

**M. SC. (APPLIED STATISTICS)
(MSCAST)**

Term-End Examination

June, 2025

**MST-019 : EPIDEMIOLOGY
AND CLINICAL TRIALS**

Time : 2 Hours

Maximum Marks : 25

Note : *Question No. 1 is compulsory. Attempt any **two** questions from question numbers 2 to 4. Use of Scientific (non-programmable) calculator is allowed. Symbols have their usual meanings.*

1. (a) Suppose, we have 1000 males and 500 females in an epidemiological study. What is the odds of being a female in the study ? 1
- (b) Calculate the crude death rate and infant mortality rate of a town whose

mid-year population is 5,00,000, live births in a year is 15,000, number of deaths in 7,000 and the number of infant deaths in 1875. 2

Select the appropriate option from the following questions (c) and (d) :

- (c) In a double-blind trial : 1
- (i) The patients do not know that they are receiving active treatment or placebo.
 - (ii) The assessors do not know which patient has received active treatment and which placebo.
 - (iii) Both of the above
 - (iv) The patients and the statistician do not know the allocation.
- (d) A clinical trial must involve : 1
- (i) Randomisation
 - (ii) Control group
 - (iii) Blinding
 - (iv) None of the above

2. (a) Find the risk difference, risk ratio and odds ratio for lung cancer comparing smokers (exposed group) to non-smokers (non-exposed group) from the data given as follows (Period of follow-up is 20 years) :

4

	Lung Cancer (+)	Lung Cancer (-)	Total
Smokers	1200	1800	3000
Non-smokers	800	2400	3200
Total	2000	4200	6200

Also, interpret the result.

- (b) If the odds of males in a study are 0.40, then find the proportion of males in the study. 1
- (c) Consider a trial on $n = 16$ patients of kidney disease, randomly divided into two equal groups of size 8. The first group received dialysis-A and then dialysis-B, and the second group received dialysis-B and then dialysis-A. Abbreviate them as tr A and tr B. Washout period between the dialyses ensured that there was no carry-over effect. The response variable is serum creatinine level. This is one of the

parameters of kidney function, measured as mg/dL. The data obtained are as follows : 5

Group-I-AB Sequence

Subject No.		1	2	3	4	5	6	7	8
Period 1	tr A	1.2	1.0	0.8	0.7	1.3	1.2	1.1	1.5
Period 2	tr B	1.2	1.2	1.4	1.3	1.3	1.1	1.2	1.2

Group-II-BA Sequence

Subject No.		9	10	11	12	13	14	15	16
Period 1	tr B	1.7	1.4	1.0	1.3	0.9	1.3	1.2	1.2
Period 2	tr A	1.3	1.5	1.1	1.3	1.4	1.3	1.4	1.2

Test for group effect (use $t_{(14,0.025)} = 2.145$.)

3. For a case control study, explain the following in detail : 4+3+3

- (i) Design of case control study
- (ii) Analysis of data of case control study design
- (iii) Advantages and disadvantages of case control study design

4. For a clinical trial, explain the following terms : 6+2+2

- (i) Protocol
- (ii) Objectives
- (iii) Hypothesis

× × × × ×