Name: _____ Tutorial group: T1

Matriculation number: | | | | | | | | | |

NANYANG TECHNOLOGICAL UNIVERSITY

SEMESTER I 2015/16

MH2500– Probability and Introduction to Statistics

22 September 2015 Test 2 40 minutes

INSTRUCTIONS

1. Do not turn over the pages until you are told to do so.
2. Write down your name, tutorial group, and matriculation number.
3. This test paper contains **FOUR (4)** questions and comprises **FIVE (5)** printed pages.
4. Answer **all** questions. The marks for each question are indicated at the beginning of each question.
5. You are allowed two double-sided A4 size cheat sheet.

For graders only	Question	1	2	3	4	Bonus	Total
	Marks						

QUESTION 1. **(6 marks)**

An urn contains 20 red balls and 10 white balls. Suppose 10 balls are drawn from the urn without replacement. Find the probability that amongst the 10 balls drawn, exactly 7 are red. Leave your answer as a fraction or correct to three significant figures.

QUESTION 2. **(12 marks)**

Suppose an office receives telephone calls as a Poisson process with $\lambda = 0.3$ per min.

(a) Find the probability that there are 10 calls in a one hour interval. Give your answer to three significant figures.

(b) Let T denote the time taken (in minutes) between one phone call and two more phone calls, i.e., time between the first and the third phone calls. Find the probability density function of T.

QUESTION 3. **(8 marks)**

Suppose U is a uniform random variable on [1,4) and let X be a random variable defined by $X = \dfrac{3}{4-U}$. Find the density function of X.

QUESTION 4. **(8 marks)**

Three players, Alan, Bob, and Carl play 10 consecutive rounds of a game. Alan has probability $\frac{1}{2}$ of winning each round, while Bob and Carl each has probability $\frac{1}{4}$ of winning each round.

(a) Find the joint distribution of the number of games won by each of the three players.

(b) Find the marginal distribution of the number of games won by Bob.