Roll.No. | 20PAMET2002

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
M.Sc.Applicable Mathematics - END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER -II
20PAMET2002 - Mathematical Statistics

Total Duration : 2 Hrs. 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Let X_1, X_2, X_3 are independent random variable having Poisson distribution with parameter λ .Show that $\frac{X_1 + X_2 + X_3}{3}$ and $\frac{5X_1 + 3X_2 + X_3}{9}$ are also unbiased estimator of λ.
2. Bring out the steps involved in finding the solution to the problem of testing of hypothesis.
3. State any five properties of maixmum likelihood estimator.
4. Prove Lehmann-Scheffe theorem.
5. Obtain $100(1-\alpha)\%$confidence interval for the difference between two population proportions.
6. Explain Type I and Type II Error.
7. How do you test the equality of variances of two normal populations using F distribution?
8. Explain the Step by Step procedure for Two way ANOVA.

Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. State and Prove Rao-Blackwell theorem.
10. Obtain the confidence interval for the difference between the two population means when population variance are not known.
11. State and prove Neyman Pearson's Lemma.
12. Test $H_0 : \mu = \mu_1$ against alternative $H_1 : \mu_1 < \mu_0$ or $H_1 : \mu_1 < \mu_0$ for the normal population with unit variance and mean μ.

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II - Compulsory question $(1 \times 10 = 10$ Marks)

13. Three different machines are used for a production. On the basis of the outputs, set up one way ANOVA table and test whether the machines are equally effective.

Machine I	**Machine II**	**Machine III**
10	9	20
15	7	16
11	5	10
10	6	14

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