

No. of Printed Pages : 5

MSTE-003

**POST GRADUATE DIPLOMA IN
APPLIED STATISTICS (PGDAST)**

Term-End Examination

June, 2026

MSTE-003 : BIOSTATISTICS-I

Time : 3 Hours

Maximum Marks : 50

Note : (i) *Question No. 1 is compulsory.*

(ii) *Attempt any **four** questions from the remaining question nos. 2 to 7.*

(iii) *Use of scientific (non-programmable) calculator is allowed.*

(iv) *Use of Formulae and Statistical Tables Booklet for PGDAST is allowed.*

(v) *Symbols have their usual meanings.*

1. State whether the following statements are True or False. Give reasons in support of your answers : $5 \times 2 = 10$

- (a) In a cross-sectional study, we obtain the following information :

	TB ⁺	TB ⁻
Male	400	9600
Female	500	14500

The prevalence of TB among men is 4%.

- (b) The single-blinding, doctors are not told who are receiving test regimen or control regimen.
- (c) The role of the control group in clinical trials is to control the size of the trial.
- (d) The population of a city according to censuses of 1971 and 1981 are 7 lakhs and 12 lakhs, respectively. The estimated population for the year 1975 will be 9 lakhs.
- (e) Fieller's theorem is used to obtain the strength of test preparation.

2. (a) Explain design and analysis of data of cross-sectional study. 8
- (b) Consider the following data collected at a point in time in a particular area :

	Having Cancer	No Cancer
Smokers	30	90
Non-smokers	25	155

Measure the association between smoking and cancer using prevalence ratio. 2

3. (a) Suppose regimen-A is considered equivalent to regimen-B if the difference in their efficacy is less than 5%. A trial on 80 patients on regimen-A revealed efficacy of 62% and on 120 patients on regimen-B revealed efficacy 65%. Can they be considered clinically equivalent at 5% level of significance ? 6
- (b) Explain the role of randomisation and matching in clinical trials with examples. 4

4. (a) Describe various types of clinical trials. 5
- (b) Differentiate between experimental and non-experimental studies. 5
5. (a) Explain different types of errors in demographic data with examples. 5
- (b) Compute the crude death rate for the following data of a city :

Age Group	Female Population (in '000)	No. of Live Births
15—19	34	680
20—24	36	3,960
25—29	40	5,800
30—34	30	3,000
35—39	24	1,680
40—44	20	800
44—49	16	80

The total population of the city for a particular year was 7 lakhs. Also compute GFR, ASFR and TFR. 5

6. For a parallel-line bioassay with 3 dose levels of a standard preparation and 4 dose levels of a test preparation, the following information are given :

$$\begin{aligned} \text{TSS} &= 7500, \text{SSD} = 7420, S_{y_s x_s} = 51, S_{y_t x_t} = 85, \\ S_{x_s x_s} &= 1.5, S_{x_t x_t} = 3, \hat{\beta} = 30; M_s = 11; \\ M_t &= 12, \bar{y}_s = 40, \bar{y}_t = 67, \text{SSP} = 1893 \end{aligned}$$

Test whether the dose-response regression curve of both preparations are linear and parallel to each other or not at 5% level of significance. 10

7. (a) Differentiate between complete and abridged life tables. 5
- (b) Explain the various components of a bioassay. 5

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