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MSTE–003

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

June, 2025

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.

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

   (a) Primary prevention includes strategies designed to reduce the incidence of disease.

   (b) A control can only be a placebo.

   (c) Equality of slopes is the basic requirement for the parallel-line assay.

   (d) The quantal assay is applicable, when the response is the percentage of subjects who responded to a treatment at different doses.

   (e) Complete life table is more elaborate than an abridged life table.

2. (a) Describe the different types of methods for collecting data for vital statistics in brief. 5

   (b) Write a short note on Role of Statistics in Bioassay. 2

   (c) Describe the various columns of a life table. 3

3. In a quantal assay, the number of cured cases for 5 doses of a standard and 4 doses of a new test drugs are recorded in the following table :

	d_i	n_i	r_i
Standard	3	28	5
	6	30	9
	9	24	14
	12	32	24
	15	27	23
Test	2	31	4
	4	25	10
	6	30	18
	8	25	18

Determine the median effective dose for the standard and test drugs using regression model. 10

4. (a) The number of births occurring in a country in 1958 classified according to age of mother, together with the female

population in each group of the child-bearing period is given as follows :

Age	Female Population (in '000)	No. of Births to mother in the age group
15—19	84.79	2,343
20—24	70.01	14,541
25—29	72.66	16,736
30—34	75.92	10,218
35—39	75.10	5,134
40—44	71.62	1,422
45—49	66.66	93
Total	516.66	50,487

The total population of the country in 1958 was 2285.8 thousand. With the given information, determine (i) CBR, (ii) GFR, (iii) The ASFR for the country in 1958. 5

(b) Explain any *five* types of biases in clinical trials. 5

5. (a) Describe descriptive and analytic epidemiology. 5

   (b) Define experimental and non-experimental studies. 5

6. (a) Describe the need of clinical trial in brief. 5

   (b) Dexamethasone Suppression Test (DST) is applied on 293 cases of depression and 207 healthy persons having no depression. The results of the test are shown as follows :

		Depression Status		
		Yes D^+	No D^-	Total
Result of DST	T^+	114	6	120
	T^-	179	201	380
	Total	293	207	500

   What are the sensitivity and specificity of the test ? Also determine the positive and negative predictive value of the test. 5

7. (a) The service area of a PHC recorded the following data, during the year 2009 :

Mid Year Population (MYP)	30,000
Live births	600
Deaths within 28 days of birth	24
Deaths from 29th day to one year of birth	12
Maternal deaths	1

Calculate the following rates for the year : 5

(a) Crude Birth Rate (CBR)

(b) Neonatal Mortality Rate (NMR)

(c) Post-Neonatal Mortality Rate (PNMR)

(d) Infant Mortality Rate (IMR)

(e) Maternal Mortality Rate (MMR)

(b) Differentiate between direct and indirect bioassays. 5

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