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Name................................

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FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2014

(UG—CCSS)

Complementary Course—Microbiology

MB 4C 15—BIOSTATISTICS—II

Time : Three Hours

Maximum : 30 Weightage

A. Answer *all* twelve questions. Each question carries $\frac{1}{4}$ **weightage** :

Choose the correct answer :

1 A statement *or* assertion about a parameter *or* the form of distribution is called :

    (a) Estimate.
    (b) Hypothesis.

    (c) Test.
    (d) None of the above.

2 Accepting a false null hypothesis is called

    (a) Type I error.
    (b) Power of a test.

    (c) Type II error.
    (d) Significance level.

3 Level of significance is the probability of :

    (a) Type I error.
    (b) Critical region.

    (c) Type II error.
    (d) None of the above.

4 ANOVA tests the hypothesis that :

    (a) All population totals are equal.

    (b) All population means are equal.

    (c) All population variances are equal.

    (d) None of the above.

5 The conditions for validity of a Chi square test is :

    (a) All sample observations are independent.

    (b) Theoretical frequencies should be 5.

    (c) Total frequency should be large.

    (d) All of the above.

6 Regression between two variables :

    (a) Is always linear.
    (b) Is never linear.

    (c) May be linear.
    (d) None of the above.

Turn over

7 In regression analysis the variable whose value is to be predicted is known as :

  (a) Dependent variable.   (b) Regression variable.

  (c) Independent variable. ———— (d) None of the above.

8 The correlation coefficient used when variables considered are not capable of qualitative measurement is :

  (a) Simple correlation.   (b) Multiple correlation.

  (c) Rank correlation. ———— (d) None of the above. ————

Fill in the blanks :

9 A hypothesis that specifies the distribution completely is known as _____

10 The condition for the Regression lines to be parallel is that the correlation coefficient is _____

11 The basic assumption of ANOVA is that the error term follows the _____ distribution.

12 If two variables X and Y are such that as X increases Y decreases, then the correlation coefficient between X and Y will be _____

(12 x ¼ = 3 weightage)

B. Short Answer Type Questions. Answer *all* nine questions. Each carries weightage 1 :

13 Distinguish between Simple and Composite hypotheses.

14 What are the two errors in testing ?

15 Define Critical Region.

16 If the probabilities of Type I and Type II errors in testing are 0.04 and 0.08 respectively, find the significance level and power of the test.

17 Explain the statistic in testing "independence of attributes".

18 Write the equations to the two regression lines. What are the regression coefficients ?

19 Define Partial correlation.

20 Describe the test procedure for testing the significance of regression.

21 If $2X + 3Y = 6$ and $5X - 4Y = 8$ are the regression lines X on Y and Y on X respectively, find (a) Value of Y when $X = 5$ and (b) Value of X when $Y = 2$.

(9 x 1 = 9 weightage)

C. Answer any *five* questions. Each question carries a weightage of 2 :

22 What do you mean by a contingency table ?

23 Explain the general testing procedure of a statistical hypothesis.

24 Explain the concept of ANOVA. Write any three assumptions underlying the ANOVA technique.

25 Define Rank Correlation Coefficient. What is Spearman's formula for finding the rank correlation coefficient ? When is it used ?

26 Calculate the correlation coefficients for the given data. Comment on the result :

    X : 69 70

    Y : 85 87

27 For the given ANOVA table, identify :

(a) Whether it is a One Way *or* Two way classification ANOVA.

(b) The number of treatments compared.

(c) Total number of observations in the analysis.

(d) Test whether HO is accepted *or* rejected at 5 % level.

Source of Variation	Sum of Squares	d.f.	Mean sum of Squares	F
Treatments	4.07	2	2.01	1.072
Error	18.75	10	1.875	
Total	22.77	12		

28 Explain test of "Goodness of Fit". What are the conditions for the validity of the test ?

(5 x 2 = 10 **weightage**)

D. Answer any *two* questions. Each question carries a **weightage** of 4 :

29 Find the 95 % confidence interval for the regression coefficient Y on X for the given data :

    X : 65 63 67 64 68 62 70 66 68 67 69 71

    Y : 68 66 68 65 69 66 68 65 71 67 68 70

30 A farmer applies 3 types of fertilizers on 4 separate plots. The figure on yield per acre are tabulated as follows. Analyse the data and give comments :

Yield

Fertilizer	Plot → A	B	C	D
Nitrogen	6	4	8	6
Potash	7	6	6	9
Phosphates	8	5	10	9

31 The following figures gives the distribution of digits in numbers chosen at random from a telephone directory :

Digit : 0 1 2 3 4 5 6 7 8 9

Frequency : 1026 1107 997 966 1075 933 1107 972 964 853

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

(2 x 4 = 8 **weightage**)