Adaboost Quiz CSE 255, Spring 2019

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Name: _____

PID: _____

This is a quiz for CSE255/DSE230
On your desk you should have only the exam paper and writing tools.
No hats or hoods allowed (unless religious items).
There is one question in this quiz.
Write your answer in the lines provided.
You have 10 minutes to complete the exam.
Start by writing your name and PID on this page.
Good Luck!

A reminder of some facts about adaboost:

- The training set is $(x_1, y_1), \ldots (x_n, y_n)$ where $y_i \in \{-1, +1\}$.
- At iteration t the weak learner recieves the training set weighted by the probability D_t. It then generates a weak hypothesis $h_t(x)$ whose weighted error is $\epsilon(h_t) = \sum_{i, h_t(x_i) \neq y_i} D_t(i)$
- We define the "edge" to be $\gamma_t = 1/2 - \epsilon_t$
- The strong Hypothesis at iteration T is $H_T(x) = \text{sign}\left(\sum_{t=1}^{T} \alpha_t h_t(x)\right)$.
- The error of H_T is $\epsilon(H_T) = \sum_{i, H_T(x_i) \neq y_i} 1/n$
- $\epsilon(H_T) \leq \exp\left(-(1/2)\sum_{t=1}^{T} \gamma_t^2\right)$

Based on this information and your memory of adaboost. for each of the following statements circle **correct** or **incorrect**. Write a short justification in the line below each question.

1. **correct** **incorrect** if $\gamma_T > 0$ then $\epsilon(H_{T+1}) < \epsilon(H_T)$

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2. **correct** **incorrect** if $\gamma_t > \gamma > 0$ for all $1 \leq t \leq T$ then $\lim_{T \to \infty} \epsilon(H_T) = 0$.

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3. **correct** **incorrect** if $\lim_{t \to \infty} \gamma_t = 0$ then $\lim_{T \to \infty} \epsilon(H_T) > 0$.

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4. **correct** **incorrect** if $\gamma_T < \gamma < 0$ for all $1 \leq t \leq T$ then $\lim_{T \to \infty} \epsilon(H_T) = 0$.
