Question 1:

(Marks: 3+5=8)

a) The fourth mean moment of a symmetric distribution is 243. What would be the value of the standard deviation in order that the distribution may be meso-kurtic?

Solution;

Standard is equal to 2nd moment

We are that $m_4 = 243$. Therefore

$m_4 = 243$

$\frac{m_4}{m_2} = b_3 = 3$ i.e $= \frac{243}{m2^2} = 3$

$or \frac{243}{3} = 81$ or $m_2 = 9$

Standard deviation is equal to m_2 2nd moment

b) Two candidates X and Y at the B.A (Hons.) Examination obtained the following data.

Candidate X	Candidate Y
$\bar{X} = 43.2$	$\bar{Y} = 20.5$
S.D = 24.25	S.D = 15.6

Which of the candidate showed a more consistent performance?

Solution:

By calculating the co-efficient of variation in each case.

Candidate A

$C.V = \frac{s}{\bar{x}} * 100$

$C.V = \frac{24.25}{43.2} * 100$

$C.V = 56.13\%$

Candidate B

$$C.V = \frac{s}{\bar{y}} * 100$$

$$C.V = \frac{15.6}{20.5} * 100$$

$$C.V = 76.097\%$$

We see that co-efficient of variation for the candidate A smaller than that for the candidate B.Hence candidate A is more consistent than candidate B.

Question 2: (Marks: 2+5=7)

a. If coefficient of skewness = 0, then what would you say about the shape of the distribution?

Solution:

For symmetric distributions or curves, the coefficient is zero. The shape is symmetric.

b. The following data were computed from personnel records of a manufacturing firm:

X = Number of years of service

Y = weekly wage rate

n = 23; $\sum X = 2433$; $\sum Y = 4254$, $\sum X^2 = 281019$; $\sum Y^2 = 841786$ and $\sum XY = 482788$

If the correlation coefficient indicates that there does exist a relationship between X and Y, compute the least squares line of regression Y = a + b X.

Solution:

where $b_{xy} = \frac{n(\quad XY) - (\quad X)(\quad Y)}{n(\quad X^2) - (\quad X)^2}$

$$b_{xy} = \frac{23(482788) - (2433)(4254)}{23(281019) - (2433)^2}$$

$$b_{xy} = \frac{11104124 - 10349982}{6463437 - 5919489}$$

$$b_{xy} = \frac{754142}{543948}$$

$$b = 1.3864$$

$$a = \bar{y} - b\bar{x}$$

$$\bar{y} = \frac{\sum y}{n} = \frac{4254}{23} = 184.96$$

$$\bar{x} = \frac{\sum x}{n} = \frac{2433}{23} = 105.78$$

$$a = 184.96 - 1.39(105.78)$$

$$a = 184.96 - 147.0342$$

$$a = 37.92$$

Hence $\hat{y} = 37.92 + 1.39X$ is the estimated regression equation appropriate for predicting the no of years (x) given weekly wage rate