[80/103] SEAT No._____ No. of Printed Pages : 2

Sardar Patel University

External Examination (NC)

M.Sc. Statistics/Applied Statistics Semester II

October 25, 2018, Thursday

PS02CSTA02/PS02CSTA22/PS02CAST22: Liner Models and Regression Analysis

Marks: 70 **Time: 10:00 a.m. to 01:00 p.m.**

Q1 **Multiple Choice Questions.** **08**

1. _____ criterion is useful to check adequacy of the model in regression analysis.
   (a)Coefficient of determination (b) AIC (c) Mallows Cp (d) all of them
2. The error space and estimation space are _____to each other.
   (a) orthogonal (b) perpendicular (c) both (a) and (b) (d) parallel
3. _____method is considered as remedial measure of Multicolinearity
   (a) simple correlations (b) VIF (c) partial correlations (d) principal component analysis
4. The necessary and sufficient condition for parametric function $\underline{\lambda}'\underline{\beta}$ to be estimable is $\underline{\lambda}' = \underline{\lambda}'H$ provided_____.
   (a) $\underline{\lambda}'\hat{\underline{\beta}}$ is biased (b) $Rank(X) = r$ (c) $Rank(X'X/X'\underline{y}) = Rank(X'X)$
   (d) $\underline{\lambda}'$ is a linear combination of columns of X
5. Test of priori contrasts are performed before rejecting hypothesis in _____.
   (a) Ridge regression (c) ANOVA
   (c) multiple regression (d) Discriminant Analysis
6. Ridge estimators' are_____ function of OLS estimators.
   (a) non linear (b) product (c) inverse (d) linear
7. $y = exp\ (\beta x)$ is _____model.
   (a) Nonlinear (b) Intrinsically nonlinear(c) Intrinsically linear model (d) None of them
8. A linear function of observations belongs to error space if
   (a) Its expected value is equal to its parametric function
   (b) Its expected value is identical to zero
   (c) It is estimable
   (d) None of the above

Q2 **Short Answer Questions. (Any Seven)** **14**

1. In usual notation, shows that X=XH.
2. In usual notation, obtain E(SSE).
3. Distinguish between Error space and Estimation space.
4. Write in brief about to detect influential points in regression analysis.
5. Define the leverage points. Further, write a criterion to detect leverage point.
6. Give the anova table for lack of fit test in regression analysis.
7. List the various criteria to decide about presence of Multicolinearity.
8. Write brief on Duncan Multiple Range test.
9. Distinguish between error and residual. List various names of residual used in regression analysis.

Q3(a)	In usual notation, derive the estimate of $\underline{\beta}$ in General Linear Model, when parameters are subject to constraints or conditions.	**06**
(b)	State and prove any two necessary and sufficient conditions for parametric function to be estimable.	**06**
	[OR]	
(b)	Discuss the Gauss Markoff theorem to obtain BLUE of an estimable parametric function in General Linear Model.	**06**
Q4(a)	Discuss Generalized Least Square method to estimate parameters when errors are heteroscedastic in nature.	**06**
(b)	Discuss ANCOVA model.	**06**
	[OR]	
(b)	In usual notation, derive the distribution of SSE.	**06**
Q5(a)	Distinguish between simple linear regression model and multiple linear regression models. Further, explain estimation procedure in simple linear regression model.	**06**
(b)	Write note on (i) normal probability plot (ii) partial residual plots.	**06**
	[OR]	
(b)	In usual notation, discuss scaling of residuals in regression analysis.	**06**
Q6(a)	Discuss Goodness of fit criteria for multiple linear regression models.	**06**
(b)	Discuss remedial measures of Multicolinearity.	**06**
	[OR]	
(b)	Explain forward method and backward method in regression.	**06**

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