UNIVERSITY OF BUEA
FACULTY OF ENGINEERING AND TECHNOLOGY
TEST II

Department: Computer Engineering **Course Master**:
Course Code: CEF301 **Course Instructor**: Alexander M., Fomboh M.
Day : Saturday **Course Title**: Probability and Statistics
Duration: 1.5 hours **Date**: 16/1/2014

INSTRUCTIONS

Answer all questions. All necessary work must be shown and must be neatly and orderly presented.

1. (18 marks)

   (i) A random variable X has probability density f given by

   $$f(x) = \begin{cases} a + bx^2 & 0 \leq x \leq 1, \\ 0 & otherwise \end{cases}$$

   If $E(X) = \frac{3}{5}$, find

   (a)$\mathbb{P}(X \leq \frac{1}{2})$

   (b) $Var(X)$ (7 marks)

   (c) Suppose that $Y = 2X^2 + 1$. Find $E(Y)$ (3 marks)

   (ii)A web site contains three identical servers. Only one is used to operate the site and the other two are used as spares that can be activated in case the primary system fails. The probability of failure in the primary computer (or any activated spare system) from a request for service is 0.0005. Assuming that each request represents an independent trial. Calculate

   (a)The mean number of requests until failure of the all three servers fail. (4 marks)

   (b) The probability that all three servers fail within five requests. (4 marks)

2. (14 marks)

   The diameter of holes drilled by a drilling machine in a sheet of metal is a continuous random variable with probability density function f given by $f(x) = 20e^{-20(x-12.5)}, x \geq 12.5$.

   (a) Calculate the interval of tolerance of the diameters. (7 marks)

   (b) What percentage of the components are scrapped? (3 marks)

GOOD LUCK