cse547/ams547 Practice Midterm Spring 2017
(20pts)

NAME **ID:** **ams/cs**

TAKE test as a practice. You have 1h 20 minutes to write solutions to all problems.

BRING YOUR solved and corrected (if needed) TEST to class on Monday, March 20. You will get your 20pts.

I hope it was helpful!

QUESTION 1

Use the Perturbation Method to evaluate a closed formula for:

Part 1 $S_n = \sum_{k=0}^{n} (-1)^{n-k}$.

Part 2 $S_n = \sum_{k=0}^{n} (-1)^{n-k} k$.

QUESTION 2 Evaluate the sum

$$S_n = \sum_{k=0}^{n} k3^k$$

using multiple sum method (Method 5). Justify carefully each step. HINT: $k = \sum_{j=1}^{k} 1$.

QUESTION 3 Use summation by parts to prove that

$$\sum_{0}^{n-1} kH_k = \frac{n^{\underline{2}}}{2}\left(H_n - \frac{1}{2}\right)$$

PROBLEM 4

Given a formula $\triangle(c^{\underline{x}}) = \frac{c^{\underline{x+2}}}{(c-x)}$

Evaluate: $\displaystyle\sum_{k=1}^{n} \frac{(-2)^{\underline{k}}}{k}$

PROBLEM 5

Show convergence of

$$\sum_{n=1}^{\infty} \frac{n!}{n^n}$$