D2AST2004 **(1 Page)** **Name.....**
Reg.No.....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2021

STATISTICS

FMST2C09: DESIGN AND ANALYSIS OF EXPERIMENTS

Time: 3 Hours **Maximum Weightage: 30**

Part A: *All* questions can be answered. Each carries *two* weightage (Ceiling 6 weightage).

1. Explain the role of randomization and replication in design of experiments.
2. Discuss the regression approach to the analysis of variance.
3. Write down the model of a Graeco Latin Square Design. Also give an example plan of it.
4. Derive the expression for the expected value of the mean squares in Randomized Block Design.
5. Construct a BIBD with $v=16, b=20, k=4, r=5$ and $\lambda=1$.
6. State and prove the parametric relations in PBIBD.
7. Distinguish between complete and partial confounding. Give an example each.

Part B: *All* questions can be answered. Each carries *four* weightage (Ceiling 12 weightage).

8. Explain Kruskal Wallis test.
9. If Y_1, Y_2, Y_3, Y_4 are independent random variables with common variance σ^2 and $E(Y_1)=E(Y_2)=\theta_1+\theta_2$ and $E(Y_3)=E(Y_4)=\theta_1+\theta_3$. Show that $\theta_1+\theta_2$ and $2\theta_1+\theta_2+\theta_3$ are estimable. Find their best estimates.
10. Write down the model and explain in detail the analysis of a design in which no local control is used.
11. Briefly describe the analysis of Latin square design.
12. State and prove Fisher's inequality.
13. Explain how various blocks are formed in Lattice design.
14. Analyse the 2^3 factorial design with ANOVA table.

Part C: *All* questions can be answered. Each carries *six* weightage (Ceiling 12 weightage).

15. Let the model equations be $y_1=2\alpha_1+3\alpha_2+e_1$, $y_2=3\alpha_1+4\alpha_2+e_2$ and $y_3=4\alpha_1+5\alpha_2+e_3$. Find the class of estimable parametric functions and their best estimates.
16. Distinguish between intra block and inter block analysis of BIBD.
17. Explain the analysis of a 3^2 factorial experiment with r replications.
18. Explain the analysis of a split plot design.