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Q8 Calculate quantiles of the following distribution:-

Age Group	f	C.f
25-30	10	10
30-35	12	22
35-40	25	47
40-45	40	87
45-50	10	97
50-55	3	100
	N=100	

Sol:-> (1) Q_1 Class $= \frac{N}{4} = \frac{100}{4}$ $Q_1 = 25$

$$Q_1 = l_1 + \left(\frac{N/4 - C.f}{f Q_1}\right) \times i$$

$$= 30 + \left(\frac{100 - 10}{4}\right) \times 5$$

$$= 30 + \left(\frac{90}{4}\right) \times 5$$

$$Q_1 = 30 + 112.5$$

$$Q_1 = 142.5$$

(2) $Q_2 = \frac{N}{2} = \frac{100}{2} = Q_2 = 50$

$l_1 = 35$, $Ef_1 = 22$, $f Q_2 = 25$, $i = 5$

$$Q_2 = l_1 + \left(\frac{N/2 - Ef_1}{f Q_2}\right) \times i$$

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$$= 35 + \left(\frac{50 - 22}{25}\right) \times 5$$

$$= 35 + \frac{28}{25} \times 5 \quad (1.12)$$

$$= 35 + 1.12 \times 5$$

$$= 35 + 5.6$$

$$\boxed{Q_2 = 40.6}$$

(3) Q_3 class $= 3/4 \ (N)$

$$= \frac{3}{4} (400)$$

$$= \frac{300}{4} = 75$$

$l_1 = 40, \ \Sigma f_1 = 47, \ fQ_3 = 40, \ i = 5$

$$Q_3 = l_1 + \left(\frac{3N/4 - \Sigma f_1}{fQ_3}\right) \times i$$

$$= 40 + \frac{75 - 47}{40} \times 5 \quad (0.7)$$

$$= 40 + \frac{31}{40} \times 5$$

$$= 40 + \frac{155}{40} \quad (3.87)$$

$$= 40 + 3.87$$

$$\boxed{Q_3 = 43.87}$$

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