UNIVERSITY OF BUEA
FACULTY OF ENGINEERING AND TECHNOLOGY
TEST II

epartment: Computer Engineering Course Master:
ourse Code: CEF301 Course Instructor: Alexander M., Fomboh M.
ay : Saturday Course Title: Probability and Statistics
uration: 1.5 hours Date: 26/1/2013

INSTRUCTIONS
nswer all questions. All necessary work must be shown and must be neatly and rderly presented.

1. (19 marks)

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

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

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

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

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

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

The time between the arrivals of electronic messages at your computer is exponentially distributed with a mean of two hours.

(a) What is the probability that you do not receive a message during a two hour period?

(b) If you have not had a message in the last four hours, what is the probability that you do not receive a message in the next two hours?

(c) What is the expected time between your fifth and sixth massages? (9 marks)

2. (14 marks)

(i) Determine the value of c that makes the function $f(x, y) = ce^{-2x-2y}$ a joint probability density function over the range $0 < x$ and $0 < y < x$. (3 marks)

(ii) Given that X and Y are random variables whose joint density is the function in (i) above, Determine

(a) $\mathbb{P}(X < 1, Y < 2)$ (3 marks)

(b) f_X and f_Y, the marginal densities of X and Y respectively.

(c) $E(X)$ and $E(Y)$. (4 marks)

(d) $E(XY)$ and $Cov(X, Y)$. (4 marks)

GOOD LUCK