LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **STATISTICS**

SECOND SEMESTER – **APRIL 2023**

PST 2504 – CATEGORICAL DATA ANALYSIS

Date: 04-05-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A

Answer all the questions **10x2=20**

1. Give an example for nominal scale.
2. Define relative risk.
3. Define over dispersion.
4. What is the formula for deviance?
5. Define logits.
6. Define AIC in model selection.
7. When a model is said to be saturated log-linear model?
8. Define a log-linear model.
9. What is meant by a square table?
10. Differentiate between symmetry and quasi-symmetry models.

SECTION B

Answer any FIVE questions **5x8=40**

11. The following table presents the distribution of hypertension and smokers in a group of 55 patients:

	Hypertensive	**Non-Hypertensive**	**Total**
Smoker	12	9	21
Non-Smoker	5	29	34
Total	17	38	55

Interpret the association between hypertension and smoking using odds ratio.

12. Explain Poisson regression model in detail.
13. Define contingency table and explain its types with an example for each type.
14. Explain various selection procedures in categorical data analysis.
15. An investigator randomly assigned 99 patients with stable congestive heart failure (CHF) to an exercise program (n=50) or no exercise (n=49) and followed patients twice a week for one year. The outcome of interest was all-cause mortality. Those assigned to the treatment group exercised 3 times a week for 8 weeks, then twice a week for 1 year. Exercise training was associated with lower mortality (9 versus 20) for those with training versus those without.

Exercised	Dead	Alive
Yes	9	41
No	20	29

Compute a valid measure of association and its 95% confidence interval.

16. What is Mantel-Haenszel test and explain its test procedure.
17. Explain (i) Complete independence (ii) Joint independence and (iii) Conditional independence log-linear models.
18. Explain Kappa measure of agreement.

SECTION C

Answer any TWO questions **2x20=40**

19. Explain Chi- Square test of independence in detail with illustrative example.
20. Explain Generalized Linear model in detail along with its components.
21. (a) Distinguish between marginal and conditional odds ratio.
    (b) Explain the stepwise procedure of logistic regression. **(8+12)**
22. (a) Discuss the connection between Logistic and Log-linear models.
    (b) Derive the logistic model (X+Z) from the log linear model (XY,XZ,YZ) when Y is a binary response variable. **(8+12)**

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