

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**



**B.Sc. DEGREE EXAMINATION – STATISTICS**

**FIFTH SEMESTER – NOVEMBER 2022**

**UST 5502 – BIOSTATISTICS AND SURVIVAL ANALYSIS**

Date: 25-11-2022

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

**PART – A**

**Answer ALL the Questions.**

**10 x 2 =20 Marks**

1. What is Odds Ratio?
2. Define Relative Risk.
3. Write 95% confidence interval for population mean when  $\sigma$  is known.
4. What do you understand by non-parametric test?
5. State the contributions of drug discovery in diabetes.
6. State the contributions of drug discovery in Cholera.
7. State the survival function of Weibull distribution.
8. Write the hazard function of Gamma distribution.
9. Define type I censoring.
10. Define of Survivorship function.

**PART – B**

**Answer any FIVE Questions.**

**5 x 8 =40 Marks**

11. a) Explain Confidence Interval for Odds Ratio  
b) Explain Control Event Rate.
12. Describe any eight applications of Biostatistics.
13. Discuss about Point Estimation and Confidence Intervals in clinical studies.
14. How to analyse research questions about one sample mean and two sample means.
15. Explain considerations in Clinical Trials.
16. Derive  $S(t)$  and  $h(t)$  for Lognormal distribution.
17. Describe the Kaplan-Meier method of estimating Survival Function.
18. Explicate the Cox-proportional Hazard model.

**PART – C**

**Answer any TWO Questions.**

**2 x 20 =40 Marks**

19. a) Describe any two observational studies and any two experimental studies.

b) A study looking at breast cancer in women compared cases with non- cases, and found that 75/100 cases did not use calcium supplements compared with 25/100 of the non-cases. (i) Develop a table to display the data.

(ii) Calculate the odds of exposure in cases and non-cases.

(iii) Calculate odds ratio.

(iv) How does the difference between the two prevalences of breast cancer (75% vs 25%) compare to the odds ratio?

20. A pharmaceutical organization created a new drug to cure sleepwalking and observed the result on a group of 5 patients after a month. Another group of 5 has been taking the old drug for a month. The organization then asked the individuals to record the number of sleepwalking cases in the last month. The result was:

Sleep walking cases in a month	Old Drug	7	8	4	9	8
	New Drug	3	4	2	1	1

Whether the two groups taking different drugs report the same number of sleepwalking cases or not?

21. Explain different phases of clinical trials and bias in observational studies.

22. a) Derive  $F(t)$ ,  $S(t)$ ,  $h(t)$  and  $H(t)$  of one parameter Exponential distribution.

b) Suppose that the following remission durations are observed from 10 patients with solid tumors. Six patients relapse at 3.0, 6.5, 6.5, 10, 12, and 15 months; 1 patient is lost to follow-up at 8.4 months; and 3 patients are still in remission at the end of the study after 4.0, 5.7, and 10 months. Estimate  $S(t)$  by Kaplan-Meier method and determine the median survival time.

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