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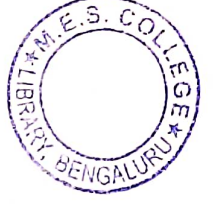
III Semester B.Sc. Degree Examination, March/April - 2021

STATISTICS - III

Statistical Inference - I

(CBCS Scheme Freshers &amp; Repeaters 2019-20 &amp; Onwards)

Paper : III



Time : 3 Hours

Maximum Marks : 70

*Instructions to Candidates:*

1. Answer any **Ten** sub-divisions from section A and any **Five** questions from Section B.
2. Scientific calculators are allowed.

**SECTION - A****I. Answer any TEN sub-divisions from the following :****(10×2=20)**

1. a) What is sampling distribution?  
b) Define scale family of pdfs with an example.  
c) Define asymptotic unbiasedness.  
d) If  $t$  is an unbiased estimator of  $\theta$ , then prove that  $t^2$  is a biased estimator of  $\theta^2$ .  
e) Define efficiency of an estimator.  
f) State C-R inequality.  
g) Obtain moment estimator of  $\lambda$  in Poisson distribution.  
h) What is meant by pivotal quantity? Give an example.  
i) Write confidence limits for the binomial proportion  $P$ .  
j) Write confidence limits for the mean  $\mu$  of normal distribution.  
k) Write a note on simulation.  
l) Mention the advantages of simulation.

[P.T.O.]



(2)  
SECTION - B

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II. Answer any FIVE of the following questions. (5×10=50)

2. a) Obtain mean and variance of chi - square distribution.  
b) Show that all odd-ordered central moments of t-distribution vanish (6+4)
  3. a) Obtain mode of chi-square distribution.  
b) Obtain the distribution of reciprocal of F-variate. (5+5)
  4. a) Show that sample mean is an unbiased estimator of  $\lambda$  of poisson distribution.  
b) State and prove sufficient conditions for the consistency of estimators. (4+6)
  5. a) Obtain consistent estimator of  $\mu$  in  $N(\mu, \sigma^2)$  distribution, where  $\sigma^2$  is known.  
b) Obtain the relative efficiency of sample mean with respect to sample median, when the random sample is taken from a normal  $N(\mu, \sigma^2)$  distribution. (4+6)
  6. a) Obtain sufficient estimator of  $\lambda$  in  $P(\lambda)$  distribution.  
b) Obtain MVB estimator of  $\mu$  in  $N(\mu, \sigma^2)$  distribution. where  $\sigma^2$  is known. (4+6)
  7. a) Obtain MLE of P in Bernoulli B(1,P) distribution.  
b) Obtain moment estimators of  $\alpha$  and  $\beta$  in  $V(\alpha, \beta)$  distribution. (4+6)
  8. a) Obtain  $(1-\alpha)$  100% confidence limits for Variance  $\sigma^2$  of a normal distribution when  $\mu$  is known.  
b) Derive  $(1-\alpha)$  100% confidence limits for the difference of two population means  $(\mu_1 - \mu_2)$  when population variances are known. (5+5)
  9. a) Explain a method of drawing random samples from normal distribution.  
b) Describe the method of generating random samples from an exponential distribution. (5+5)
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