

C 15483

(Pages 4)

Name.....

Reg. No.....

**FOURTH SEMESTER B.Sc. (MICROBIOLOGY) DEGREE
EXAMINATION, MAY 2011**

(CCSS)

Biostatistics (Complementary)

MB 4C 15—BIOSTATISTICS—II

(As per 2009 Admission Syllabus)

Time : Three Hours

Maximum : 30 Weightage

Part A

*Answer **all** questions.
Each carries a weight of $\frac{1}{4}$.*

1. The power of the test is :

- (a) **P** [Reject H_0 | H_0 is true]. **(b) P** [Reject H_0 | H_A is true].
(c) **P** [Accept H_0 | H_0 is true]. **(d) P** [Accept H_0 | H_A is true].

2. The performance of a statistical test depends on :

- (a) Only significance level. (b) Only the power of the test.
(c) Both significance level and power. (d) None of these.

3. For the validity of Chi-square test which of the following must be true :

- (a) sample size must be small and expected frequency of every cell > 5 .
(b) sample size must be large and expected frequency of every cell > 5 .
(c) sample size must be large and expected frequency of every cell < 5 .
(d) sample size must be small and expected frequency of every cell < 5 .

4. The value of correlation coefficient r satisfies :

- (a)** $r^2 < 1$. **(b)** $-1 < r < 1$.
(c) $0 < r < 1$. **(d)** $|r| < 1$.

5. Rank correlation coefficient equals 1 implies :

- (a) Rankings are not similar.
(b) Ranking is not proper.
(c) Same ranks are assigned to both scores.
(d) None of these.

Turn over

6. Principle of least squares :

- (a) Minimizes the sum of squares of the observations.
- (b) Maximizes the error sum of squares.
- (c) Minimizes the sum of squares of the deviations between observed values and there estimates.

7. If the regression of x on y is $3x + 2y - 7 = 0$ then the regression coefficient of x on y is :

- (a) 3 .
- (b) $\frac{2}{3}$.
- (c) $-\frac{3}{2}$.
- (d)

8. The variable affected by the treatment is called _____ ~~variable~~.

9. If there are 4 treatments in an RBD then degrees of freedom corresponding to treatments in the ANOVA table will be _____

10. In a CRD experiment the error sum of squares can be obtained by subtracting _____ sum of squares from the total sum of squares.

11. To test the significance of a correlation coefficient we use, _____ test.

12. In the Chi-square test for testing association of 2 attributes the null hypothesis is that the two attributes are _____

(12 x 3 = 36 weightage)

Part B

*Answer all questions.
Each carries a weight of 1.*

13. Define significance level of a test.

14. Distinguish between Type I and Type II errors.

15. What is a contingency table ?

16. Define Analysis of variance.

17. What is an experimental unit ?

18. The Rank correlation coefficient of 6 pairs of observations is 0.2. Find the sum of squares of differences of ranks.

19. Explain why there are 2 regression lines.

20. Give the concept of partial correlation.

21. What is meant by interaction ?

(9 x 1 = 9 weightage)

Part C

Answer any **five** questions.
Each carries a weight of 2.

22. Find the rank correlation coefficient :

x	5	4	3	2	1
y	1	2	3	4	5

23. What is Randomization and Replication ?

24. Give the layout of an RBD design. Describe the ANOVA table.

25. For variables x_1, x_2, x_3 based on 20 sets of values $r_{12} = 0.73, r_{13} = 0.68$ and $r_{23} = 0.59$. Find $r_{12.3}$ and $R_{1.23}$.

26. Explain the statistical test for testing the significance of a regression coefficient.

27. Find out the correlation coefficient and the regression of y on x given the following information :—

$$x = 102, \sum y = 96, \sum x^2 = 1368, \sum y^2 = 1,500, \sum xy = 1366, n = 8.$$

28. Consider the following ANOVA table :—

Source	SS	d.f.	MS	F
Treatments	231.5	2	115.7	2.8
Blocks	98.5	7	14.07	
Error	573.8	14	40.98	

- What design was employed ?
- How many treatments were compared ?
- How many observations were analysed ?
- At 0.05 level of significance can one conclude that the treatments have different effects ? Why ?

(5 x 2 = 10 weightage)

Turn over

Part D

Answer any two questions.

Each carries a weight of 4.

29. The following data shows the yield of 3 varieties of wheat in an RBD experiment. Analyse the data and give comments :

	<i>Block 1</i>	<i>Block 2</i>	<i>Block 3</i>	<i>Block 4</i>
Variety A	8	10	6	8
Variety B	3	4	5	6
Variety C	7	8	6	7

30. From the following data find the correlation coefficient and the two regression lines :—

x	2	3	4	5	6
y	3	5	4	8	9

31. The following table gives the observed frequencies of plants in an F_2 population of chillies. Test whether the frequencies are in the. ratio 1 : 3 : 8 : 4.

Class	Purple deep Purple	Medium Purple	Light Purple	green
Frequency	65	203	563	269

(2 x 4 = 8 weightage)