

University of Miskolc
Institute of Mathematics

Miskolc, 29 October, 2018.
Name:.....
Neptun-code:.....

COMPLEXITY OF ALGORITHMS (GEMAK121M-A)
First test

1 (6 pts) Give the following definition

(a) Turing-machine:

(b) Universal Turing-machine:

(c) Recursive (or computable) function:

(d) Recursive language:

(e) Time demand of a Turing machine:

(f) Fully time-constructible function:

2 (6 pts) Give the following theorems and examples

(a) Rice's Theorem:

(b) Give 3 undecidable problems

(c) Give 3 Polynomial time algorithms in arithmetic:

(d) Gödel's incompleteness theorem

(e) Gap-Theorem:

(f) Linear Speedup Theorem:

3 (6 pts) Construct a Turing machine that computes the following function:

$$x_1x_2 \dots x_n \rightarrow x_1x_2 \dots x_{n-1}x_nx_nx_{n-1} \dots x_2x_1$$