



The Open University of Sri Lanka
B.Sc. /B.Ed. Degree, Continuing Education Programme
Open Book Test (OBT) 2016/2017
Level 04 - Applied Mathematics
APU 2140/APE5140– Statistical Distribution Theory

Duration: - One Hour.

Date: - 17-04-2017

Time: - 4.15 p.m. to 5.15 p.m.

Non programmable calculators are permitted. Statistical tables are provided.

Answer All Questions.

(1)

A company that produces a certain electrical product claims that the life time of the product X (in years) has the density function.

$$f_X(x) = ke^{-kx}; x > 0, k > 0$$

The past data indicate that it is reasonable to take that the median of the lifetime to be seven years.

- (i) Calculate the value k .
- (ii) Find the mean lifetime of the product.
- (iii) What is the probability that a randomly selected product will fail within 10 years?
- (iv) What is the probability that a randomly selected product will not fail before 6 years?

(2)

- (a) Some traffic lights have three phases: *stop 35%* of the time, *waits 10% of the time* and *go 55%* of the time. Assuming that you only cross a traffic light when it is in the *go* position and that you have to pass 10 such traffic lights on your way to school.

- (i) Model the number of times that you have to *wait or stop* on your way to school using a suitable statistical distribution. State any assumptions that must be made and give possible values for the parameters.
 - (ii) Find the probability that you have to wait or stop at 5 traffic lights.
 - (iii) Find the mean number of times that you have to *wait or stop* on your way to school.
- (b) The number of admissions to an emergency ward of a hospital on a Saturday morning during the period beginning at 12.00 midnight and ending at 2.00 a.m. is found to have a Poisson distribution with an average of 5 admissions. During this period of a particular Saturday morning
- (i) What is the probability that three patients will be admitted?
 - (ii) What is the probability that two to six persons (inclusive) will be admitted?