



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

$$N = 100$$

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

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

$$\begin{aligned}
 \text{Median} &= l + \left\{ \frac{\frac{N}{2} - F}{f} \right\} \times h \\
 &= 70 + \left\{ \frac{50 - 43}{22} \right\} \times 20 \\
 &= 70 + \frac{7 \times 20}{22} \\
 &= 70 + \frac{140}{22} \\
 &= 70 + 6.36 \\
 &= 76.36
 \end{aligned}$$

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

$$N = 150$$

$$\text{So, } \frac{N}{2} = 75$$

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

$$\begin{aligned}\text{Median} &= l + \left\{ \frac{\frac{N}{2} - F}{f} \right\} \times h \\ &= 120 + \left\{ \frac{75 - 60}{45} \right\} \times (-10) \\ &= 120 - \frac{15 \times 10}{45} \\ &= 120 - \frac{150}{45} \\ &= 120 - 3.333\end{aligned}$$

$$= 116.67 \text{ (approx)}$$

Hence, the median is 116.67.

\*\*\*\*\* END \*\*\*\*\*