NC-106

December-2015

B.Sc., Sem.-V

Core Course-302: Statistics
(Statistical Inference and Design of Experiment – I)

Time : 3 Hours] **[Max. Marks : 70**

Instruction : All questions carry equal marks.

1. (a) Explain the term :

   (i) Estimator (ii) Estimable

   (iii) Parameter (iv) Parameter space

   OR

   Explain general procedure for estimation by giving an example of Normal distribution.

   (b) Give the difference between statistics and parameter. Explain the role of statistics in estimation procedure.

   OR

   Explain the procedure of interval estimation by giving an example of estimating μ in Normal distribution.

2. (a) Show that $t = \dfrac{r(r-1)}{n(n-1)}$ is an unbiased estimator of θ^2 in the binomial distribution

   $f(r) = \begin{pmatrix} n \\ r \end{pmatrix} \theta^r (1-\theta)^{n-r}$, r = 0, 1, 2, ….n, $0 < \theta \leq 1$. Hence show that

   $T = \dfrac{r}{n} - \dfrac{r(r-1)}{n(n-1)}$ is unbiased estimator of $\theta(1-\theta)$.

   OR

   Show that sample mean $(\bar{x})$ for Cauchy distribution is not consistent estimation for μ but Sample Median $(\tilde{x})$ is consistent estimator for μ.

   (b) State and prove Cramer – Rao inequality. State Regularity Conditions.

   OR

   State and prove factorization theorem for discrete case only.

3. (a) For $f(x \cdot \mu \cdot \sigma) = \dfrac{1}{\sqrt{2\pi\sigma}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$; $-\infty < x < \infty$. Find m/c of μ and σ^2 on basis of a random of size n.

OR

Explain method of moments. Obtain moment estimator of P in binomial distribution.

(b) Explain method of m/c.

OR

Explain method of Scoring by giving an example.

4. (a) Discuss the procedure of Analysis of two way classification fully.

OR

Explain following terms :
(i)   Experiment
(ii)   Treatment
(iii) Experimental unit and
(iv)   Experimental errors.

(b) Discuss principles of design of experiment.

OR

Discuss layout of CRD, give its advantages and disadvantages. Also describe Analysis of CRD fully.

5. (i)   State Rao-Blackwell theorem.
(ii)   State Gauss Markoff's theorem.
(iii) Define degress of freedom in ANOVA.
(iv)   Define MVUE.
(v)   Give two applications of two way ANOVA.
(vi)   Write two uses of CRD.
(vii) State two properties of m/c.

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