Exam topics in Statistics and Information Theory

1. Kullbach-Leibler divergence, entropy, mutual information, entropy rate of a stationary process
2. Noiseless source coding theorem, Shannon-code, arithmetic codes
3. Method of types, Sanov theorem, Stein lemma
4. Basics of information geomety: I-projection, linear and exponential distribution families, Pythagorean identity, maximum likelihood estimation when the set of feasible distribution is an exponential family
5. f-divergence, asymptotic distribution of the Kullbach-Leibler divergence, hypothesis testing for exponential families and in particular for log-linear models
6. Iterative algorithms: iterative scaling, generalized iterative scaling
7. Universal source coding, redundancy, practical coding process for the class of I.I.D. processes

Literature

https://users.renyi.hu/~csiszar/Publications/Information_Theory_and_Statistics:_A_Tutorial.pdf

Fort he first topic:

Thomas M. Cover and Joy A. Thomas, Elements of Information Theory, Wiley Interscience, New York, NY, 1991., pages 12-31. and 63-65.