D 51009 (Pages : 5) Name..

Reg. No....................................

THIRD SEMESTER M.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2023

(CBCSS)

Economics

ECO 3C 11—BASIC ECONOMETRICS

(2019 Admission onwards)

Time : Three Hours   Maximum : 30 Weightage

Part A

Answer **all** *questions.*

Each bunch of **five** *questions carries a weightage of* 1.

Multiple Choice :

1. Which of the following methods do we use to find the best fit line for data in Linear Regression ?

    a) Least Square Error.   b) Maximum Likelihood.

    c) Logarithmic Loss.   d) Both a) and b).

2. Which of the following is true about Residuals ?

    a) Lower is better.

    b) Higher is better.

    c) a) or b) depend on the situation.

    d) None of these.

3. Suppose that we have N independent variables $(X1, X2...Xn)$ and dependent variable is Y. Now Imagine that you are applying linear regression by fitting the best fit line using least square error on this data. You found that correlation co-efficient for one of it's variable (Say X1) with Y is – 0.95. Which of the following is true for X1 ?

    a) Relation between the X1 and Y is weak.

    b) Relation between the X1 and Y is strong.

    c) Relation between the X1 and Y is neutral.

    d) Correlation can't judge the relationship.

Turn over

4. Which of the following statement is true about outliers in Linear regression ?

   a) Linear regression is sensitive to outliers.

   b) Linear regression is not sensitive to outliers.

   c) Can't predict.

   d) None of these.

5. In a linear regression problem, we are using "R-squared" to measure goodness-of-fit. We add a feature in linear regression model and retrain the same model. Which of the following option is true ?

   a) If R Squared increases, this variable is significant.

   b) If R Squared decreases, this variable is not significant.

   c) Individually R squared cannot tell about variable importance. We can't say anything about it right now.

   d) None of these.

6. Which of the one is true about Heteroskedasticity ?

   a) Linear Regression with varying error terms.

   b) Linear Regression with constant error terms.

   c) Linear Regression with zero error terms.

   d) None of these.

7. Which of the following indicates a fairly strong relationship between X and Y ?

   a) Correlation co-efficient = 0.9.

   b) The p-value for the null hypothesis Beta co-efficient = 0 is 0.0001.

   c) The t-statistic for the null hypothesis Beta co-efficients is 30.

   d) None of these.

8. Generally, which of the following method(s) is used for predicting continuous dependent variable?

  1 Linear Regression.

  2 Logistic Regression.

   a) 1 and 2.   b) only 1.

   c) only 2.   d) None of these.

9. What would be then consequences for the OLS estimator if heteroscedasticity is present in a regression model but ignored ?

    a) It will be ignored.

    b) It will be inconsistent.

    c) It will be inefficient.

    d) All of a), c), b) will be true.

10. The expected value of Y is a linear function of the $X(X1, X2...Xn)$ variables and regression line is defined as :

$$Y = \beta 0 + \beta 1\ X1 + \beta 2\ X2..... + \beta n\ Xn$$

Features are independent of each others(zero interaction).

Which of the following statement(s) are true ?

    1 If Xi changes by an amount ΔXi, holding other variables constant, then the expected value of Y changes by a proportional amount $\beta i\ \Delta Xi$, for some constant βi (which in general could be a positive or negative number).

    2 The value of βi is always the same, regardless of values of the other X's.

    3 The total effect of the X's on the expected value of Y is the sum of their separate effects.

    a) 1 and 2.

    b) 1 and 3.

    c) 2 and 3.

    d) 1, 2 and 3.

11. Suppose you have applied a logistic regression model on data and got training accuracy X and testing accuracy Y. Now you want to add few new features in data. Select option(s) which are correct in such case. (Consider remaining parameters are same.)

    1 Training accuracy always decreases.

    2 Training accuracy always increases or remain same.

    3 Testing accuracy always decreases.

    4 Testing accuracy always increases or remain same.

    a) Only 2.

    b) Only 1.

    c) Only 3.

    d) Only 4.

12. In a simple linear regression model (One independent variable), If we change the input variable by 1 unit. How much output variable will change ?

    a) By 1.   b) No change.

    c) By intercept.   d) By its Slope.

13. A dummy variable is used as an independent variable is used when ———————.

    a) The variable is numerical.

    b) Variable involved is categorical.

    c) When 2 independent variables interact.

    d) None of the above.

14. How many dummy variables are needed to uniquely represent if a categorical independent variable contains two categories ?

    a) 1.   b) 2.

    c) 3.   d) 4.

15. When two or more of the explanatory variables are highly correlated, this situation is referred to as

    a) Heteroscedasticity.   b) Autocorrelation.

    c) Linearity.   d) Collinearity.

$(15 \times 1/5 = 3 \text{ weightage})$

Part B (Very Short Answer Questions)

Answer any **five** *questions.*
Each question carries a weightage of 1.

16. What is Heteroscedasticity ?

17. Define P value.

18. What do you mean by a positive co-efficient in a multiple regression ?

19. Discuss the uses of f test.

20. Define margin of error.

21. What is Seasonal Analysis ? Discuss applications of Seasonal Analysis ?

22. Explain various use of Dummy variable in Seasonal Analysis.

23. Define Statistic.

(5 × 1 = 5 weightage)

Part C (Short Answer Questions)

Answer any **seven** *questions.*
Each question carries a weightage of 2.

24. Differentiate between standard error and standard deviation.

25. Discuss the properties of estimators.

26. Discuss the properties of Maximum likelihood estimators.

27. Explain central limit theorem.

28. What is goodness of fit for a linear regression model ?

29. Discuss the uses of t test.

30. Explain the uses of dummy variable.

31. Briefly explain autocorrelation.

32. What do you mean by distributed lag models ?

33. What do you mean by normality assumption.

(7 × 2 = 14 weightage)

Part D (Essay Questions)

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

34. Write a short note on ANOVA model.

35. Explain Nature, consequences, detection, and remedial measures of autocorrelation.

36. The following figures represent the Annual sales of M/s. Suman Roy Company.

   Find the trend values for each year, by adopting the method of least squares, b) Estimate the Annual sales for the next five years.

Year	:	1996	1997	1998	1999	2000
Sales in lakhs	:	46	50	47	60	70

37. Nature, consequences, detection, and remedial measures of Heteroskedasticity.

(2 × 4 = 8 weightage)