September - 2009

[KV 251] Sub. Code: 2851

M.Sc (BIOSTATISTICS) DEGREE EXAMINATION

FIRST YEAR

Paper I – PROBABILITY THEORY AND DISTRIBUTION

Q.P. Code : 282851

Time : Three hours **Maximum : 100 marks**

Answer All questions.

I. Essays: **(2 X 20=40)**

1. The following distribution relates to the number of accidents to 650 women working on highly explosive shells during 5 weeks period. Show that a negative binomial distribution, rather than a geometric distribution, gives a very good fit to the data. How would you explain this?

No. of accidents	:	0	1	2	3	4	5
Frequency	:	450	132	41	22	3	2

2. a) What is meant by discrete random variable. Give three example that are of interest to the health professional.
   b) Explain the term convergence in probability.

II. Write Short Notes on : **(10X 6 = 60)**

1. Obtain binomial distribution as a limiting case of hyper-geometric distribution.
2. Explain the concept of a) Random variables b) Independence of random variables.
3. Explain the concepts of multiple and partial correlation coefficients.
4. State and prove the central limit theorem for the sum of n independently.
5. A coin is tossed until a tail appears. What is the expectation of the number of tosses?
6. A hospital switchboard receives an average of 4 emergency calls in a 10 minute interval. What is the probability that
   a) There are at the most 2 emergency calls in a 10 minute interval.
   b) There are exactly 3 emergency calls in a 10 minute interval.
7. Ina certain developing country, 30% of the children are undernourished. In a random sample of 25 children from this area, find the probability that the number of undernourished will be
   a) Exactly 10 b) Less than 5 c) 5 or more
8. What is a hyper geometric distribution? Find the mean and variance of this distribution.
9. Two cards are drawn at random from the cards numbered 1 to 10. Find the expectation of the sum of points on two cards.
10. Explain probability discrete space with suitable illustrations.

*****