## Final Examination (Sample 2) ECE 1771F: Quality of Service, Fall 2018

## Instructor: Baochun Li Department of Electrical and Computer Engineering University of Toronto December 19, 2018, 12 p.m. - 2 p.m.

Notes:

- 1. You have **120 minutes** to complete this examination.
- 2. This is a closed-book closed-notes examination.

Question 1	2	3	4	5	6	7	8	Total
/15	/15	/15	/15	/10	/10	/10	/10	/100

MARKS

## Your Last Name:

Your First Name:

Your Student Number:

1. (15 Points) What is the *Matching Theorem*, when we use a bipartite graph (with equal numbers of nodes on the left and right) to represent preferences, and try to assign nodes on the left to nodes on the right?

2. (15 Points) What is the main idea of a VCG auction? Is the Generalized Second-Price (GSP) auction — which Google uses in its sponsored search market — a VCG auction? Please justify your answer with a clear explanation. 3. (15 Points) What is *Braess's Paradox* in a transportation network? Please explain the main idea using an example.

4. (15 Points) What is the *Prisoner's Dilemma* in game theory? Please explain the main idea using an example.

5. (10 Points) Please explain how a *linear bounded arrival process* can be implemented. What are its two parameters?

6. (10 Points) In TCP, how can a sender get to know that a packet is lost?

7. (10 Points) What is the *End-to-End Argument*? Please explain with an example.

8. (10 Points) What are single-item *second-price sealed-bid auctions*? Why are they *truth-ful*?