Problem, Chapter-8: Two hundred Engineers were interviewed and classified according to their results and job satisfaction. The distribution of graduates by results and job satisfaction are given in the following contingency table:

Results	Job satisfaction	
	Yes	No
Excellent	20	70
Good	45	65

Compute the value of Chi-square for the above data.

Solution: Computation table

Results	Job satisfaction		Total
	Yes	No	
Excellent	20 (O_{11})	70(O_{12})	90
Good	45(O_{21})	65(O_{22})	110
Total	65	135	200

We know, $$\chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Here, $$E_{11} = \frac{90 \times 65}{200} = 29.25,$$

$$E_{12} = \frac{90 \times 135}{200} = 60.75,$$

$$E_{21} = \frac{110 \times 65}{200} = 35.75,$$

$$E_{22} = \frac{110 \times 135}{200} = 74.25$$

Therefore, $$\chi^2 = \frac{(20 - 29.25)^2}{29.25} + \frac{(70 - 60.75)^2}{60.75} + \frac{(45 - 33.75)^2}{33.75} + \frac{(65 - 74.25)^2}{74.25}$$

$$= 2.93+1.41+3.75+1.15 = 9.24$$