

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – STATISTICS

FIFTH SEMESTER – NOVEMBER 2019

16/17UST5ES02 – BIO-STATISTICS AND SURVIVAL ANALYSIS

Date: 06-11-2019

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART-A

Answer ALL the questions

2x10=20 Marks

1. Define Observational Study with an example
2. What is a Double blind trial ? give an example
3. Define Epidemiology and provide any two uses
4. What is Meta-Analysis?
5. Provide (1-)% Confidence Interval for Population Proportion
6. What is Germ theory of disease?
7. Provide the formula to calculate PV^+ and PV^-
8. Define Kappa Statistic
9. Provide any two relationships between Survival Functions
10. State any two qualities of a Good Protocol.

PART-B

Answer any FIVE questions

5x8=40 Marks

11. Explain Observational studies and Experimental studies with examples and also provide the need for Randomization in clinical trials
12. Provide the formula to calculate odds ratio and obtain odds ratio based on the cross tabulation given below and interpret the results.

	Dead	Survived
Treatment A	7	22
Treatment B	86	36

13. i) Discuss 95% and 99% Confidence Interval for one population proportion.
ii) Out of 64 patients who underwent a surgery 58 of them survived longer than 10years. Obtain a 95% and 99% Confidence interval for the population proportion.
14. Data on weight gain after a surgical procedure is recorded for 15 patients. Test whether the median weight gain is less than 8kg. i.e., test $H_0: m \leq 8\text{kg}$ vs $H_1: m > 8\text{kg}$ using sign test based on the data given below
4.5, 3, 5.5, 6, 7.5, 5, 10, 11.5, 14.5, 12, 6, 8, 9, 6.5, 8.
15. Explain Type II and Type III censoring with diagram and examples
16. Discuss the steps involved in performing i) Mann-Whitney Wilcoxon U test (4 Marks) and ii) Wilcoxon signed rank test (4 Marks)
17. Obtain $f(t)$ and $h(t)$ for the data given below

Time(months)	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	≥ 50
No.of.Patients Survived	40	35	28	22	18	13	9	5	5	3	2
Number of patients died in the interval	5	7	6	4	5	4	4	0	2	1	2

18. i) What are the questions answered by a Clinical trial protocol?

ii). Discuss Patient selection in a Clinical trial

PART-C

Answer any TWO questions

2x20=40 Marks

19. Discuss the following Study designs in detail

i) Discuss Case-Series study

(6 Marks)

(4 Marks) ii) Case-Control

iii) Cross-sectional study

(5 Marks)

(5 Marks) iv) Cohort Study

20. Compare the survival function of the two groups using Log-Rank test and provide your conclusion.

Group A: 1, 2, 2, 2, 6, 8, 8, 9, 13, 16, 17, 29, 34, 2+, 9+, 13+, 22+, 25+, 36+, 43+, 45+

Group B: 1, 2, 5, 7, 12, 42, 46, 54, 7+, 11+, 19+ 22+, 30+, 35+

21. Test whether the mean serum free level are the same for the three different treatment procedure based on the data given below. The population is assumed to be normally distributed.

Treatment A: 15, 14, 14, 13, 12, 15, 12, 13, 11, 14, 11, 12,15,15,14,16,13,14,13,15

Treatment B: 14,13,21,14,14,13,14,15,12,12,14,15,14,15,13,12,15,12

Treatment C: 15,13,17,17,15,15,14,18,14,17,20,16,15,15,14,17,18,19,15,16,16,20,16,
18,17,14,16,18,15,13,14,12,16,18,13

22. Discuss the different phases of a Clinical trial in detail

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