B.Sc. (Honours) Examination, 2019
Semester-II
Statistics
Course : BSC-21
(Probability and Distribution-II)

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 ~ Bin (n,p). Find out the mode of the distribution.

   (c) If X ~ U(O,θ), 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 .7979σ.

   (b) For $N(\mu,\sigma^2)$, show $\mu_{2r} = \sigma^{2r}(2r-1)(2r-3)...3.1.$ 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