

**SYLLABUS FOR GSAT-2020**  
**For Admission to M.Sc. STATISTICS**  
**Test Code: 101 S**

**Basics in Statistics:**

Measures of Central Tendency – Mean, Median, Mode, Geometric Mean and Harmonic Mean, Measures of dispersion: Range, Quartile Deviation, Mean Deviation and Standard Deviation, Central and Non-Central moments, Skewness and kurtosis.

**Probability:**

Basic Concepts of Probability, Conditional Probability and independence of events, addition and multiplication theorems of probability, Boole's inequality and Baye's theorems, discrete and continuous random variables, Probability mass function, Probability density function, Distribution function and its properties, Bivariate random variables, joint, marginal and conditional distributions.

**Distributions, Correlation and Regression:**

Mathematical expectation (ME) of a random variable and function of a random variable, Moments and covariance, Moment generating function its properties, Chebyshev and Cauchy - Schwartz inequalities, Discrete Distributions: Binomial, Poisson distributions and geometric distributions, Continuous Distributions: Rectangular, Exponential, Normal Distribution, Correlation and Regression.

**Concepts of Sampling and Testing of Hypothesis:**

Concept of population, Parameter, random sample, statistic, sampling distribution, standard error, Chi-square, t and F distributions.

Null and alternative hypothesis, critical region, two types of errors, level of significance, power of a test, one-tailed, two-tailed tests, Neyman -Pearson's lemma.

**Large Sample Tests:**

Large sample tests for single mean, two means, single proportion, two proportions, Standard deviation of single and double samples and Fisher's Z-transformation.

**Theory of Estimation:**

Estimation of a parameter, unbiasedness, consistency, efficiency, & sufficiency and Neyman's factorization theorem, Estimation of parameters by the methods of moments and maximum likelihood (M.L), properties of MLE's, Binomial, Poisson and Normal Population parameters estimate by ML method, Confidence intervals of the parameters of normal population.

**MODEL QUESTIONS**

1. The mean and variance of Normal Distribution [   ]  
a) are same                      b) cannot be same                      c) are sometimes equal  
d) are equal in the limiting case as  $n \rightarrow \infty$
  
2. If A and B Mutually exclusive events, then [   ]  
a)  $P(A \cup B) = P(A)P(B)$       b)  $P(A \cup B) = P(A) + P(B)$       c)  $P(A \cup B) = 0$   
d) none of these
  
3. If  $Var(X) = 1$  then  $Var(2X + 3)$  is [   ]  
a) 5      b) 13      c) 4      d) 0