ORDRE DES INGÉNIEURS DU QUÉBEC

NOVEMBER 2021 SESSION

Open-book examination Calculators: only authorized models Duration: 3 hours

14-EC-2 ENGINEERING IN SOCIETY, HEALTH AND SAFETY

Question 1. (10 marks)

a. The code of ethics describes the relations with the Order and colleagues. In your own words, as an engineer explain the principles and obligations to observe. (5 points)
b. Why does the code of ethics address this aspect? (5 points)

Question 2. (10 marks)

a. In all aspects of his work, the engineer must respect his obligations towards man and consider the consequences of the performance of his work on the environment and on the life, health and property of every person. Why is this important? (2 marks)

b. An engineer may not cease to act for the account of a client unless he has just and reasonable grounds for so doing. What are these just and reasonable grounds? (2 marks)

c. An engineer must always safeguard his professional independence and avoid any situation which would put him in conflict of interest. Give two examples of such situations. (2 marks)

d. An engineer must charge and accept fair and reasonable fees. What constitutes fair and reasonable fees? (2 marks)

e. What acts are derogatory acts to the dignity of the profession? (2 marks)

Question 3. (10 marks)

Plastic injection molding machines are used for the manufacture of plastic products. The "Commission des normes, de l'équité, de la santé et la sécurité du travail (CNESST)" described in a guide how to analyze risk using four factors namely: (i) hazards, (ii) hazardous situations, (iii)

hazardous events and (iv) possible harm. An example of electrical hazard for the injection molding machine is described in Table 1.

Table 1: Electrical risk for the injection molding machine

Tasks	**Hazard**	**Hazardous situation**	**Hazardous event**	**Possible harm**
Operation	Electric – electrical panel of machine	Worker in proximity of live electrical parts during operation	Worker unintentionally in contact with live electrical parts	Electrocution, electric shock
Maintenance	Electric – electrical panel of machine	Worker in proximity of live electrical parts during maintenance	Worker unintentionally in contact with live electrical parts	Electrocution, electric shock

a. A **circular saw** (Figure 1) is used to cut wood and plastic. This tool has several types of hazards. Identify the **tasks, hazards, hazardous situations, hazardous events and harm** associated with these hazards for the various tasks which are described. **It is important to identify the most relevant ones, to include operation and maintenance tasks and to identify different hazards. You can make assumptions.** (5 marks)

Figure 1: Circular saw

Tasks	Hazards	Hazardous situations	Hazardous events	Possible harm

b. The RSST (occupational heath and safety regulations in Quebec) describes several types of guards for machine safety (section XX1). How to manage risks associated with this tool (Figure 1)? (5 marks)

Question 4 (10 marks)

a. What are the steps in a lockout procedure? (2 marks)
b. What should we do if lockout cannot be applied? (2 marks)
c. Give an example of a confined space. (2 marks)
d. What are the main risks associated with interventions into the confined space? Briefly describe the interventions and the risks (2 marks)
e. How to reduce the risks associated with confined spaced? (2 marks)