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 - NOV'2024
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. What is point estimation? When do we say that an estimate of a population parameter is consistent?
2. State Cramer-Rao inequality and its uses.
3. Find the maximum likelihood estimate for the parameter $'\mu'$ of normal distribution $N(\mu, \sigma^2)$.
4. Explain the method of moments for estimating the parameter of a population.
5. Describe the errors that can arise in testing of hypothesis.
   How are they related to power of the test?
6. Define critical region. How is the critical region determined for a most powerful test and uniformly most powerful test?
7. A die is rolled 120 times with the following results:

Result:	1	2	3	4	5	6
Frequency:	20	30	20	25	15	10

   Test the hypothesis that the die is fair at 5% level of significance.

8. There are three main brands of a certain powder. A set of 120 sample values is examined and found to be allocated among four groups (A, B, C and D) and three brands 1 2 and 3 as shown

Brands	Groups			
	A	B	C	D
I	0	4	8	15
II	5	8	13	6
III	18	19	11	13

   Is there any significant difference in brand's preference. Answer at 5% level using one way ANOVA.

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Section C

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

9. State and prove Rao-Blackwell theorem.
10. Describe the method of moments of obtaining the maximum likelihood estimate of a population parameter.
11. State and prove Neymann Pearson lemma.
12. A filling machine is expected to fill 5kg of powder into bags. A sample of 20 bags gave the weights 4.7, 4.9, 5, 5.1, 5.4, 5.2, 4.6, 5.1, 4.6, 4.7.Test whether the machine is working properly.

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

13. Perform two way Anova for the data given below:

Plots of land	Treatment			
	A	B	C	D
I	38	40	41	39
II	45	42	49	36
III	40	38	42	42

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