Assignment 5.1

Solution

	High School	Bachelor	Masters	Ph.d	Total
Female	60	54	46	41	201
Male	40	44	53	57	194
Total	100	98	99	98	395

We have to use chi-square test of Independence

Chi-square test statistic $= \chi^2 = \sum (O-E)^2/E$

O = observed frequency.

E = Expected frequency under the null hypothesis

$E = \frac{\text{row total} \times \text{column total}}{\text{sample size}}$

Table of expected counts:

	High School	Bachelors	Masters	Ph.d	Total
E/Female	50.886	49.868	50.377	49.868	201
E/Male	49.114	48.132	48.623	48.132	194
Total	100	98	99	98	396

$\chi^2 = (60-50.886)^2/50.886 + (54-49.868)^2/49.868 + (49-50.377)^2/50.377$
$+ (41-49.868)^2/49.868 + (40-49.114)^2/49.114 + \dots (57-48.132)^2/48.132$

$\chi^2 = 8.006$

$\therefore$ The critical value of χ^2 with 3 degree of freedom is 7.815.

Since $8.006 > 7.815$. Therefore we reject the null hypothesis and conclude that the education level depends on gender at 5% level of significance.