

Student Name:

## **Shuttle Disaster Ethics Discussion MAE175A**

### **Engineering Ethics**

There is a large literature available on-line regarding professional ethics, and engineering ethics in particular. The notion of ethical engineering practice has long moved beyond ad-hoc decision making processes, and has evolved into an agreed upon set of fundamental values that most professional engineering societies have agreed upon. These fundamental values, often referred to as Fundamental Canons, have been created by groups of engineers in order to form a common, agreed-upon set of essential elements which underpin ethical professional behavior. One such set of canons, taken from the National Society of Professional Engineers (NSPE) website, is listed below.

### **Fundamental Canons**

Engineers, in the fulfillment of their professional duties, shall:

- 1. Hold paramount the safety, health and welfare of the public.**
- 2. Perform services only in areas of their competence.**
- 3. Issue public statements only in an objective and truthful manner.**
- 4. Act for each employer or client as faithful agents or trustees.**
- 5. Avoid deceptive acts.**
- 6. Conduct themselves honorably, responsibly, ethically and lawfully so as to enhance the honor, reputation and usefulness of the profession.**

While students may be tempted to see these canons as somewhat self-evident, their actual application in real engineering practice may often not be so clear cut. Often, one will encounter an ethical dilemma due to a conflict between two or more of these canons. For example, an engineer may encounter a situation in which her responsibility to her employer conflicts with her responsibilities to her customers or to the public. Furthermore, difficult decisions must often be made based upon uncertain or incomplete information or data. It is these types of difficulties that students will very likely encounter during their careers.

### **Case Study for Ethics Lecture**

The Shuttle disasters have been chosen for our case study because they provide visceral examples of how well-intentioned, and well-qualified individuals can find themselves making very poor, and even un-ethical decisions, when acting in their professional capacities. Students are encouraged to consider the following materials when watching the videos, and during the in-class discussion that will follow.

## **Questions on the Ethics Issues Of The Shuttle Disasters**

1. What were the physical causes of the shuttle Challenger disaster.
2. Summarize the key players in the disaster.
3. Prior to the launch of both ill-fated shuttle flights, there were indications that the shuttle components involved in the disasters were not functioning properly.
  - a. In the case of the Challenger disaster, what were these indications?
  - b. At what point in time were they first noticed?
  - c. Is there an Ethics Issue that arises when were first noticed?
4. Despite the engineering evidence that important shuttle components were not functioning to their design specifications, the decision was made to waive the design performance requirements, and the vehicles were cleared for flight.
  - a. Who made these decisions?
  - b. What factors went into their decision?
  - c. Why would competent engineers make such important decisions without a sound technical basis?
5. Individual engineers played significant roles in the two disasters (Roger Bojeley in the case of Challenger, Rodney Rocha in the case of Columbia).
  - a. Briefly summarize the efforts of such individuals to try and avert the disaster.
  - b. What common elements do you see in the actions of such individuals?
6. In light of the engineering ethics canons we present in class, should such individuals have taken additional steps to try and ensure the safety of their respective flights?
7. If you think the answer is 'yes', then discuss what those steps might be. If you think the answer is 'no', then justify your answer in light of the canons of engineering ethics.