

INDIAN STATISTICAL INSTITUTE
CHENNAI CENTRE
M.Stat. : 2015-17
(Year I – Semester II)

Mid-Semester Examination – Categorical Data Analysis

Date: 26th February 2016

Duration : 3 Hours

ANSWER ALL QUESTIONS. TOTAL MARKS IS 40.

1. Two different types of fire control computers are being considered for use. The two computer systems are subjected to an operational test in which the total number of hits on the target is counted. Computer system 1 gave 191 hits out of 200 rounds, while computer system 2 gave 90 hits out of 100 rounds.
 - a) Is there reason to believe that the two computer systems differ? Use Fisher's Exact Test.
 - b) Compute Relative Risk and Odds Ratio and their 95% confidence intervals.

[4+4 = 8]
2. Consider the following 3 x 3 contingency table, where both X and Y are ordinal variables.

X levels	Y variable		
	1	2	3
1	12	10	15
2	10	20	17
3	18	14	25

- a) Compute local, global and cumulative odds ratios for (X2, Y1). Compute 95% Confidence interval for local and global odds ratios.
- b) Find concordance and discordance measures of association. Also, compute Somer's D and Gamma index.

[7 + 8 = 15]

3. The following table contains information of depression diagnosis of patients who completed the one-year follow-up of a specific treatment at the baseline and 1 year after the treatment.

		Year 1	
		No Depn	Depression
Year 0	No Depn.	256	12
	Depression	29	136

Check the prevalence of depression at the two time points to assess the effect of the treatment.

[5]

4. Consider the following 2 x 2 x 2 tables on success rates of two hospitals stratified by disease severity.

		Success	Failure
Less	Hospital A	45	15
Severe	Hospital B	84	16
More	Hospital A	32	48
Severe	Hospital B	8	32

- Compute Mantel-Haenszel estimate of common Odds Ratio and interpret.
- Test for difference in the success rates between the two hospitals.
- Model success rate as a function of hospitals and disease severity and test for its significance.
- Compute expected frequencies using the fitted model.

[3 + 3 + 3 + 3 = 12]
