

## Lassonde School of Engineering

Dept. of EECS

Professor G. Tournakis

EECS 1028 M. Problem Set No1

Posted: Jan. 16, 2022

**Due:** Jan. 31, 2022; by **4:35pm**, in eClass.

**Q:** How do I submit?

**A:**

- (1) **Submission must be a SINGLE standalone file to eClass. Submission by email is not accepted.**
- (2) **Accepted File Types: PNG, JPEG, PDF, RTF, MS WORD, OPEN OFFICE, ZIP**
- (3) **Deadline is strict, electronically limited.**
- (4) **MAXIMUM file size = 10MB**



It is worth remembering (from the course outline):

The homework **must** be each individual's own work. While consultations with the instructor, tutor, and among students, are part of the learning process and are encouraged, **nevertheless**, *at the end of all this consultation* each student will have to produce an individual report rather than a *copy* (full or partial) of somebody else's report.

The concept of “late assignments” does not exist in this course, as you recall.



1. True or False **and Why**.

(a) (2 MARKS)  $\{\{1\}, \{42\}\} = \{1, 42\}$

(b) (2 MARKS)  $\bigcup\{\{1\}, \{42\}\} = \{1, 42\}$

(c) (2 MARKS)  $\bigcup\{1, \{1, 42\}\} =$  **is What? Why?**

(d) (2 MARKS)  $\{\emptyset\} = \emptyset$  (you do not have to involve stages! But OK if you do)

(e) (2 MARKS)  $\emptyset \in \{\emptyset\}$

2. (3 MARKS) Is there a set  $A$  that satisfies  $A = \{A\}$ ? If yes, exhibit one such. If not, **Why** not exactly?

3. (4 MARKS) Prove that if  $A$  is a set then so is  $\{A\}$  but do NOT use an argument that involves stages *explicitly*.

4. (5 MARKS) Prove that, for any sets  $A$  and  $B$ , it is true that  $A \subseteq B$  iff  $A \cap B = A$ .

*Hint.* There are two directions! lhs of iff implies rhs, and rhs of iff implies lhs.

5. (4 MARKS) What is  $\bigcup F$ , where  $F = \emptyset$ ? Prove the correctness of your *answer / computation*.

6. Use notation by explicitly listing **all the members** of each rhs  $\{\text{??}\}$  to complete the following incomplete equalities:

(a) (2 MARKS)  $2^\emptyset = \{\text{??}\}$

(b) (2 MARKS)  $2^{\{\emptyset\}} = \{\text{??}\}$

(c) (2 MARKS)  $2^{\{1,2\}} = \{\text{??}\}$

(d) (2 MARKS)  $2^{\{a,b,3\}} = \{\text{??}\}$