Assignment 12

The due date for submitting this assignment has passed.

Due on 2021-04-14, 23:59 IST.

1) Can $\text{MAE} \subseteq \text{SAT}$ have a polynomial-time approximation algorithm for every $\alpha < 1$?  
   4 points
   
   Yes $\alpha \neq \text{NP}$
   
   No $\alpha = \text{NP}$

2) Which of the following statements are known to be true?  
   4 points
   
   $\text{PCP} \text{log}_2 n, 1 \leq \alpha \leq \text{NP}$
   
   $\text{PCP} \text{log} \alpha n, 1 \leq \alpha \leq \text{NP}$
   
   $\text{PCP}(\text{log} \alpha n, 1) \leq \text{NEEXP}$

3) Which of the following statements are known to be true?  
   2 points
   
   $\text{NP} \subseteq \text{PCP}(\text{log} \alpha n, 1) \leq \text{NEEXP}$
   
   $\text{PCP}(\text{log} \alpha n, 1) \leq \text{NEEXP}$

4) Consider the following statement:  
   2 points
   
   $\text{NP} \subseteq \text{PCP}(\text{log} \alpha n, 1)$
   $\text{NP} \subseteq \text{PCP}(\text{log} \alpha n, 1) \leq \text{NEEXP}$
   $\text{PCP}(\text{log} \alpha n, 1) \leq \text{NEEXP}$

5) Which of the following is true?  
   
   $\text{CUQ}\geq \frac{1}{\sqrt{2}}$  
   
   $\text{CUQ} \leq \frac{1}{\sqrt{2}}$  
   
   $\text{CUQ} = \frac{1}{\sqrt{2}}$  

6) Which of the following is true?  
   
   The function PARITY$(x)$ that computes the parity of the 2n bits, has communication complexity $2^n$.
   
   The algorithmic function DISTANCE$(x, y) = 1$ if $x$ and $y$ are distinct (when viewed as vectors of $\alpha$), has communication complexity $O(\log \alpha)$.

7) Which of the following is true?  
   
   B) 2
   
   C) $\frac{1}{\sqrt{2}}$
   
   D) $\frac{1}{\sqrt{3}}$

8) Which of the following is true?  
   
   $\text{NP} \subseteq \text{NPC}$  
   
   $\text{NP} \subseteq \text{NPC}$  
   
   $\text{NP} = \text{NPC}$  
   
   $\text{NP} \subseteq \text{NPC}$  
   
   $\text{NP} \subseteq \text{NPC}$  
   
   $\text{NPC} \subseteq \text{NP}$  

9) Which of the following statements are known to be true?  
   
   $\text{NP} \subseteq \text{NPC}$  
   
   $\text{NPC} = \text{NP}$  
   
   $\text{NP} \subseteq \text{NEEXP}$  
   
   $\text{NPC} = \text{NP}$  

10) Which of the following statements are known to be true?  
    
    $\text{NP} \subseteq \text{NEEXP}$  
    
    $\text{NPC} = \text{NP}$  
    
    $\text{NP} \subseteq \text{NEEXP}$  
    
    $\text{NPC} \subseteq \text{NP}$  
    
    $\text{NP} \subseteq \text{NEEXP}$  
    
    $\text{NPC} \subseteq \text{NP}$  

11) Which of the following statements are known to be true?  
    
    $\text{NP} \subseteq \text{NEEXP}$  
    
    $\text{NPC} = \text{NP}$  
    
    $\text{NP} \subseteq \text{NEEXP}$  
    
    $\text{NPC} \subseteq \text{NP}$  
    
    $\text{NP} \subseteq \text{NEEXP}$  
    
    $\text{NPC} \subseteq \text{NP}$