INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR
CS21003 Algorithms I: Second Class Test 2021 Spring

Date of Examination: 10th April 2021
Duration: 35 minutes + 5 minutes (for scanning, concatenating, and uploading)
Full Marks: 10
Subject: CS21003 Algorithms I

Part I

1. For a string y and integer $i > 0$, let y^i denote the string we obtain by concatenating y i times. For a string x, we define its repetition factor $\rho(x)$ to be the highest integer $i > 0$ such that $x = y^i$ for some string y.

   Write down answers to the following:

   (a) Present an efficient algorithm that takes as input a pattern $P[1, \ldots, m]$ and computes the value $\rho(P[1, \ldots, i])$ for $i = 1, 2, \ldots, m$.

   (b) Analyze the time and space complexity of your algorithm.

   (c) Show its working on the string "ababc".

   [6+2+2 Marks]

All the best