Statistics Ex 7.4 Q14

Answer :

(i)

We prepare the cumulative frequency table, as given below.

Marks	No. of students: (f_i)	cumulative frequency $(c.f.)$
0–10	0	0
10–30	10	10
30–50	15	25
50–70	18	43
70–90	22	65
90–110	22	87
110–130	9	96
130–150	4	100
	$N=100$	

Now, we have

$N=100$

So, $\frac{N}{2}=50$

Now, the cumulative frequency just greater than 50 is 65 and the corresponding class is $70-90$.

Therefore, $70-90$ is the median class.

Here, $l=70, f=22, F=43$ and $h=20$

We know that

$$\text{Median}=l+\left\{\frac{\frac{N}{2}-F}{f}\right\}\times h$$

$$=70+\left\{\frac{50-43}{22}\right\}\times 20$$

$$=70+\frac{7\times 20}{22}$$

$$=70+\frac{140}{22}$$

$$=70+6.36$$

$$=76.36$$

Hence, the median is 76.36.

Note: The first class in the table can be omitted also.

(ii)

We prepare the cumulative frequency table, as given below.

Marks	No. of students: (f_i)	cumulative frequency $(c.f.)$
more than 150	0	0
140 – 150	12	12
130 – 140	15	27
120 – 130	33	60
110 – 120	45	105
100 – 110	19	124
90 – 100	17	141
80 – 90	9	150
	$N = 150$	

Now, we have

$N = 150$

So. $\frac{N}{2} = 75$

Thus, the cumulative frequency just greater than 75 is 105 and the corresponding class is $110 - 120$.

Therefore, $110 - 120$ is the median class.

$l = 120, f = 45, F = 60$ and

$h = -10$ (Because class interval given in descending order)

We know that

$$\text{Median} = l + \left\{\frac{\frac{N}{2} - F}{f}\right\} \times h$$

$$= 120 + \left\{\frac{75 - 60}{45}\right\} \times (-10)$$

$$= 120 - \frac{15 \times 10}{45}$$

$$= 120 - \frac{150}{45}$$

= 120 – 3.333

= 116.67 (approx)

Hence, the median is 116.67.

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