

B.Sc. (Honours) Examination, 2018
Semester-II
Statistics
Course : BSC-21 (Old)
(Probability Distribution)

Time : 3 Hours

Full Marks : 40

Questions are of value as indicated in the margin

Answer **any four** questions

1. (a) If the probability of success in a Bernoullian experiment is .01, how many trials are necessary in order to achieving probability of at least one success $\frac{1}{3}$?
(b) Let $X \sim \text{Bin}(n,p)$. Find out the mode of the distribution.
(c) If $X \sim U(O,\theta)$, find out moment generating function. 3+5+2=10
 2. (a) Show that poisson distribution is the limiting distribution of binomial distribution, clearly stating the assumptions.
(b) Prove that for poisson (λ), ($r+1$) th order central moment statistics
$$\mu_{r+1} = \lambda \left(r\mu_{r-1} + \frac{d\mu_r}{d\lambda} \right).$$
 5+5=10
 3. (a) Prove that for a normal distribution with mean μ and variance σ^2 , mean deviation about mean is $.7979\sigma$.
(b) For $N(\mu, \sigma^2)$, show $\mu_{2r} = \sigma^{2r} (2r-1)(2r-3)\dots 3.1$. 5+5=10
 4. (a) Find the first and third quartile of a Cauchy distribution with parameter λ and μ . Hence find its quartile deviation.
(b) Derive the r th order raw moment of a lognormal distribution. Hence find the mean of it. 6+4=10
 5. (a) Obtain moment generating function of $BN(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$.
(b) Write the statement of weak law of large number. Determine if the following obeys
this $P\{X_k = 2^k\} = P\{X_k = -2^k\} = \frac{1}{2^{2k+1}}$ $P\{X_k = 0\} = 1 - \frac{1}{2^{2k}}$. 6+4=10
 6. Write short notes on the following : 5+5=10
 - (a) Central limit theorem
 - (b) Geometric distribution
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