Nov-2014

DEPARTMENT OF STATISTICS

M.Sc. SEMESTER-I EXAMINATION

PAPER: 3 - INFERENCE-I (THEORY OF ESTIMATON) – 2754

MARKS: 70 **DURATION: 2.5 HOURS**

Q-1 (A)	Define the following terms: (1) Consistency (2) Statistic (3) Trivial Statistic (4) Parameter (5) Unbiasedness (6) Sufficiency Principle	**(6)**
Q-1 (B)	State and prove Rao-Blackwell Theorem.	**(8)**
	OR	
Q-1 (A)	Define the following terms: (1) MVUE (2) UMVUE (3) Standard Error (4) Estimator (5) Complete Statistic (6) Statistical Inference	**(6)**
Q-1 (B)	State and prove Neyman Fisher Factorization Theorem.	**(8)**
Q-2 (A)	State and prove Lehmann Scheffe Theorem.	**(7)**
Q-2 (B)	State and prove Cramer-Rao Inequality.	**(7)**
	OR	
Q-2 (A)	Write a detailed note on Fisher's Information.	**(7)**
Q-2 (B)	State and prove Chapman-Robin's Inequality.	**(7)**
Q-3 (A)	Define Likelihood function and MLE. State it's six properties.	**(7)**

Q-3 (B) Obtain the most general form of the distribution having MLE of the parameter θ equal to the sample mean. **(7)**

OR

Q-3 (A) Explain the method of minimum chi square. **(7)**

Q-3 (B) Obtain moment estimates for $\theta_1 and\ \theta_2$ on a random sample of size 'n' for $X \sim U(\theta_1, \theta_2)$. **(7)**

Q-4 (A) Explain ZOLF, GELF and LLF in detail. **(6)**

Q-4 (B) Write a short note on Bayes Estimation. **(8)**

OR

Q-4 (A) Explain the following terms: **(6)**

(1) Prior p.d.f. (2) Posterior p.d.f. (3) Loss function

Q-4 (B) Let $g(t/\theta)$ be the p.d.f. of a sufficient statistic 't' for θ and $\pi(\theta)$ be the prior distribution of θ, then prove that the marginal distribution of 't' is given by $m(t) = \int_\Omega g(t/\theta)\,\pi(\theta)d\theta$ and the posterior distribution is $P(\theta/x) = h(\theta/t) = \dfrac{g(t/\theta) \cdot \pi(\theta)}{\int_\Omega g(t/\theta)\,\pi(\theta)d\theta}$ **(8)**

Q-5 (A) Explain the following terms: **(6)**

(1) Fiducial Interval (2) UMA Confidence Set

(3) UMAU Confidence Set

Q-5 (B) Define Ancillary Statistic and First Order Ancillarity. Let $X \sim F_x(x - \theta)$ which is a location parameter family. Prove that sample range is ancillary statistic. **(8)**

OR

Q-5 (A) It is known that the 95% confidence limits for population mean are 48.04 and 51.96. What is the value of population variance if the sample size is 100 ? **(6)**

Q-5 (B) State and prove Basu's Theorem. **(8)**

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