Let f, g be the functions defined as $f(n) = 10^3 n \log n$ and $g(n) = \frac{n^2}{10^5 \log n}$.

Scegli una o più alternative:

- [ ] $f \in \Omega(g)$
- [ ] $f \in \Theta(g)$
- [x] $f \in O(g)$

Nondeterministic Turing Machines:

Scegli una o più alternative:

- [ ] Can be simulated by deterministic TMs.
- [x] If working in polynomial time, can be used to characterize $\mathbf{NP}$
- [ ] Always work in polynomial time
- [ ] Are essential to define the complexity class $\mathbf{NP}$

The universal Turing machine:

Scegli una o più alternative:

- [x] Can simulate every Turing machine, with a polynomial overhead.
- [ ] Can simulate every Turing machine, but not itself
- [ ] Works in polynomial time.
- [x] Is an essential ingredient of in the proof of existence of uncomputable problems.

Suppose a language $\mathcal{L}$ is in $\mathbf{EXP}$ but not in $\mathbf{P}$. Then:

Scegli una o più alternative:

- [ ] $\mathcal{L}$ is necessarily $\mathbf{NP}$-complete.
- [x] The classes $\mathbf{NP}$ and $\mathbf{P}$ are different.
- [x] There could be a nondeterministic polytime TM computing $\mathcal{L}$
- [ ] $\mathcal{L}$ can be computed in polynomial time.

The notion of PAC-learnable concept class:

Scegli una o più alternative:

- [ ] Requires the output concept to have probability of error ε, in all cases
- [x] Does not make any reference to the time complexity of the learning algorithm
- [x] Needs to hold for every distribution $\mathbf{D}$ on the instance class.
- [ ] Cannot be reached when the underlying concept class is the one conjunctions of literals.

Problems by memory:

1. give a TM to decide L = set of strings for which if 01 is present then it is followed by all zeroes

2. prove that the problem is in NP: check if a number is the sum of powers of 3 by giving a TM or pseudocode.
(asked to the professor, he said that 3^0 is not allowed as the problem would be trivial)

3. PP is the set of theorems expressed in the Principia Matematica, published by Bertrand Russel in 1909-13. Do they fall in a complexity class? Motivate