Assignment 1

The due date for submitting this assignment has passed.

Due on 2021-02-03, 23:59 IST.

As per our records you have not submitted this assignment.

1) Consider the following functions; $f(n) = n^{100}$; $g(n) = 2^{n^{\frac{1}{100}}}$; $h(n) = n \log n$. Which of the following statement is(are) true? *1 point*

- $f(n) = O(h(n))$
- $h(n) = O(f(n))$
- $g(n) = O(f(n))$
- $h(n) = O(f(n))$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$h(n) = O(f(n))$
$g(n) = O(f(n))$

2) Which of the following statement is(are) true? *1 point*

1. A k-tape Turing machine is more powerful than a 2-tape Turing machine, for some constant $k > 2$?
2. A Turing machine with k transition functions is more powerful than a Turing machine with only 2 transition functions, for some constant $k > 2$

- Only 1
- Only 2
- Both 1 and 2
- None of them

No, the answer is incorrect.
Score: 0

Accepted Answers:
None of them

3) *1 point*

Given a number n as an input (in binary) an algorithm checks whether n is a prime number or not as follows: the algorithm goes over all the numbers m

- Polynomial time
- Exponential time
- Logarithmic time
- Nondeterministic Polynomial time

No, the answer is incorrect.
Score: 0

Accepted Answers:
Exponential time

4) If $\text{DTIME}(n^2) = \text{NTIME}(n^2)$ then what can we conclude for $\text{DTIME}(n^6)$ and $\text{NTIME}(n^6)$? *1 point*

- $\text{DTIME}(n^6) \subsetneq \text{NTIME}(n^6)$
- $\text{NTIME}(n^6) \subsetneq \text{DTIME}(n^6)$
- $\text{NTIME}(n^6) = \text{DTIME}(n^6)$
- We cannot conclude anything new about these classes

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\text{NTIME}(n^6) = \text{DTIME}(n^6)$

5) Suppose there is a language $L \in NP \cap coNP$ such that L is NP-complete. This will imply *1 point*

- $P = NP$
- $NP = coNP$
- $NP \neq coNP$
- $P \subsetneq NP \cap coNP$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$NP = coNP$

6) *1 point*

$\text{Exactly1SAT} = \{\phi \mid \phi \in \text{3SAT}$ and ϕ has a satisfying assignment with exactly one true literal per clause$\}$. Which of the following statements is know

- Exactly1SAT is in P
- Exactly1SAT is in $coNP$
- Exactly1SAT is NP-complete
- Exactly1SAT is in NP but not NP-complete

No, the answer is incorrect.
Score: 0

Accepted Answers:
Exactly1SAT is NP-complete

7) Which of the following statements is (are) true? *1 point*

- NP is closed under set difference
- P is closed under set difference
- NP is not known to be closed under set difference.
- P is not known to be closed under set difference

No, the answer is incorrect.
Score: 0

Accepted Answers:
P is closed under set difference
NP is not known to be closed under set difference.

8) Suppose we show that $NP = coNP$ then this will imply that *1 point*

- $P = NP$
- $P \subsetneq NP \cap coNP$
- Every language in NP is NP-complete
- If L is NP-complete then L is also $coNP$ complete

No, the answer is incorrect.
Score: 0

Accepted Answers:
If L is NP-complete then L is also $coNP$ complete