



**American International University- Bangladesh (AIUB)**  
**Faculty of Engineering (EEE)**  
**Subject: Engineering Ethics and Environmental Protection**

<b>Course Name:</b>	Engineering Ethics and Environmental Protection	<b>Course Code:</b>	EEE 3107
<b>Semester:</b>	Spring 2021-22	<b>Submission date:</b>	22-Feb-22
<b>Item:</b>	CO2: Identify impact on society and environment for professional engineering solutions (P.g.2.C5)		
<b>Student Name:</b>	Oysharja, Miftahul Jannat	<b>Student ID:</b>	20-42741-1
<b>Department:</b>	CSE	<b>Section:</b>	G

**Rubric:**

Category	Proficient [6]	Good [5]	Average [4-3]	Poor [2-1]	Secured Marks
<b>Risk and safety analysis</b>	Risk and safety analysis related to the case is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Risk and safety analysis related to the case is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Risk and safety analysis related to the case is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Risk and safety analysis related to the case is stated without clarification or description.	
<b>Comprehension of the role of engineering in society (K7)</b>	Comprehension of the role of engineering in society is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Comprehension of the role of engineering in society is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Comprehension of the role of engineering in society is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Comprehension of the role of engineering in society is stated without clarification or description.	
<b>Issues in engineering practice</b>	Issues in engineering practice is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Issues in engineering practice is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issues in engineering practice is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Issues in engineering practice is stated without clarification or description.	
<b>Engineering responsibility to public safety and Environment</b>	Engineering responsibility to public safety and environment is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Engineering responsibility to public safety and environment is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Engineering responsibility to public safety and environment is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Engineering responsibility to public safety and environment is stated without clarification or description.	
<b>Importance of 'Safety' to social, economic and sustainable development</b>	Importance of 'Safety' to social, economic and sustainable development is stated clearly and described comprehensively, delivering relevant information necessary for full understanding.	Importance of 'Safety' to social, economic and sustainable development is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Importance of 'Safety' to social, economic and sustainable development is stated, but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined,	Importance of 'Safety' to social, economic and sustainable development is stated without clarification or description.	
	<b>For complete Similarity with other (Negative Marking will be imposed)</b>				
Comments:			Total Marks (Out of 30):		

Sustainable development (SD) is the blueprint to ensure a better future for all. The economy, society and the environment are the predominant pillars of SD. There is an inherent relation between socio-economic development and the environment. The activities involved in such development can bring both adverse and favorable consequence to the environment. The journey of mankind to an elevated socio-economic condition significantly depends on the industrial revolution; whichever depend well and truly on the generation and consumption of energy. Hence, extensive use of fossil fuels i.e. oil, gas, coal etc. to produce energy is the principal reason behind the emission of greenhouse gas, trace metals and similar type of pollutants. The by-product of fossil-fuel combustion is a significant threat to the environment which later brings a harmful effect on human health. As a developing country, Bangladesh is not an exception in this regard. It is quite obvious that prolongation of such energy generation method certainly raises a conflict to the concept of SD. Further, it creates a confrontment situation concerning the projected timeline. Henceforth, a transition to renewable energy may mitigate all these adverse effects within a short time. Generating energy from clean and renewable source can significantly reduce carbon footprint and global warming, and it has numerous environmental and health benefits. Besides, using renewable sources for energy generation allow to build a reliable and affordable energy source; that lessen reliance on foreign energy sources as well. Above all, to ensure the sustainability of the three pillars of Sustainable Development and to safeguard the environment for a better future; there is no alternative to using renewable energy for energy generation.

**Based on the concept of Social and Environmental Ethics, identify, discuss and analyze the following issues from the given case:**

- (a) What are the adverse effects of the conventional power station that affect the safety and welfare of the public and the environment? **(Hint: Indicate the Risk and safety issues from the above discussion about the use of different petroleum fuels in Electric Power generation)**
- (b) What are the social and environmental impacts of renewable energy sources on the sustainable power generation of a country? **(Hint: Discuss the role of sustainable engineering techniques in the development of society and ecosystem)**
- (c) What are the ethical issues in the engineering practice of the above case study? **(Hint: Identify the violations of standard ethical practices in engineering if any)**
- (d) What is the engineering responsibility in designing a power plant ensuring public safety, which uses fuel that is directly responsible for global warming? How might these responsibilities be fulfilled simultaneously? **(Hint: Evaluate the engineering responsibility to public safety and environment in the development of new power plant)**
- (e) Discuss the importance of designing a sustainable Power Engineering Solution to support the development of a country **(Hint: Discuss the importance of 'Engineering Safety' to social, economic and sustainable development)**

**Answers:**

- a)** In Bangladesh uses coal gas and oil to generate energy at our conventional power station. Using coal gas for power plants implies that electricity is generated by steam produced by burning coal in a high-temperature water bath. The fact is that coal combustion is the primary source of smoke, acid rain, global warming, and air toxics. According to a study, coal plants emit 3,700,000 tons of carbon dioxide (CO<sub>2</sub>) each year, which is the primary cause of global warming since trees are cut down to burn coal gas. Second, it was discovered in other studies that 10000 tons of sulfur dioxide were liberally mixed with the air, resulting in acid rain that harms forests, lakes, and houses. It produces 10,200 tons of nitrogen oxide per year when coal gas is burned. The major cause of human lung tissue burning is nitrogen oxide, which makes patients worse. On the other side, the burning of coal gas produces 720 tons of carbon monoxide each year, which causes headaches and is a cause of heart disease.
- b)** Sustainability refers to the use of any resource in such a manner that we don't have to entirely dispose of it and future generations have access to the same quantity of it. When it comes to solar and wind energy, both of which are genuinely sustainable. Developing renewable energy sources that make use of the sun and wind. As a result, renewable energy sources such as wind, solar, and geothermal have major environmental consequences. Wind is one of the most environmentally friendly ways to generate power since it emits no hazardous pollution or contributes to global warming. When we talk about solar power, we're talking about a technology that makes use of the sun, which is a fantastic resource for creating clean, long-term electricity. Another sort of geothermal energy is hydrothermal plants, which are the most developed type of geothermal power plant. Biomass is another renewable resource that may be used to generate electricity.
- c)** When the word "ethical issue" is used, it refers to all of the codes of ethics that are accessible to engineers. Engineers should be conscious of the general population and their well-being in anything they develop and action they do. Regarding the many examples offered, we would have a broad concept of what has to be done, which is to imply providing inspiration. When we strive to design something, we must keep in mind what we do as engineers, as this will serve as a picture of your profession. If we do something incorrect, the general public will have an unfavorable impression of our profession.

- d)** Before making any choice as an engineer, we must first realize that environmental deterioration is occurring and that we must play a role in this issue. Second, it's about having experiences and learning about the problem so that you may become an expert on it. This will happen when you've received your acknowledgement. Finally, depending on your competence, we may be able to advance to a leadership position. Where can you educate others and where can we come up with creative solutions to the problem? So, in the above case study, they're talking about developing a power plant, and in order to do so, they need to acknowledge the problem. What is the best course of action to pursue that is not damaging to the broader public? Because power plants consume fuel gas, which is the primary cause of global warming, they must make decisions in such a manner that people may live in peace. In that instance, they can design the power plant from a distance that is not visible to the general public. Though it was not a permanent solution, they could use renewable resources such as solar power, wind energy, biomass for electricity, and geothermal energy instead of consuming raw fuel materials. The engineers' best option for developing a power plant will be this.
- e)** When we create anything or try to take some steps toward the development of a new item as engineers, we must constantly bear in mind the environmental implications and whether they would be harmful to the environment or not. There are many types of environmental degradation, such as global warming, floods, cyclones, and other types of occurrences that have an impact on the ecosystem. As engineers, we have the obligation to take the lead in this scenario and devise solutions to preserve the environment from various occurrences. When we strive to create anything, we should think about a variety of concerns, and the word SD (Sustainable development) should come to mind. Sustainability refers to the use of any resource in such a manner that we do not need to entirely dispose of it and future generations have access to the same quantity of resources. In our typical power plant, for example, we use Coal gas and oil to generate electricity. Gas and oil are unrestricted resources. If we continue to use them in the same manner, future generations will not have access to the same resources, which is an unsustainable habit. So, this notion of sustainability, in which we consider the consequences for future generations and future uses, may be applied to our personal lives as well as our professional lives.