****

**MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**P.O. Box 972-60200 – Meru-Kenya.**

**Tel: 020-2069349, 061-2309217. 064-30320 Cell phone: +254 712524293, +254 789151411**

**Fax: 064-30321**

**Website:** [**www.must.ac.ke**](http://www.must.ac.ke) **Email:** [**info@must.ac.ke**](mailto:info@must.ac.ke)

**University Examinations 2014/2015**

THIRD YEAR, SUPPLEMENTARY / SPECIAL EXAMINATION FOR BACHELOR OF SCIENCE INFORMATION TECHNOLOGY

**SMA 2230: PROBABILITY AND STATISTICS II**

**DATE: OCTOBER, 2015 TIME: HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE – (30 MARKS)**

1. If x is a random variable with mean 100 and variance 15, find;
2. E() (3 Marks)
3. E (3x + 10) (3 Marks)
4. A random variable has density function given by:

1. Prove that f(x) is a pdf. (3 Marks)
2. Obtain the mgf of x. (4 Marks)
3. Obtain the first 3 moments about the origin. (6 Marks)
4. Suppose x has a pdf given by P (1) = ½ , P(2) =  , P(3) =  . Find the CDF of X
5. In a large consignment of electric bulbs, 10% are defective. a random sample of 10 is taken for inspection. Find the probability that;
6. All are good bulbs. (2 Marks)
7. Atmost there are two defective. (4 Marks)
8. Exactly two are defective. (1 Mark)

**QUESTION TWO – (20MARKS)**

If x is a random variable with binomial distribution i.e

1. Show that E(x) = np and V(x) = npq (12 Marks)
2. Obtain the mgf x and use it to prove (i) above. (8 Marks)

**QUESTION THREE – (20 MARKS)**

1. If x is a continuous random variable with pdf.

1. Find K (3 Marks)
2. Find P (1 ≤ x ≤ 2) (3 Marks)
3. Verify that f(x) is a pdf (2 Marks)
4. If the moment generating function of a random variable x is given by;

M(t)= (1 – 4t)4

Find the mean and variance of x. (7 Marks)

1. If x is a random variable with pdf

 for 

Find  (5 Marks)

**QUESTION FOUR – (20 MARKS)**

If x is a poison random variable with parameter  .

1. Show that E(x) = V(x) =  (10 Marks)
2. Obtain the mgf of x and use it to prove (i) above. (10 Marks)

**QUESTION FIVE – (20 MARKS)**

1. Let x be random variable with pdf

Find (i) Quartile deviation (6 Marks)

(ii) Median (3 Marks)

(iii) 6th decile (3 Marks)

b) Given that

Determine the mode of x (4 Marks)

c) A random variable x has a mean 3 and variance 4, find ;

(4 Marks)