Statistics Ex 7.5 Q13

Answer :

The given data is shown below.

Monthly Consumption (in units)	No. of consumers (f_i)	x_i	$f_i x_i$	C.f.
65–85	4	75	300	4
85–105	5	95	475	9
105–125	13	115	1495	22
125–145	20	135	2700	42
145–165	14	155	2170	56
165–185	8	175	1400	64
185–205	4	195	780	68
	$\Sigma f = 68$		$\Sigma f_i x_i = 9320$	

Here, the maximum frequency is 20 so the modal class is 125–145.

Therefore,

$l = 125$

$h = 20$

$f = 20$

$f_1 = 13$

$f_2 = 14$

$$\Rightarrow \text{Mode} = l + \frac{f - f_1}{2f - f_1 - f_2} \times h$$

$$= 125 + \frac{7}{13} \times 20$$

$$= 125 + \frac{140}{13}$$

$$\boxed{\text{Mode} = 135.76 \text{ units}}$$

Thus, the mode of the monthly consumption of electricity is 135.76 units.

$$\text{Mean} = \frac{\Sigma f_i x_i}{\Sigma f} = \frac{9320}{68} = 137.05$$

Thus, the mean of the monthly consumption of electricity is 137.05 units.

Here,

Total number of consumers, $N = 68$ (even)

Then, $\frac{N}{2} = 34$

$\therefore$ Median

$$= l + \frac{\frac{N}{2} - F}{f} \times h$$

$$= 125 + \frac{\frac{68}{2} - 22}{20} \times 20$$

$$= 125 + \frac{34 - 22}{20} \times 20$$

$$= 125 + 12$$

$= 137$

Thus, the median of the monthly consumption of electricity is 137 units.

********** END **********