

C 81813

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Name.....

Reg. No.....

**SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, APRIL 2020**

Microbiology

MBG 2C 04—BIOSTATISTICS—II

(2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

*Use of Calculator is permitted.*

**Section A**

*Answer all questions in one word each.*

*Each question carries ½ mark.*

1. Rejecting  $H_0$  when  $H_0$  is true is \_\_\_\_\_ error.
2. Level of significance is the probability of \_\_\_\_\_.
3. Error SS in RBD as compared to CRD using the same material is \_\_\_\_\_.
4. If  $b_{yx} > 1$ , then  $b_{xy}$  is \_\_\_\_\_.
5. If  $r = 0$ , the two lines of regression are at an angle of \_\_\_\_\_.
6. The quantity  $\rho^2$  is known as \_\_\_\_\_.
7. The range of a partial correlation coefficient is \_\_\_\_\_.

Write True or False :

8. A regression equation having two or more independent variable is termed as multiple regression.
9. If  $\rho = 0$ , the lines of regressions are perpendicular to each other.
10. Area of critical region depends on the size of type I error.
11. In a completely randomized design with  $t$  treatments and  $n$  experimental units, error degrees of freedom is equal to  $n - t + 1$ .
12. Tabled value of Chi-square distribution at 5% level of with 10 d.f. = 12.52.

(12 × ½ = 6 marks)

**Section B**

*Answer all questions.*

*Each question carries 2 marks.*

13. Define size of the test.
14. Define Power function.

**Turn over**

15. Explain independence of attributes.
16. Mention any two methods of testing the hypotheses.
17. How will you test the significance of correlation co-efficient ?
18. Define multiple correlation.
19. What do you understand by the test of goodness of fit ?
20. If  $\text{Var}(X + Y) = \text{Var}(X) + \text{Var}(Y)$ , then find the value of correlation co-efficient  $r_{xy}$ .
21. Discuss the type of errors in testing of hypothesis.
22. Describe Chi-square test for independence of attributes.

(10 × 2 = 20 marks)

### Section C

Answer any **six** questions.

Each question carries 5 marks.

23. In 250 digits from the lottery numbers, the frequencies of the digits 0, 1, 2, ..., 9 were 23, 23, 20, 23, 23, 22, 29, 25, 33 and 27. Test that they were randomly drawn.
24. The coefficient of rank correlation between the purchasing cost and manufacturing cost of a company was +0.8. If the sum of the squares of the difference in rank was 33. Find the value of  $n$ .
25. The theory predicts the proportion of beans in the four groups A, B, C and D should be 9:3:3:1. In an experiment among 1600 beans, the numbers in the four groups were 882, 313, 287 and 118. Does the experimental result support the theory ?
26. In a trivariate distribution,  $r_{12} = 0.7$ ,  $r_{23} = r_{31} = 0.5$ , find 1)  $r_{23.1}$  and 2)  $R_{1.23}$ .
27. Explain the procedure of carrying out one-way ANOVA.
28. Out of the two regression equations given below, which one is the equation of X on Y and which one is equation of Y on X :

$$2X + 4Y = 10$$

$$4X + 6Y = 8$$

29. Given the following data :

Treatments			
$T_1$	$T_2$	$T_3$	$T_4$
20.9	23.7	13.2	5.8
12.4	14.1	10.2	6.1
10.1	9.0	5.1	4.8
4.2			1.5

Construct ANOVA table.

30. The following table showing the distribution of digits in numbers chosen from a telephone directory :

Digits :	0	1	2	3	4	5	6	7	8	9	Total
Freq. :	1026	1107	997	966	1075	933	1107	972	964	853	10,000

Test whether the digits may be taken to occur equally frequently in the directory.

(6 × 5 = 30 marks)

### Section D

*Answer any two questions.*

*Each question carries 12 marks.*

31. a) How is partial correlation is different from multiple correlation ?  
 b) Calculate Spearman's Rank correlation coefficient for the following data :

X :	18	33	40	9	16	16	65	24	16	57
Y :	13	13	24	6	15	4	20	9	6	19

32. a) Distinguish between correlation and regression.  
 b) In an experiment on immunization of Cattle from tuberculosis the following results were obtained :

		Affected	Unaffected
Inoculated	...	12	28
Not Inoculated	...	13	7

Examine the effect of vaccine in controlling the incidence of the disease.

33. a) What are different types of correlation ?  
 b) For the following set of data, calculate partial correlation  $r_{12.3}$ .

$X_1$ :	4	6	7	8	13	15
$X_2$ :	15	12	8	6	4	3
$X_3$ :	30	24	20	14	10	4

(2 × 12 = 24 marks)