COL202: Discrete Mathematical Structures. I semester, 2017-18.
Quiz 7
11 September 2017
Maximum Marks: 4

Name	**Ent. No.**

Important: Keep your answer within the box. Anything written outside the box will be treated as rough work. Do your rough work on the free space on the flip side of this sheet.

Q. You are given n bins and m balls. Each ball is thrown uniformly at random into a bin (i.e. it can land in any bin and the probability of landing in each bin is the same as that of landing in any of the bins). Show that if $m = n \ln n$ the probability that bin number 1 is empty after all the balls are thrown is less than $1/n$ (where $\ln n = \log_e n$, i.e., log to the base e of n.) You may use the inequality $1 - x \leq e^{-}x$ if required.