APPENDIX - 4

MODE OF X^2 (Chi-square) CALCULATION.

To test the hypothesis that "there is no significant difference between ONIDA and ORSON colour television sets regarding objective and subjective factors", which was preffered by their respective consumers, Chi-square test was applied and the mode of Chi-square calculation is as below:

For example : The table below shows the preferences obtained by ONIDA and ORSON to attractive appearance from their 100 customers each.

Brands	Preferences						Total
	1st	2nd	3rd	4th	5th	6th	
ONIDA	26	24	12	17	-	-	79
ORSON	24	30	10	10	8	8	90
Total	50	54	22	27	8	8	169

Solution : To test the hypothesis that "there is no significant difference between ONIDA and ORSON colour TV sets regarding attractive appearance, Chi-square test is applied.

Weightages were allotted to the consumer preferences, 1,2,3,...6 to 6,5,4,...1, for example:

ONIDA - 26 x 6 = 156, 24 x 5 = 120.

ORSON : 24 x 6 = 144, 30 x 5 = 150.

Brands	Preferences						Total
	1st	2nd	3rd	4th	5th	6th	
ONIDA	156	120	48	51	--	--	375
ORSON	144	150	40	30	16	8	388
Total	300	270	88	81	16	8	763

From the above observed preferences, expected preferences were computed by using the formula:

$$\text{Expected preference} = \frac{\text{Total of row X Total of column}}{\text{Grand Total}}$$

The expected preferences were obtained as follows:

CNIDA

1. for first row, first column = $\frac{300 \times 375}{763}$ = 147.44
2. " " " 2nd " = $\frac{270 \times 375}{763}$ = 132.70
3. " " " 3rd " = $\frac{88 \times 375}{763}$ = 43.25
4. " " " 4th " = $\frac{81 \times 375}{763}$ = 39.81
5. " " " 5th " = $\frac{16 \times 375}{763}$ = 7.86
6. " " " 6th " = $\frac{8 \times 375}{763}$ = 3.93

ORSON

7. for second row, first column= $\frac{300 \times 388}{763}$ = 152.56
8. " " " 2nd " = $\frac{270 \times 388}{763}$ = 137.30
9. " " " 3rd " = $\frac{88 \times 388}{763}$ = 44.75
10. " " " 4th " = $\frac{81 \times 388}{763}$ = 41.19
11. " " " 5th " = $\frac{16 \times 388}{763}$ = 8.14
12. " " " 6th " = $\frac{8 \times 388}{763}$ = 4.07

Applying X^2 test:

Applying X^2 test:

Sr. No.	Observed (O)	Expected (E)	(O-E)	$(O-E)^2$	$\frac{(O-E)^2}{E}$
1.	156	147.44	8.56	73.27	0.497
2.	120	132.70	12.70	161.29	1.216
3.	48	43.25	4.75	22.56	0.522
4.	51	39.81	11.19	125.22	3.146
5.	-	7.86	7.86	61.78	7.860
6.	-	3.93	3.93	15.45	3.930
7.	144	152.56	8.56	73.27	0.480
8.	150	137.30	12.70	161.29	1.175
9.	40	44.75	4.75	22.56	0.504
10.	30	41.19	11.19	125.22	3.040
11.	16	8.14	7.86	61.78	7.590
12.	8	4.07	3.93	15.45	3.796
					33.756

$$\Sigma \frac{(O-E)^2}{E} = 33.756$$

Degree of Freedom

$V = (r-1)(c-1)$

$V = (2-1)(6-1)$

$V = 5$

where : V = degree of freedom,
r = rows, and
c = columns.

for $V = 5$, $X^2_{0.05} = 11.070$

Here, 1. Calculated value of X^2, i.e. $\Sigma \frac{(O-E)^2}{E} = 33.756$, and

2. Table value of chi-square (X^2) for 5 degrees of freedom at 5% level of significance is 11.070.

Conclusion :

The calculated value of chi-square (X^2)-(33.756) is greater than the table value of chi-square (X^2) for 5 degrees of freedom at 5% level of significance (11.070). Hence, the hypothesis is rejected and thus there is significant difference btween ONIDA and ORSON regarding attractive appearance.