OBJECTIVE TYPE QUESTIONS

1. (i) Match the correct parts to make a valid statement

a) Binomial distribution applies to	1. rare events
b) Poisson distribution applies to	2. repeated two alternatives
C) The mean of a Hypergeometric distribution	3. $\frac{1-6pq}{npq}$
d) The moment generating function of negative binomial distribution	4. $n.\frac{M}{N}(1-\frac{M}{N})(\frac{N-n}{N-1})$
e) The coefficient of kurtosis of binomial distribution	5. $(Q - pe^{t})^{-r}$
f) The variance of geometric distribution	6. $\frac{nM}{N}$
g) Variance of Hypergeometric distribu tion	7. $\frac{q}{p^2}$

2. Under what conditions binomial distribution tends to
    I. Poisson distribution
    II. Normal distribution
    III. Geometric distribution.

- Give practical examples (one each) where you would expect binomial, Poisson, negative binomial and geometric distribution.

3. State the relationship between:
    I. Mean and variance of Poisson distribution.
    II. Mean and variance of negative binomial distribution.

III. Mean and variance of geometric distribution.

IV. Poisson distribution and binomial distribution.

V. Hypergeometric distribution and binomial distrilJution.

4. Name the discrete distribution for which

   I. Mean and variance have the same value.

   II. Mean is greater than the variance.

5. State which of the following statements are True and which are False. In case of the false statement, give the correct statement:

   I. Mean of binomial distribution is 3 and variance is 5.

   II. Mean of Poisson distribution is 2 and variance is 3.

   III. The sum of two independent Poisson variates is also a Poisson variate. The result holds for difference also.

   IV. For a binomial distribution, Mean = Mode = Median

   V. The Poisson distribution is a limiting case of binomial distribution when $n \to \infty$, $p \to 0$, $np \to m$.

   VI. Nearly all the distributions are particular cases of Poisson distribution.

   VII. The sum of two binomial variates is a binomial variate if the variables are independent and have the different probabilities of success.

   VIII. Negative binomial distribution may be regarded as the generalization of geometric distribution.

6. Fill in the blanks:

   I. The variance of a binomial distribution is ....

   II. The characteristic function of negative binomial distribution is ....

   III. Poisson distribution is a limiting case of binomial distribution under the conditions ....

IV. For Poisson distribution all cumulants ....

V. Mean> variance for .... distribution.

VI. For the Poisson distribution, the variance and the third central moment are ....

VII. Mean < variance for .... distribution.

7. Give the correct answer to each of the following:

   I. The mean and variance of negative binomial distribution:

   (a) are same. (b) can not be same.
   (c) are sometimes equal in limiting case as $n \to \infty$

   II. The characteristic function of Poisson distribution P(m) is

   (a) $e^{m(it-1)}$ (b) $e^{m(e^{it}-1)}$
   (c) e^{mit} (d) none of these.

   III. The mean of a Hypergeometric distribution is

   (a) $\frac{n(M-1)}{(N-1)}$ (b) $\frac{M(M-1)}{N(N-1)}$ (c) $\frac{nM(M-1)}{(N-1)}$ (d) None of these

   IV. The mean of the binomial distribution ${}^{10}C_X \left(\frac{2}{5}\right)^X \left(\frac{3}{5}\right)^{10-X}$;x = 0, I. 2, ... 10 is

   (a) 4. (b) 6, (c) 5. (d) 0.

   V. The mean of Poisson variate is

   (a) greater than. (b) less than.
   (c) equal to. (d) twice, its variance.

8. By using the uniqueness property of m.g.f.'s determine the distribution if the M.G.F. is as follows:

a. $M(t) = (\frac{1}{2}, \frac{1}{2}e^t)^6$

b. $M(t) = \frac{(1+e^t)^5}{32}$

c. $M(t) = \frac{(1+2e^t)^3}{27}$

d. $M(t) = e^{3(e^t-1)}$

e. $M(t) = e^{(e^t-1)/4}$

f. $M(t) = \frac{1}{3} e^{-t}(e^{-t} - \frac{2}{3})^{-1}$

g. $M(t) = 4(3e^{-t}-1)^{-2}$

h. $M(t) = (3e^{-t} -2)^{-3}$ λ

Ans(8).

(a) Binomial, n= 6. p = $\frac{1}{2}$

(b) Binomial, n= 5. P = $\frac{1}{2}$

(c) Binomial, n= 3. p =$\frac{2}{3}$

(d) Poisson, λ = 3.

(e) Poisson, λ == $\frac{1}{4}$

(f) Geometric with p = $\frac{1}{3}$

(g) Negative binomial with r =2,P = = $\frac{2}{3}$

(h) Negative binomial with r = 3,p = $\frac{1}{3}$