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MSTE–003

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

Term-End Examination

June, 2024

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) While measuring migration, we consider only international migration.
- (b) In direct bioassay, the dose is considered as fixed and the response as random.

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- (c) Primary prevention includes strategies designed to reduce the incidence of disease.
- (d) In Phase-II of a clinical trial, we determine a safe dosage range and identify side effects.
- (e) In non-randomized clinical trials, placebos are useful for comparison purposes.
2. (a) The population and number of deaths in different age groups during 2010 are given in the following table :

Age Group (in years)	Population	Death
0—10	5000	125
10—30	10000	25
30—50	13000	35
50—70	10000	200
≥ 70	2000	1000

- Compute the crude death rate and age specific death rate for all age groups. 5
- (b) Describe various uses of life tables. 5
3. (a) Explain the slope-ratio assay. 2

- (b) The following information was provided for a slope-ratio assay in which 4 doses of standard preparation and 3 doses of test preparation were considered :

$$\hat{\beta}_s = 0.5, \hat{\beta}_t = 0.9, S'_{x_s x_s} = 1000 ,$$

$$S'_{x_t x_t} = 1200, N = 30, \text{MSE} = 2.2$$

Obtain the relative potency and its 95% fiducial limits. Also interpret the results. 8

4. (a) Explain the determination of ED50 and LD50. 5
- (b) Write a short note on the Sampling Registration method of data collection for vital statistics. 5
5. Explain the following :
- (a) Pilot testing and Research protocol 4
- (b) Incidence rate and Cumulative incidence 6
6. (a) In a hypothetical study, 10 patients of kidney disease were randomly allocated to receive two methods of dialysis (A and B). 5 patients received dialysis-A followed by dialysis-B and rest 5 received dialysis-B

followed by dialysis-A. The kidney function scores of these patients are given as :

	Group-I (AB Sequence)				
Patient No.	1	2	3	4	5
Dialysis-A	69	73	50	69	76
Dialysis-B	68	79	68	72	85

	Group-II (BA Sequence)				
Patient No.	6	7	8	9	10
Dialysis-B	57	70	75	70	69
Dialysis-A	51	71	53	62	64

Test whether the mean score for dialysis-A is different from the mean score of dialysis-B, assuming no carry-over effect. 4

- (b) Explain the steps taken for minimising bias in a research setup of a clinical trial. 6

7. Write short notes on the following :

- (a) Epidemiological Triad 3
- (b) Counfounding 3
- (c) Types of clinical trials 4