Surprise Test-II

Q.no 1. Sum of random variables when random variables move towards infinity will have ____________. distribution.

Gaussian

Q.no 2. The Gaussian distribution will be ________ on surfaces in x-space for which this Mahalanobis Distance is constant.

Constant

Q.no 3. The Gaussian is said to be well defined only if the Eigen values of the co variance matrix are _________.

Strictly +ve

Q.No. 4. if two sets of variables are jointly Gaussian, then the conditional distribution of one set conditioned on the other is _________. And marginal distribution of either set is also ________.

Gaussian

Q.No. 5 Given a data set $X = (x_1, \ldots, x_N)^T$ in which the observations $\{x_n\}$ are assumed to be drawn independently from a multivariate Gaussian distribution. The log likelihood function is given by ________.

$$\ln p(X|\mu,\Sigma) = . \quad -(ND/2)\ln(2\pi) - (N/2)\ln|\Sigma| - 1/2 \sum_{n=1}^{N} (x_n-\mu)^T\Sigma^{-1}(x_n-\mu).$$

Q.No.6. Sequential methods allow data points to be processed ______ and then ________ and are important for on-line applications, and also where ______data sets are involved so that batch processing of all data points at once is infeasible.

One at a time, discarded,Large,

Q.No.7. Logistic Sigmoid function is given by for variable x which is Gaussian _________.

S(x) = 1/1+exp(-f(X)) ; f(X) is pdf

Q.No.8. Conjugate prior for the Bernoulli Distribution is ________.

Beta distribution or Gussian Distr

Q.No.9. the mean of the binomial distribution is given by _________.

Eqn(2.11)

Q.No.10. Consider two variables x and y with joint distribution p(x, y). Prove the following two results

$$E[x] = E_y\,[E_x[x|y]]\ ;$$

$$\mathrm{var}[x] = E_y\,[\mathrm{var}_x[x|y]] + \mathrm{var}_y\,[E_x[x|y]]$$

Here $E_x[x|y]$ denotes the expectation of x under the conditional distribution p(x|y), with a similar notation for the conditional variance.