G-2/238/21

Roll No. .....

M.Sc. II Semester Examination, 2021

MICROBIOLOGY

Paper IV

(Biostatistics)

Time : 3 Hours] [Max. Marks : 80

Note : *All questions are compulsory. Question Paper comprises of 3 sections. Section A is objective type/multiple choice questions with no internal choice. Section B is short answer type with internal choice. Section C is long answer type with internal choice.*

SECTION A **1 × 8 = 8**

(Objective Type Questions)

Choose the correct answer :

1. Which of the following relation is correct :

(a) Mean = 3 Median – 2 Mode

(b) Median = 3 Mode – 2 Mean

(c) Mode = 3 Median – 2 Mean

(d) Mode = Median + Mean

2. The example of applicaton of range in real world includes :

(a) Weather forecast (b) Quality control

(c) Fluctuation in share prices

(d) All of above

P.T.O.

3. A bag contains 7 white and 9 black balls. A ball is randomly drawn from the bag. What is the probability of getting white ball :

(a) $\frac{7}{16}$ (b) $\frac{9}{16}$

(c) $\frac{7}{9}$ (d) $\frac{9}{7}$

4. The range of partial correlation coefficient is :

(a) 0 to 1 (b) 0 to ∞

(c) – 1 to + 1 (d) $-\infty$ to $+\infty$

5. Regression coefficient is independent of :

(a) Origin (b) Scale

(c) Both origin and scale

(d) Neither origin or scale

6. A researcher surveyed 903 people about their favourate TV programme was News, Documentory, Sports or Cooking show. They could only choose the one answer, as such the researcher get the number of people who chose each catagory of programme. How should the researcher analyse the data :

(a) *t*-test (b) *F*-test

(c) Chi square test (D) Regression

7. Analysis of variance is a statistical method of comparing of the several populations :

(a) Mean

(b) Variance

(c) Standard Deviation

(d) Mean Deviation

8. The uncontrollable factors are also called :

(a) Design factor

(b) Noise factor

(c) Acceptance factor

(d) Sound factor

SECTION B **4 × 6 = 24**

(Short Answer Type Questions)

Note : *Answer the following questions.*

Unit-I

1. Explain the various measurement scale of statistics with example.

Or

Find the arithmatic mean of a sample of reported cases of mumps in school children of the following data :

Blood LDL	52	58	60	65	68	70	75
No. of Patient	7	5	4	6	3	3	2

Unit-II

2. What is correlation coefficient ? Describe its significance and properties.

Or

One card is drawn from a well shuffled deck of 52 cards, find the probability of getting :

(a) A king of red colour

(b) A face card

(c) A Jack of heart

(d) A spade.

Unit-III

3. Write the difference between Correlation and Regression.

Or

Write the properties of χ^2 distribution, conditions for using the χ^2 test and uses of χ^2 (chi square) test.

Unit-IV

4. Write a note on statistical quality control.

Or

In a laboratory experiment, two samples blood gave the following results :

Sample	Size	Sample Mean	Sum of squares of deviation from the mean
1	10	15	90
2	12	14	108

Test the equality of sample variances at 5% level of significance.

Critical value : table value of F at $\alpha = 0.05$ for 9 and 11 degrees of freedom is $F_{0.05} = 2.90$.

Section C **4 × 12 = 48**

(Long Answer Type Questions)

Note : *Answer the following questions.*

Unit-I

1. Write a detailed note on presentation of data.

Or

(a) What is measures of central tendencies ? Write the merits and demerits of mode.

(b) The following table shows the ages of patients admitted in a hospital during a year, find the mode.

Age (years)	5 – 15	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65
No. of Patients	6	11	21	23	14	5

Unit-II

2. (i) Define the following terms with example :

(a) Sample space,

(b) Equally likely event,

(c) Mutually Exclusive event,

(d) Random experiment.

(ii) A lot of 20 bacterial samples 4 are showing amylase activity. One sample is drawn at random from it, what is the probability of getting bacterial sample showing amylase activity.

(iii) Suppose the bacterial sample drawn in (ii) is not showing amylase activity and is not replaced back to the lot. Now one sample is again drawn from the rest. What is the probability that this sample does not show amylase activity.

Or

(a) Describe the various methods of correlation.

(b) Find the correlation coefficient of the following data :

Height of father (in inches)	65	66	67	68	69	70	71
Height of son (in inches)	67	68	66	69	72	72	69

Unit-III

3. What is regression analysis ? Explain the coefficient of regression and its uses.

Or

(a) What is Student *t* test ? Write its uses.

(b) The following data relate to the days of flowering in two varieties of sunflower G–65 and PS–16. Determine whether the two means are significantly different.

	G – 65	PS-16
n	30	35
Mean	32	38
Variance	9.62	14.23

Table value of *t* at 60 d.f. (at 1 % level of significance) is 2.66.

Unit-IV

4. What is the basis principle of experimental design ? Explain different types of design with example.

Or

Explain ANOVA with example and its significance.

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