Solution:- We have Mean $\bar{x} = 100$,

Variance $= 35$, Skp $= 0.2$,

Now $Skp = \frac{\text{Mean} - \text{Mode}}{\sigma \text{ (Variance)}}$

$0.2 = \frac{100 - \text{Mode}}{\sqrt{35}}$ $\quad \because SD^2 = \text{Variance}$

$100 - \text{Mode} = 0.2 \times 5.92 = 1.184$ $\quad \Rightarrow SD = \sqrt{\text{Variance}}$.

$\text{Mode} = 100 - 1.184 = 98.816$

Mode $= 3$ Median $- 2$ Mean $\Rightarrow 98.816$

$98.816 = 3$ Median $- 2 \times 100$

3 Median $= 298.816$

$\text{Median} = \frac{298.816}{3} = 99.61$

Median = 99.61

Question:- The sum of 20 observations is 300 and Sum of their squares is 5000. The median is 15. Find the Karl Pearson's coefficient of Skewness.

Sol: Let 'x' be the variable under consideration

We have $n = 20$, $\Sigma x = 300$, $\Sigma x^2 = 5000$, Median $= 15$

$\therefore$ Mean $\bar{x} = \frac{\Sigma x}{n} = \frac{300}{20} = 15$

$S.D. = \sqrt{\frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2} = \sqrt{\frac{5000}{20} - \left(\frac{300}{20}\right)^2}$

$= \sqrt{250 - 225} = \sqrt{25} = 5$

$\therefore$ Karl Pearson's Coefficient of Skewness

$= \frac{3(\text{Mean} - \text{Median})}{S.D.} = \frac{3(15-15)}{5} = \frac{0}{5} = 0$ Hence

Sim.

Question:→ The first three central moments of a distribution are 0, 15, −31. Find the moment coefficient of Skewness.

Solution: We know that

Moment coefficiant of Skewness $= \frac{\mu_3}{\sqrt{\mu_2^3}} = \pm\sqrt{\beta_1}$

(G.B.T.U. 2009, 2011)

$$= \frac{-31}{\sqrt{15^3}} = -\frac{31}{58.09} = -0.53$$

Question:→ The first four moments of a distribution about the value 5 of the variable are 2, 20, 40 and 50. Calculate the moment coefficient of Skewness.

Sol. We have $A = 5$, $\mu_1' = 2$, $\mu_2' = 20$

$\mu_3' = 40$ and $\mu_4' = 50$

Now $\mu_2 = \mu_2' - (\mu_1')^2 = 20 - (2)^2 = 16$

$$\mu_3 = \mu_3' - 3\mu_1'\mu_2' + 2\mu_1'^3 = 40 - 3(2)(20) + 2(2)^3$$

$$= 40 - 120 + 16 = -64$$

Moment coefficient of Skewness $= \frac{\mu_3}{\sqrt{\mu_2^3}}$

$$= \frac{-64}{\sqrt{16^3}} = \frac{-64}{64} = -1$$

$\therefore$ $\boxed{S_{kp} = -1}$