

GNG4170 – Engineering and the Law

Final Examination - April 15, 2004 – 3 hrs, closed book

Spend 10 minutes simply reviewing the entire examination, and, among other things, deciding which questions you will answer – remember, *you are given choices* at each stage of the exam. If a student answers more than is required, only the first-written response(s) will be considered – the 'extra' writing will be ignored.

Part A [25 marks, approx. 45 minutes]

You must answer **one** (1) of the following two (2) questions. *Do not answer both.* [5 marks total, approx. 10 minutes]

- Q1** (a) identify the four kinds of licences granted by the PEO [2 marks]
(b) There are four requirements to be designated a "consulting engineer" – list three of them [3 marks]
- Q2** (a) briefly describe the people involved and the process when an engineer faces disciplinary proceedings by the PEO [5 marks]

You must answer **two** (2) of the following three (3) questions. *Do not answer all three* (3). Attached to this exam is a copy of sections 72 (definition of professional misconduct) and 77 (code of ethics) of the regulations under the *Professional Engineers Act*. [10 marks each X 2 = 20 marks, approx. 17 minutes each, 35 minutes (total)]

- Q3** Delta, P.Eng., works full-time for ABC Co., and a part of Delta's job is selecting and specifying computer-controlled automation systems. Delta is considering doing some extra engineering work in the evenings for other, private clients, including some of the manufacturers who produce the automation-systems which Delta reviews on a day-to-day basis (Delta has some ideas on design modifications). Discuss what ethical and practical considerations arise in this situation, and what Delta should do.
- Q4** Epsilon, an engineer, has just been hired at XYZ Manufacturing, and is responsible for the production of a particular soap made by XYZ. XYZ has been producing this soap for the past 6 months. On the second day of the job, lab reports (requested by Epsilon) reveal that small amounts of cyanide (a poisonous substance) appear to be contained in the soap. This is a banned substance. It is not listed on the ingredients of the soap. Discuss what ethical and practical considerations arise in this situation, and what Epsilon should do.

- Q5** Sigma and Rho work for ABC Engineering. Omicron is their supervisor. Sigma has been the main engineer and contact person for LMN Co., a large client of ABC. Sigma has prepared designs for LMN for a new product, and has not responded well to LMN's requests for a cheaper, more basic design, insisting that his (Sigma's) design is "fantastic" and "revolutionary". Sigma has been a bit rude and impatient with LMN representatives. Omicron takes Rho into her office, shuts the door, and asks Rho to conduct a secret review of Sigma's work for LMN, and to report back to Omicron. What should Rho say (and why)? [5 marks] Also, discuss Sigma's relationship to, and behavior in respect of, LMN [5 marks]. In both cases, discuss the relevant ethical and practical considerations that arise.

Part B [75 marks, approx. 2 hours]

- Q6** Briefly discuss/explain **five** (5) of the following seven (7) terms/principles. Do not answer all seven (7). Your goal should be trying to note five separate, relevant points about each. [5 marks each X 5 = 25 marks (total), approx. 9 minutes each, or 45 minutes (total)]
- (a) Five examples of inappropriate conduct in the workplace under the Ontario *Human Rights Code*;
 - (b) Trademark;
 - (c) Contract 'A';
 - (d) "Piercing the corporate veil";
 - (e) ADR;
 - (f) Statutory holdback; and
 - (g) Defamation.

You must answer **one** (1) of the following three (2) short-answer questions. Do not answer both. [10 marks, approx. 15 minutes]

- Q7** Discuss the issue of "limitation periods" – What is a limitation period? Identify the new Ontario Act that applies to this legal principle, and discuss the central points raised by the Act. [10 marks]
- Q8** Beta signs an employment contract which states that if Beta leaves the firm, she will not work in structural engineering, in the City of Ottawa, for a period of 6 months. What is that term called? Discuss the legal principles involved in the court analyzing whether or not to enforce such a term. Do not [10 marks]

You must answer **two** (2) of the three (3) following hypothetical questions. *Do not answer all three (3).* [20 marks each X 2 = 40 marks, approx. 30 minutes each, or 1 hour (total)]

- Q9** Alpha (an engineering company) was hired by World Manufacturing Ltd. (both Canadian companies) to design an exterior transport system for a highly explosive chemical (from storage tanks, to the manufacturing plant itself). The contract price was \$5 million dollars. One month after completion, the transport system broke-down. The chemical leaked, resulting in a huge explosion. Fortunately no one was injured, but World had to pay \$6 million dollars to repair the damages, \$0.5 million in fines from the Ministry of the Environment, and an additional \$1.5 million to have the system re-designed and re-installed (the new system operated to proper specifications). World also lost \$2 million in profit as a result of its operations being shut down for one month.

Two independent reports have confirmed that the original system (designed by Alpha) could never have met the proper specifications as a result of Alpha's poor work.

Alpha's and World's contract contained the following term: "Alpha accepts no responsibility, of any kind, for whatever injury or damage, however caused, whether by breach of a contractual obligation or any negligence, beyond the value of the contract. Alpha's total liability is limited to \$5 million dollars". To date, Alpha had been paid \$4,500,000 under its contract with World.

What damages would World ultimately be entitled to in the circumstances? Discuss, making sure to note the relevant legal principles, and the legal history of how the Courts have approached contractual terms that appear to limit liability.

- Q10** Global Inc. hired an architect to design a new amusement park, including a tunnel passing through it's "Wonder Mountain". The architect then hired a structural engineering firm ("SE"), specifically to design the tunnel.

In the instructions to SE, the architect identified the existence and availability of geological reports (about "Wonder Mountain"), but did not include those reports in its instructions to SE. Those reports contained important geological information based on extensive testing.

Pi (an engineer at SE) was responsible for the tunnel design, and read the architect's instructions. Pi completed very basic, initial tests, but those were the wrong kinds of tests required in the circumstances. Pi never asked for copies of the geological reports.

The tunnel was built, collapsed before opening day, and an independent report confirmed that the problem could have been avoided had the information in the geological reports been taken into consideration in preparing the plans and specifications for the tunnel.

What liabilities in *tort* law arise in this case? In your answer (which will lead to a position on the likely outcome in this case) make sure you discuss the relevant legal principles.

Q11 Lamda Engineering Ltd. has a contract with Mega Co. to prepare an environmental assessment on one of Mega's properties (property "X"). The contract states that if Lamda finishes the work by December 31st, Lamda is entitled to exercise an option to do the same kind of assessment on another of Mega's properties (property "Y"), for the same cost (\$50,000).

In late November/early December of that year, several of Lamda's full-time employees become sick, and the Vice-President of Lamda approaches Mega about the problem. Lamda does not want to hire independent contractors to complete the work by the deadline, as this could be expensive.

The President of Mega indicated to Lamda's VP that Mega understood Lamda's difficulties, and, feeling very kind (since it was near the holidays, after all), confirmed verbally that "everything would be fine—just the same—as long as you [Lamda] finish the work on property X by January 15th of the New Year". Lamda was very pleased, since Mega was not required to "give them a break" under the terms of the contract.

Of course, Lamda simply waited until its full-time employees were feeling better to complete the work, instead of hiring the independent contractors. Lamda finished the work on property X by January 10th.

On January 12th, Lamda then sent a letter to Mega indicating Lamda would exercise its option under the contract to prepare the environmental assessment on property Y. Mega refused, indicating that Lamda was not entitled to exercise the option since it had not met the December 31st deadline (for completing the work on property X) noted in the written contract.

Was Mega entitled to deny Lamda's exercise of the option (to do work on property Y)? Discuss, ensuring you identify and explain the relevant legal principles that apply to these facts.

[end of exam]

[best wishes for both the summer and the future]