

# ASSOCIATION OF PROFESSIONAL ENGINEERS OF ONTARIO

## PROFESSIONAL PRACTICE EXAMINATION – December 5, 2015

### PART “A” – Professional Practice and Ethics

You will be given a total of **90 minutes** to complete this examination.

Use the correct colour-coded Answer Book for each part, place in the correct envelope and **seal after completed**.

*White Answer Book for Part A white question paper.*

*Coloured Answer Book for Part B coloured question paper.*

This is a “**CLOSED BOOK**” examination. **No** aids are permitted other than the excerpts from the 1990 Ontario Regulation 941 covering sections 72 (*Professional Misconduct*) and 77 (*Code of Ethics*) supplied at the examination. Dictionaries are **not** permitted.

The marking of questions will be based not only on academic content, but also on legibility and the ability to express yourself clearly and correctly in the English language. If you have any doubt about the meaning of a question, please state clearly how you have interpreted the question.

All **four** questions constitute a complete paper for Part “A”. Each of the four questions is worth 25 marks.

**WHERE A QUESTION ASKS IF A CERTAIN ACTION BY AN ENGINEER WAS ETHICAL OR NOT, A SIMPLE “YES” OR “NO” ANSWER IS NOT SUFFICIENT. YOU ARE EXPECTED TO COMMENT ON AND DISCUSS THE ACTION OF THE DIFFERENT INDIVIDUALS AND/OR ORGANIZATIONS INVOLVED IN EACH SITUATION AS IF YOU WERE PERSONALLY INVOLVED.**

You should identify where applicable the appropriate clauses in Regulation 941. **SIMPLE REFERENCE TO THE APPROPRIATE CLAUSES WITHOUT A DISCUSSION OF HOW THE CLAUSE APPLIES IN THE SITUATION DESCRIBED IS NOT SUFFICIENT.**

### Question 1

- (5) (a) Is there any difference between being a member of PEO and holding a licence to practice professional engineering in Ontario? Explain.
- (5) (b) Which licence holders can hold a Certificate of Authorization (C of A)? Are there any limitations on the C of A?
- (5) (c) Is the code of ethics enforceable under the professional engineers Act? Explain.
- (10) (d) Define the practice of professional engineering

### Question 2

Proteus, a senior licensed professional engineer, established a small firm, EngCo, to provide professional engineering services to the public. The firm became busy very quickly and within a few months, hired A. Green, a bright, recent university graduate with an engineering degree, to assist with the work. Proteus strongly believed in mentoring and hoped that in several years, after obtaining the necessary experience requirements and becoming a P.Eng., Green would assume increasing managerial responsibility and possibly an ownership interest in the firm.

About a year after Green joined the firm, EngCo was asked by one of its clients to provide a formal report that included an engineering opinion. Green performed the work on that matter and prepared a draft of the report. Before having a chance to review Green's work, Proteus received an urgent request from another client that required Proteus to leave on a lengthy business trip. On the way out of the office, Proteus stopped at Green's desk and said, "Sorry, but I'll be out of the country and tied up completely for the next three weeks, so I won't be able to review that report. I know that it's due tomorrow, so go ahead and sign it under your own name and send it to the client so we meet the deadline." Proteus was confident that the report would be fine since Green had always produced outstanding work in the past. Green proceeded to complete the report, signed it "A. Green, Eng., EngCo" and sent it to the client.

**In your answer, please assume that Green's report would have no impact on public safety or welfare.**

- (10) (a) Discuss the conduct of both Proteus and Green. What, if anything, should they be concerned about?
- (10) (b) Could Proteus and/or Green be subject to a disciplinary hearing by the Discipline Committee of PEO? Discuss
- (5) (c) Is there anything about Proteus's conduct relative to the Code of Ethics that is commendable?

### Question 3

Chancer, an experienced P.Eng., was recently hired by Northshore Engineering to help increase Northshore's business in Ontario. Chancer had been in a non-engineering management position for the past 20 years and was happy to be back into a more hands-on engineering role. Northshore had the necessary Certificate of Authorization and insurance to work in Ontario.

Chancer didn't have much billable work to do and a client asked Northshore to do a small project that was within Chancer's capability and experience. Chancer took on the project. Before he had done much work on the project, the requirements changed and Chancer was requested to conduct an in-depth engineering analysis of alternatives for a new plant. This analysis needed to be completed in a very short time period to allow the client to submit a proposal to their regulatory body for approval within a regulated time period.

Chancer had not done this type of analysis for a long time. Not wanting to lose the project and feeling that he could do an acceptable job with some guidance from other experienced engineers in the firm, Chancer decided to take on the work. Unfortunately the other engineers could not give Chancer the support he needed in the very short time available and he completed the analysis on his own under great time pressure. The final report was completed and submitted to the client under Chancer's seal and signature.

Chancer and the client testified at a hearing with the regulator that the work was accurate and complete. Shortly after the regulator gave approval to proceed with the plant, Chancer found a significant error in his work. The error did not put the public safety at risk but did dramatically alter the financial feasibility of the project. Another decision might have been made with the new information. Chancer decided that he would not inform the client about the error since he was trying to get more work from them.

Using the Code of Ethics and Code of Professional Misconduct as your guide,

- (15) (a) Discuss Chancer's behaviour. What should Chancer have done at the various stages of this project?
- (10) (b) Discuss Northshore's behaviour. What obligations did Northshore owe to the client?

## Question 4

King, a property owner in rural southeastern Ontario, was concerned that illegal dumping had occurred on his property and that the waste material might have contaminated the groundwater in the area. Since many local residents obtained their water from wells he was concerned that this could contaminate their drinking water.

King hired Scrabble P.Eng. (with a valid certificate of authorization and insurance) to conduct a review of the situation and report to him if there was any contamination in the drinking water. Scrabble conducted the necessary tests and had samples of the groundwater tested by an accredited laboratory. The results from the laboratory showed that the groundwater was indeed severely contaminated, well above legally allowable limits, and should not be used for drinking water. Scrabble prepared a report for King and submitted it with his seal, signature and date.

At Kings' request, Scrabble arranged for a public meeting to inform the local residents of the problem. King requested that he not contact the authorities since King was concerned about legal repercussions. Scrabble sent the residents a letter under his name about the meeting and requested that they not drink the well water until further notice, making note of some minor concerns. Scrabble never informed either the Ministry of Environment or local health department about the groundwater contamination.

Duke P.Eng. (senior engineer at the local Ministry of Environment Office) was made aware of the letter by one of the residents and initiated a formal investigation into the matter. He requested a copy of Scrabble's report. Scrabble refused to provide a copy of the report stating that it was confidential to his client King and would be used in a court case against the party that had dumped the waste on his property.

Using PEO's Code of Ethics and Code of Professional Misconduct as your guide:

- (7) (a) Discuss Scrabble's conduct in dealing with the public in this case.
- (5) (b) Discuss Scrabbles conduct in dealing with King..
- (10) (c) Discuss Scrabble's conduct in dealing with Duke and the local authorities
- (3) (d) Would Scrabble suffer any consequences? Explain.

# ASSOCIATION OF PROFESSIONAL ENGINEERS OF ONTARIO

## PROFESSIONAL PRACTICE EXAMINATION – December 5, 2015

### PART “B” - Engineering Law and Professional Liability

This examination comes in two parts (**Part “A” and Part “B”**). Both parts must be completed in this sitting. You will be given a total of **180 minutes** to complete the examination.

Use the correct colour-coded Answer Book for each part, place in the correct envelope and **seal after completed**.

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*Coloured Answer Book for Part B coloured question paper.*

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All **four** questions constitute a complete paper for Part “B”. Each of the four questions is worth 25 marks.

**ASSOCIATION OF PROFESSIONAL ENGINEERS OF ONTARIO**

**PROFESSIONAL PRACTICE EXAMINATION – December 5, 2015**

**PART “B” - Engineering Law and Professional Liability**

You will be given a total of **90 minutes** to complete this examination.

Use the correct colour-coded Answer Book for each part, place in the correct envelope and seal after completed.

*White Answer Book* for Part A white question paper.

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The marking of questions will be based not only on academic content, but also on legibility and the ability to express yourself clearly and correctly in the English language. If you have any doubt about the meaning of a question, please state clearly how you have interpreted the question.

All **four** questions constitute a complete paper for Part "A". Each of the four questions is worth 25 marks.

25 1. Briefly define and explain any five of the following:

- (i) Five examples of equal treatment employment rights to which individuals are entitled under Ontario's Human Rights Code (list only)
- (ii) Fiduciary duty of a director
- (iii) The discoverability concept
- (iv) The difference between mediation and arbitration
- (v) Contra proferentem
- (vi) Secret commission
- (vii) The New York Convention
- (viii) Statutory holdback applicable to construction

25 2. Live Rail Inc. ("Live Rail"), a company specializing in the manufacture and installation of railway commuters systems was awarded a contract by a municipal government to design and build a transit facility in British Columbia. The contract specified electrically powered locomotives. As part of the design, Live Rail was contractually obligated to design an overhead contact system in a tunnel. Live Rail subcontracted the design of the overhead contact system to a consulting design firm, Ever Works Limited ("Ever works").

Ever Works designed an overhead electrified wire contact system suspended from the ceiling in the tunnel, however, in doing so it did not carry out any testing, nor did it gather any data of its own relating to the conditions inside the tunnel. It did not even request copies of underlying reports, which, had they been examined, would have indicated that there was a large volume of water percolating through the tunnel rock, and that the tunnel rock contained substantial amounts of sulphur compounds. The project documentation that was turned over to Ever Works by Live Rail did not include the underlying reports, but did identify the existence and availability of the underlying reports.

The construction of the rail system through the tunnel was completed in accordance with the Ever Works design. However, within eight months of completion, the overhead contact system in the tunnel became severely corroded and damaged due to the water seepage in the tunnel.

As a result of the corrosion damage, the municipality had to spend

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substantial additional money on redesigning and rewiring the system.

What potential liabilities in tort law arise in this case? In your answer, explain what principles of tort law are relevant.

- 25      3. ACE Construction Inc. is a company primarily engaged in the business of supplying heavy equipment used in construction. As part of the company's economic plan to expand its business, ACE became interested in the rock crushing industry.

ACE had become aware that International Metals Company Ltd. ("IMCO") required a contractor to crush, weigh and stockpile approximately 250,000 tons of ore. As ACE believed this was an excellent opportunity to venture into the rock crushing business, it decided to tender on the IMCO contract.

In order to tender on the contract, ACE set out to purchase the necessary equipment to crush the material. ACE was contacted by a representative of Rock Busters Ltd., a company that sold such equipment. After visiting the IMCO site and determining the nature of the material to be crushed, the representative discussed the IMCO contract with ACE. After performing a number of calculations, the representative determined and guaranteed that the equipment Rock Busters would provide would be capable of crushing the material at a rate of 175 tons per hour. On the basis of the guarantee, Rock Busters and ACE entered into a contract. Rock Busters agreed that if ACE were successful in its tender to IMCO, Rock Busters would provide the equipment for a price of \$400,000. The contract also contained a provision limiting Rock Busters' total liability to \$400,000 for any loss, damage or injury resulting from Rock Busters' performance of its services under the contract.

Based on the information provided by the representative, ACE prepared and submitted its tender to IMCO. IMCO accepted the tender and entered into a contract with ACE to crush the material.

The rock crushing equipment was set up at the IMCO site by employees of Rock Busters and crushing operations commenced. However, from the beginning there was trouble with the operation. One of the components of the crusher, called the cone crusher, consistently became plugged by the accumulation of material. Each time the cone crusher became plugged, the operation would have to be shut down and the blockage cleared manually. In some cases, such blockages caused damage to the equipment. Rock Busters made several unsuccessful attempts to correct the defect by making modifications at the site and at its factory. The crushing equipment was never able to crush more than 30 tons of materials per hour.

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In order to meet its obligations under the IMCO contract, ACE hired another supplier to correct the defects in the Rock Busters equipment. For an additional \$500,000 the supplier replaced the cone crusher with one manufactured by another company. The replacement equipment was able to crush the material at the rate of 180 tons per hour. The total amount which had been paid by ACE to Rock Busters was \$350,000.

Explain and discuss what claim ACE can make against Rock Busters in the circumstances. Would ACE be successful in its claim? Why? In answering, please include a summary of the development of relevant case precedents. In particular, point out how the law changed because of these relevant case precedents. Identify the legal principles on which the precedent decisions were based and apply the appropriate legal principle to the facts.

**(25) 4.** An information technology firm submitted a bid to design and install software and hardware for an electronic technology process to control the operation of large scale sorting equipment for a major international courier company.

The firm's fixed guaranteed maximum price was the lowest bid and the contract was awarded to it. The contract conditions entitled the information technology firm to terminate the contract if the courier company did not pay monthly progress payments within 15 days following certification that a progress payment was due. Pursuant to the contract, the certification was carried out by an independent engineering firm engaged as contract administrator.

The work under the contract was to be performed over a 5 month period. After commencing work on the project the information technology firm determined that it had made significant judgment errors in arriving at its bid price and that it would face a major loss on the project. Its concern about the anticipated loss was increased further when it also learned that, in comparison with the other bidders, its bid price was extremely low and that, in winning the bid, it had left more than one million dollars "on the table".

Two monthly progress payments were certified as due by the independent engineering firm and paid by the courier company in accordance with the terms of the contract. However, after the third monthly progress payment was certified as due by the independent engineering firm, the courier company's finance department asked the information technology firm's representative on the project for additional information relating to an invoice from a subcontractor to the information technology firm. The subcontractor's invoice comprised a portion of the third progress payment amount. The courier company's finance department requested that the additional information be provided prior to payment of the third progress payment.

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There was nothing in the signed contract between the information technology firm and the courier company that obligated the information technology firm to provide the additional information on the invoice from its subcontractor. However, the information technology firm's representative did verbally indicate to the courier company's finance department that the additional information would be provided.

The additional information relating to the subcontractor's invoice was never provided by the information technology firm.

Sixteen days after the third progress payment had been certified for payment, the information technology firm notified the courier company in writing that it was terminating the contract because the courier company was in default of its obligations to make payments within fifteen days pursuant to the express wording of the contract.

Was the information technology firm entitled to terminate the contract in these circumstances? In giving reasons for your answer, identify and explain the relevant legal principle and how it would apply.