



Q.1. Answer the following short questions:

- i) Write a note on the comparison of Asymptotic Unbiasedness and Consistency. (05)**
- ii) Write the procedures for finding whether any estimator is sufficient or not, what are (if any) the objections on them? (4+4)**
- iii) How would you explain the joint sufficiency? (02)**
- iv) Differentiate between location invariant and scale invariant estimators. (03)**
- v) What do you mean by completeness? explain. (05)**
- vi) Write and explain different forms of efficiency. (07)**

Q.2. Answer the following questions.

- i) Let $f(x : \theta, p) = \frac{1}{\Gamma(p)\theta^p} x^{p-1} e^{-x/\theta}$. $0 < x \leq \infty$, $p > 0$. The M.V.B estimator of θ for known p is \bar{x} / p with variance $\theta^2 / (np)$, find the M.V.B estimator of 'p' and its variance. (10)**
- ii) Prove that sufficient statistic is unique. (08)**
- iii) Let $x_1, x_2, x_3, \dots, x_n$ be a random sample, n being fixed, from a uniform distribution over the range $(0, a)$. Check $\hat{M} = \max(x_1, x_2, \dots, x_n)$ and $\hat{Q} = \min(x_1, x_2, \dots, x_n)$ for possible unbiasedness and consistency. (12)
Where \hat{M} and \hat{Q} are order statistics**