

C 4011

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Name.....

Reg. No.....

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2016

(CUCBCSS—UG)

Complementary Course

MBY 4C 15—BIostatistics—II

Time : Three Hours

Maximum : 80 Marks

Use of calculator is permitted.

Section A

*Answer all questions in one word each.
Each question carries 2 mark.*

1. The distribution formed of all possible values of a statistic is called _____
2. Test statistic used in ANOVA is _____
3. Diagrammatic representation of bivariate data is known as _____
4. Point of intersection of the regression lines is _____
5. Type II errors are made when we accept a null hypothesis which is _____
6. The hypothesis $H_0 : \mu = \mu_0$ against $H_1 : \mu = \mu_1$ for $N(\mu, 1)$ distribution is _____
7. The coefficient of multiple correlation lies between _____ and _____

Write True or false.

8. Correlation coefficient between height and weight of new born is 2.75.
9. The correlation between the age of applicants for Life insurance and premium of insurance is positive.
10. 1.2 and 1 can be the simple regression coefficients for the variables Hb % and body weight of preterm mothers.
11. In ANOVA, the variation due to assignable causes is called treatment variation.
12. Tabled value of chi-square distribution at 5 % level with 1 df = 3.84.

(12 x $\frac{1}{2}$ = 6 marks)

Turn over

Section B

*Answer **all** questions.
Each question carries 2 marks.*

13. Define Power of a test.
14. In an ANOVA table $SSB = 190$, $MSB = 95$, find the number of treatments.
15. Give any *two* properties of Karl Pearson's Coefficient of correlation.
16. What is the principle of least squares ?
17. Write any *one* application of Correlation.
18. Give the model for a two way ANOVA.
19. Define null hypothesis.
20. What are contingency tables ?
21. If $2Y + X = 50$ and $X + Y = 20$ are the two regression lines , find mean of Y.
22. What do you mean by partial correlation of order two ?

(10 x 2 = 20 marks)

Section C

*Answer any **six** questions.
Each question carries 5 marks.*

23. In an infantile paralysis epidemic, 500 persons contracted the disease. 200 received no serum treatment and of these 75 became paralysed. Of those who did receive serum treatment 65 became paralysed. Was serum treatment is effective?

[Tabled value of Chi-square distribution at **1%** level for 1 and 2 df are 6.64 and 9.21 respectively.]
24. Explain the procedure for carrying out ANOVA.
25. What are the conditions under which chi-square test for testing independence of attributes is applied?

26. One of Mendel's breeding experiments resulted in the following data :

Type of pea	Expected	Observed
Smooth yellow	313	315
Wrinkled yellow	104	101
Smooth green	104	108
Wrinkled green	035	032

Do you think such a good fit is "too good to be true" ?

[Tabled value of chi-square distribution at 5 % level with 3 and 4 df are 7.815 and 9.488 respectively]

27. A researcher wanted to study the Bacteria content in 3 brands of soft drink bottles. He examined randomly taken 5 bottles of each brand. His calculation is as follows :

Source	df	SS	MSS	F
Between	8.14
Within	140		
Total			

Complete the ANOVA table.

28. Calculate Rank correlation coefficient between stress score (x) and anxiety score (y) of 7 patients :

X	90	80	81	70	63	77	68
Y	51	45	52	34	30	49	33

29. Distinction between correlation and regression analysis.
30. In a partially destroyed record, two regression lines are $4y = 9x + 15$, and $25x = 6y + 7$. Find the correlation coefficient.

(6 x 5 = 30 marks)

Turn over

Section D

*Answer any two questions.
Each question carries 12 marks.*

31. (a) What is meant by correlation ?

(b) The heights of fathers and sons are given below :

Height of fathers (inches)	65	61	67	68	69
Height of sons (inches)	67	66	64	68	70

Calculate Karl Pearson's correlation coefficient.

(3 + 9 = 12 marks)

32 (a) What are the important properties of regression coefficients ?

(b) The height (x cms.) and weight (y kgs.) of 6 students are as follows :

X	153	157	168	160	170	164
Y	48	50	53	49	54	52

Obtain the two regression equations. Find the expected height of a person whose weight is 55 kgs.

(3 + 9 = 12 marks)

33. (a) Explain multiple and partial correlation in the case of trivariate distribution.

(b) If $r_{12} = 0.8$, $r_{13} = 0.4$ and $r_{23} = 0.56$, find the values of $r_{12.3}$, $r_{13.2}$ and $r_{23.1}$.

(3 + 9 = 12 marks)

[2 x 12 = 24 marks]