

Dr. Babasaheb Ambedkar Open University
Term End Examination January – 2026

Course	: MSCDS	Date	: 23/02/2026
Subject Code	: MSCDS-201	Time	: 11:30am to 01:45pm
Subject Name	: Regression Analysis and Predictive Models	Duration	: 02.15 Hours
		Max. Marks	: 70

Section A

Answer the following (Attempt any three) (30)

1. Define Residuals and describe different types of Residuals.
2. How does the standard error indicate the reliability of regression coefficients?
3. List and explain various model building guidelines in details.
4. Discuss how the t-test is used to evaluate the significance of individual predictors in a regression model?
5. Write a detailed note on Natural Logarithm Transformation for Predictors.

Section B

Answer the following (Attempt any four) (20)

1. Discuss in short about Simple Linear Regression Model.
2. What is need for square root transformation for the response?
3. How the F-test is used to evaluate the overall fit of a simple regression model?
4. Describe in short about variable selection procedure.
5. Write down not on interpretation of the coefficients in a multiple regression model?
6. Explain general form of interaction between a Continuous and a Categorical Predictor.

Section C

Part – A (Multiple Choice Questions) (10)

- 1 In regression analysis, the dependent variable is also referred to as the ____ variable.
A Predictor B Independent
C Response D Confounding
- 2 _____ is used to summarize the results of the F-test for significance in regression.
A Correlation matrix B ANOVA table
C Scatter diagram D Residual plot
- 3 In any regression model that includes an intercept term (β_0), the sum of the residuals is always _____.
A Zero B Positive
C Negative D Unpredictable
- 4 The _____ Model serves as the baseline for comparison.
A R-squared B Reciprocal
C Polynomial D Linear
- 5 The _____ is an automated approach for suggesting power transformations of predictor variables.
A Partial residuals Plots B Ceres Plots
C Box-Tidwell method D None of them

- 6 The Residual Mean Square (RMS) is used to _____.
 A Measure model fit B Find regression line
 C Measure correlation D Compute coefficients
- 7 Primary objective of building a regression model is to _____.
 A find a perfectly predictive model for the response variable.
 B find a useful model that explains relationships and predicts outcomes
 C include as many predictors as possible for the highest accuracy
 D ensure that all predictor variables are significant
- 8 _____ technique starts with no variables in the model and adds variables one by one based on their contribution to improving model fit.
 A Backward selection B Stepwise regression
 C Best-subset regression D Forward selection
- 9 _____ method can help detect multicollinearity.
 A Durbin-Watson Test B Variance Inflation Factor (VIF)
 C Q-Q Plot D Residual Plot
- 10 _____ helps assess the model's validity and the relevance of its predictors.
 A Residual analysis B Data normalization
 C Correlation plotting D Significance testing

Part – B (Do as Directed)

(10)

- 1 A simple linear regression model is more effective when the observed y -values are closer to the fitted $\hat{y}$ -values. True / False
- 2 The least-squares regression line invariably passes through the centroid of the data, represented by the point $(\bar{x}, \bar{y})$. True / False
- 3 The relationship between dependent and independent variables must be linear. True / False
- 4 A model is linear if its parameters are linear, even if predictors are nonlinear. True / False
- 5 Residual analysis helps us assess whether the regression assumptions are satisfied. True / False
- 6 The multiple linear regression model describes an algebraic relationship between a predictor variable and one or more response variables. True / False
- 7 A qualitative predictor with k levels requires $k - 1$ indicator variables to represent it in a regression model. True / False
- 8 Mallows' C_p Statistic helps balance the trade-off between the bias and variance of the model. True / False
- 9 Logistic regression is a powerful tool for modeling binary outcomes. True / False
- 10 Regression models aim to quantify relationships between variables. True / False
