

## **LIST OF QUESTIONS FOR FINAL EXAM.**

1. Bayesian principle. Prior and posterior distributions
2. Total probability and Bayes Formulae
3. Classical examples of calculation of posterior distributions
4. Joint distribution functions and joint density functions. Independent random variables
5. Non-informative prior distribution.
6. Statistical decision theory. Posterior intervals.
7. Bayesian hypothesis testing and model selection. Examples.
8. Gamma distribution.
9. Beta distribution.
10. Single parameter model. Normal distribution with known variance and unknown mean
11. Single parameter model. Prior distribution of parameter is exponential, and likelihood function is Poisson.
12. Posterior distribution under beta distribution.
13. Risk functions. Quadratic loss function
14. Risk functions. Absolute error loss function
15. Risk functions. Zero-one loss function
16. Median of a probability distribution.
17. Calculation of Bayes' estimates using Risk functions. Examples.
18. Bayesian Inference for the normal distribution. Examples.
19. Rao-Cramer inequality.
20. Sufficient statistics.
21. Conjugate prior distributions. Improper priors. Examples.
22. Simple multi-parameter models.
23. Simulation. Inverse transform method
24. Markov chains. Basic definitions
25. Chapman-Kolmogorov equation and prove of property of stochastic matrix
26. Ergodic Markov chains. Examples
27. MCMC algorithms .
28. Metropolis algorithm.
29. Bivariate normal distribution. Ellipse of dispersion.
30. Dirichlet distribution
31. The inverse method for sampling of discrete random variables.
32. Linear regression models.