29-3-2018

Class: B.Sc. Generic   Course: Econometrics

Semester: II   Course Code: MAG-152

Time Allowed: 2Hours   *Maximum Marks: 30*

<u>Note:</u> Attempt all six questions in Section A. Each question carries 1 marks.

Attempt any four questions in Section B. Each question carries 3 marks.

Attempt any two questions in Section C. Each question carries 6 marks.

SECTION: A
(Very Short Answer Type Questions)

(Marks:6X1=6)

1. What does mean by null hypothesis for a test statistics?
2. In a statistic class there are only five students; the midterm score of these be 70, 78, 80, 80, and 95. Let a sample of size three: 70, 80, 95be taken from it. Does the mean score estimated from the sample ,higher than the mean score of the population? Explain it.
3. Define the following: Type-I-Error, Power of a Test.
4.   In the model $y = b_1 + b_2 x + e$ explain each term.
5. What is scatter diagram?
6. Define coefficient of determination ;what is its range.

SECTION: B
(Short Answer Type Questions)

(Marks: 4X3=12)

7. Write test about apopulation mean for a normal population with known variance. Also define unbiasedness, and efficiency of estimators.
8. In one sample of 8 observations, the sum of square of deviations of the sample values from the sample mean was 84.4 and in the other sample of 10 observations it was 102.6. Test whether this difference is significant at 5% level.Given $F_{0.05}(7,9)df = 3.29$, df means degrees of freedom.
9. Let p be the probability that a coin will fall head in a single toss in order to test null hypothesis $H_0 : p = 1/2$ against alternative hypothesis $H_1 : p = 3/4$ .The coin is tossed 5 times and H_0 is rejected if more than 3 heads are obtained. Find the probability of type I error, type II error, and power of the test.

10. Briefly explain the assumptions of the ordinary linear regression model.

11. i.Plot the following straight lines. Give the values of the y-intercept and slope for each of these lines and interpret them. Indicate whether each of the lines gives a positive or a negative relationship between x and y.
    a. $y = -60 + 8x$ b. $y = 300 - 6x$

ii. A population data set produced the following information: $N = 250$, $\sum x = 9880$, $\sum y = 1456$, $\sum xy = 85,080$, $\sum x^2 = 485,870$.

Find the population regression line.

12. Find the least squareregression line for the data on income and food expenditures on the seven households given in the table

Income	55	83	38	61	33	49	67
Food expenditure	14	24	13	16	9	15	17

Use income as an independent variable and food asadependent variable.

SECTION: C
(Long Answer Type Questions)

(Marks: 2X6=12)

13. i. Derive the ordinary least square regression line for one explanatory variable.

ii. Show that mean value of the residuals(errors) is zero.

14. Write short notes on Chi -square test

ii. The following figures show the distribution of digits in numbers chosen at random from a telephone directory :

Digits	0	1	2	3	4	5	6	7	8	9	Total
Frequency	1026	1107	997	966	1075	933	1107	972	964	853	10000

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

15. Let $\hat{\theta}_1$ and $\hat{\theta}_2$ be two unbiased estimators of θ. Show that $\hat{\theta}_3 = a\hat{\theta}_1 + (1-a)\hat{\theta}_2$, $0 \le a \le 1$

is an unbiased estimator of θ. Again assume that $\hat{\theta}_1$ and $\hat{\theta}_2$ are independent, and

$\text{var}(\hat{\theta}_1) = \sigma_1^2$ and $\text{var}(\hat{\theta}_2) = \sigma_2^2$. How should '$a$' be chosen inorder tominimise the

variance of $\hat{\theta}_3$.