LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **STATISTICS**

FIFTH SEMESTER – **NOVEMBER 2013**

ST 5405 - ECONOMETRIC METHODS

Date : 18/11/2013 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

SECTION A

Answer all the Questions **(10X2=20 Marks)**

1. Define Econometrics
2. State any two uses of linear regression model
3. State the test statistic used for testing significance of individual regression coefficients
4. State the hypothesis and procedure for testing overall significance of model coefficients?
5. Total Sum of Squares = 390 and Error Sum of Squares = 40 then r^2=?
6. State the methods of detecting outliers in the context of linear regression
7. Define Dummy variable rule with an example
8. Explain almost near Multicollinearity and state its concequence
9. What is optimal cut value in the case of binary classification?
10. Explain classification table in the context of Binary logistic regression

SECTION B

Answer any FIVE questions **(5X8=40 Marks)**

11. a. Explain the procedure to test the overall significance of the model coefficients
    b. Explain the procedure for testing the significance of individual regression coefficients

12. Estimated linear regression model for the data given below is
    Sales=100.39+2.362(Advertisement Expense). Determine r^2 and MAPE

Sales(in lakhs)	157	172	165	182	185	186	189	199	202	157
Adv_Expense	24	28	24	27	29	31	35	38	39	24

13. State the assumptions of OLS regression and the consequences of violating OLS assumptions
14. Explain the methods of model validation
15. a. Explain dummy variable rule with an example (3+5)
    b. Explain how the coefficient of the cross product term captures the interaction effect

16. Explain the construction of Binary Logistic regression model and provide any two use of binary logistic regression model

17. Explain with an example how the coefficients of cross product term in a linear lregression model captures the interaction effect

18. Explain classification rule , sensitivity, specificity and method of determining optimal cut value in the case of binary logistic regression model

SECTION C

Answer any TWO questions **(2X20=40 Marks)**

19. a. Define Least square criteria and obtain the least squares estimators of regression coefficients
    b. Explain the methods of detecting outliers

20. a. Explain r^2 as a measure for goodness of model fit
    b. Define Multicollinearity and explain the method of detecting Multicollinearity using VIF

21. Construct a Multiple Linear regression model of the form

    Purchase value = $\beta_0 + \beta_1(\text{Age}) + \beta_2(\text{Income}) + \varepsilon$ based on the data given below

Purchase Value(000s)	23	28	25	24	29	25	23	33	28	38
Age	38	43	48	45	43	47	49	42	41	39
Income (in Lakhs)	15.5	16	16	16.5	17	16.5	16	18	16.5	19

22 . Consider the data given below,

Bad customer={1-Bad credit customer, 0-Good credit customer}

X1:Income	229	312	235	397	269	268	234	708	198	306
X2:MartStatus	0	0	1	0	0	1	1	0	1	0
Y:Bad customer	1	0	1	0	0	1	0	0	1	0

The fitted logit model equation is given by

$$\ln\left(\frac{p_i}{1-p_i}\right) = 11.229 - 0.04632(Income) + 0.9255(MartStatus)$$

i) Determine the predicted probability based on the fitted model

ii) Obtain Classification table, Sensitivity, Specificity based on cut value = 0.2 and cut value=0.5, which cut value provides a better classification?

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