B.N.BANDODKAR COLLEGE OF SCIENCE,THANE

QUESTION BANK

S.Y. B.Sc. Statistics PAPER I /Course 4-6

1) Obtain an expression for c.d.f of an exponential variate, hence find its quartiles.
2) State and prove memory less property of an exponential variate.
3) Obtain an expression for c.d.f. of rectangular distribution over the range (a, b) hence find its quartiles.
4) State and prove additive property of gamma variates, after deriving the expression for its m.g.f.
5) Define Standard Cauchy variate. Obtain its median and mode.
6) Write down p.d.f. of Cauchy variate obtain an expression for its c.d.f. hence obtain median, Q1and Q3
7) Define triangular distribution. Obtain the expressions for its mean and variance.
8) Obtain the expression for c.d.f. of triangular distribution.
9) Define normal variate. State its properties and prove any one.
10) Obtain an expression for mean deviation about mean for normal distribution.
11) Obtain an expression for moment generating function of normal distribution, hence find mean and variance.
12) Show that the probability that the number of heads in 400 tosses of an unbiased coin lies between 180 and 220 is approximately $2\varphi(2)-1$, where $\varphi(z)$ is area under normal curve from $-\infty$ to z.
13) State and prove addition property of normal variates.
14) Define lognormal variate. State its properties and prove any one.
15) Define lognormal distribution; obtain its p.d.f. mean and variance
16) If x is lognormal variate. Obtain E (x) and v(x)
17) Define gamma variate. Write down its p.d.f. obtain its mean and variance
18) If r.v.x. follows β distribution of first kind. Obtain an expression for its mean and variance.
19) If r.v,x follows β distribution of second kind. Obtain an expression for its mean and variance.
20) State and prove central limit theorem.
21) Write down the p.d.f. of β distribution β distribution of first kind and β distribution of 2^{nd} kind. Show that β variate of 2^{nd} kind can be obtained from β variate of 1^{st} kind by using transformation.

22) If X and Y are independent chi-square variates with parameters m, n respectively, show that U = x/y is β variate of 2nd kind .

23) If X and Y are independent gamma variates with parameters m and n respectively then show that U = x are independently distributed.

24) Explain various applications of chi-square distribution.

25) Define Chi-square variate with n.d.f. Obtain an expression for its p.d.f.

26) Define t- statistic. Derive an expression for p.d.f. of t

27) Define chi-square variate with n.d.f. obtain its moment generating function hence mean and variance.

28) Find mode of chi-squre distribution with n d.f. state in mean and show that chi-square curve is positively skewed curve.

29) Discuss various applications of t- distribution, stating the assumptions made

30) Define F Statistic , Obtain an expression for p.d.f.of F.

31) If F follows F- distribution with (n,m) d.f. then show that 1/F follows F-dist. with (m, n) d.f. hence show that if $P [F^{n}_{n} \geq 1/c] = 1- <$

32) If t follows t-distribution with n d.f. then show that t^2 follows F distribution. with (1, n) d.f.

33) Show that F curve is + vely skewed curve.

34) Define the terms confidence interval and confidence coefficient.

35) Obtain 100 (1 - α)% confidence interval for population mean μ when sample size is i) large ii) small.

36) Obtain 100 (1- α)% confidence interval for i) population variance. ii) Ratio of two population variance.

37) Show that mode of F distribution is less than one.

38) The p.d.f. of the r.v X is given by

$$f(x) = \frac{1}{\Pi(x^2 - 18x + 82)} \qquad -\infty < X < \infty$$

Recognize the distribution state its mode.

Question Bank Prepared by Prof (Mrs) M.J. Gholba