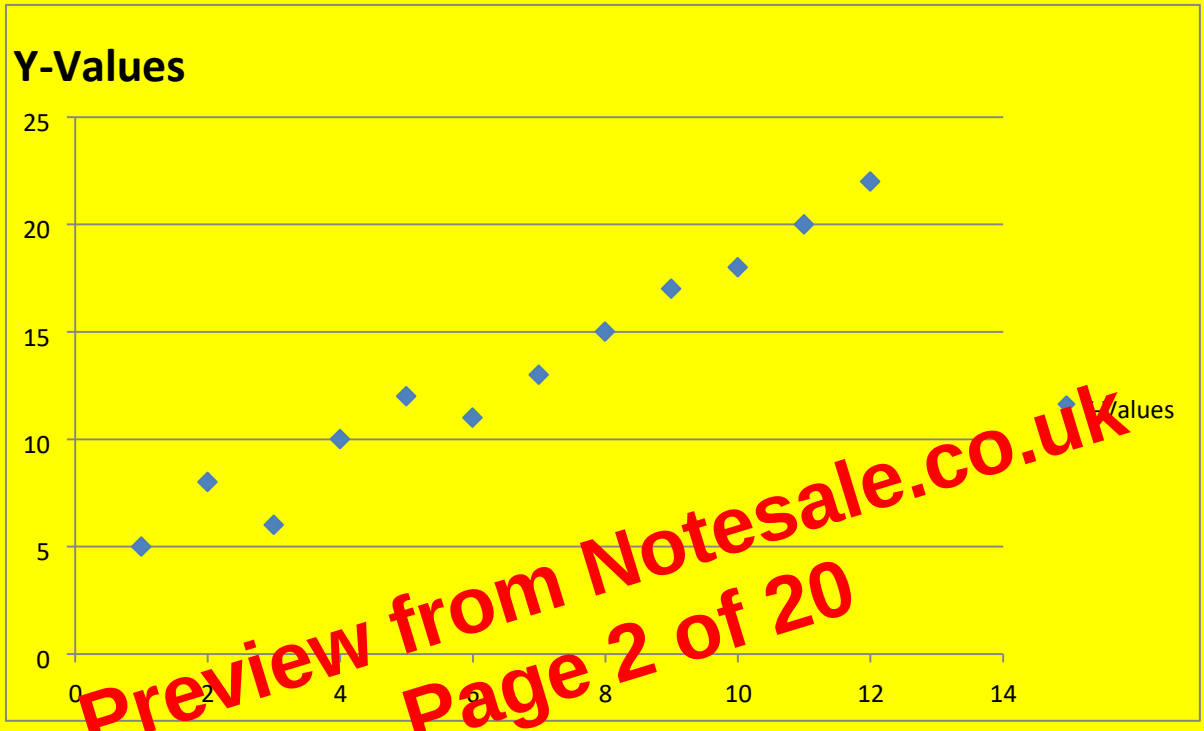

Figure 1

Fig 1 represents that there is a positive correlation between the variables X and Y.

S.D	2	4

$r = 0.8$

Find the two regression equations

Solution

Regression equation Y on X

$$b_{yx} = r \cdot \frac{\sigma_y}{\sigma_x} = 0.8 \times \frac{2}{4} = 0.4$$

$$(Y - \bar{Y}) = b_{yx}\,(X - \bar{X})$$

$$(Y - 10) = 0.4(X - 15)$$

$$Y - 10 = 0.4X + 10 - 6$$

$$Y = 0.4X + 10 - 6$$

$$Y = 0.4X + 4$$

Regression equation X Y on

$$b_{yx} = r \cdot \frac{\sigma_y}{\sigma_x} = 0.8 \times \frac{4}{2} = 1.6$$

$$(X - \bar{X}) = b_{yx}(Y - \bar{Y})$$

$$(X - 15) = 1.6(Y - 10)$$

$$X = 1.6Y - 16 + 15$$

$$X = 1.6Y - 1$$

Example

Find the regression equation for the following

X:	2	4	6	8
Y:	10	20	25	30

Solution

Regression equation

X	Y	$d_x = X - 5$	d_y	d_x^2	d_y^2	d_{xy}

11. Calculate the regression equation for the following data and also compute Karl Pearson's coefficient of correlation:

No. of students (X):	800	600	900	700	500	400
No. of Passed (Y):	480	300	450	560	450	310

12. To study the effect of rain on yield of wheat the following results were obtained.

	Mean	S.D
Yield(X):	800	12
Rainfall(Y):	50	2

$r = +0.80$

Estimate the yield when the rainfall is 80 inches.

13. Find the two regression equations, regression co-efficient of correlation from the following figures.

$\sum X = 120, \quad \sum Y = 432, \quad \sum XY = 4992, \quad \sum X^2 = 1394, \quad \sum Y^2 = 18{,}252, \quad and\ n = 12$