



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING  
UNIT II  
ENGINEERING AS SOCIAL EXPERIMENTATION

**1. What are the conditions required to define a valid consent?**

- The consent was given voluntarily.
- The consent was based on the information that rational person would want, together with any other information requested, presented to them in understandable form.
- The consenter was competent to process the information and make rational decisions.

**2. What are the two main elements which are included to understand informed consent?**

Informed Consent is understood as including two main elements:

- Knowledge [Subjects should be given not only the information they request, but all the information needed to make a reasonable decision].
- Voluntariness [Subjects must enter into the experiment without being subjected to force, fraud, or deception].

**3. What are the general features of morally responsible engineers?**

- Conscientiousness.
- Comprehensive perspective.
- Autonomy.
- Accountability.

**4. What is the purpose of various types of standards?**

- Accuracy in measurement, interchangeability, ease of handling.
- Prevention of injury, death and loss of income or property.
- Fair value of price.
- Competence in carrying out tasks.
- Sound design, ease of communications.
- Freedom from interference.

**5. Define Code?**

Code is a set of standards and laws.

**6. Enumerate the roles of codes?**

- Inspiration and Guidance
- Support
- Deterrence and Discipline
- Education and Mutual Understanding
- Contributing to the Profession's Public Image
- Protecting the Status Quo
- Promoting Business Interests

**7. Give the limitations of codes?**

- Codes are restricted to general and vague wording.
- Codes can't give a solution or method for solving the internal conflicts.
- Codes cannot serve as the final moral authority for professional conduct.
- Codes can be reproduced in a very rapid manner.



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**8. What are the problems with the law in engineering?**

- Minimal compliance
- Many laws are without enforceable sanctions.

**9. What is the need to view engineering projects as experiments?**

- Any project is carried out in partial ignorance.
- The final outcomes of engineering projects, like those of experiments, are generally uncertain.
- Effective engineering relies upon knowledge gained about products before and after they leave the factory – knowledge needed for improving current products and creating better ones.

**10. Differentiate scientific experiments and engineering projects?**

Scientific experiments are conducted to gain new knowledge, while “engineering projects are experiments that are not necessarily designed to produce very much knowledge”.

**11. What are the uncertainties occur in the model designs?**

- Model used for the design calculations.
- Exact characteristics of the materials purchased.
- Constancies of materials used for processing and fabrication.
- Nature of the pressure, the finished product will encounter.

**12. Comment on the importance of learning from the past, using Titanic disaster, as an example?**

The Titanic lacked a sufficient number of lifeboats.

**13. Comment on the importance of learning from the past, using the nuclear reactor accident at Three Mile Island, as an example?**

Valves are notorious for being among the least reliable components of hydraulic systems. It was a pressure relief valve, and lack of definitive information regarding its open or shut state. Similar Malfunctions had occurred with the identical valves on nuclear reactors because of the same reasons at other locations, but no attention had been given to them

**14. Give any two prominent features of contemporary engineering practice that differentiate casual influence and moral accountability in engineering?**

- Large-scale engineering projects involve fragmentation of work.
- Due to the fragmentation of the work, the accountability will spread widely within an organization.
- There is frequently pressure to move on to a new project before the current one has been operating long enough to be observed carefully.
- The contagion of malpractice suits currently afflicting the medical profession is carrying over into engineering.

**15. Are SRBs inherently too dangerous to use on manned spacecraft? If so, why are they part of the design?**

Yes, since they have the disadvantage that once the fuel is lit, there is no way to turn the booster off or even to control the amount of thrust produced. SRBs were used instead of safer liquid fueled boosters because they required a much smaller research-and-development effort.



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Numerous other design changes were made to reduce the level of research and development required.

**16. Under what conditions would you say it is safe to launch a shuttle without an escape mechanism for the crew?**

- Design specifications <sup>3</sup> 310F
- Have given valid consent
- Instead of rubber, steel billets for O-rings
- Liquid fueled boosters instead of Solid rocket boosters

**17. In your opinion, was the ‘Right for informed consent’ of the astronauts of Space Shuttle Challenger respected?**

No.

**18. Define Ethical Conventionalism?**

Ethical conventionalism is the view that a particular set of conventions, customs, or laws is self-certifying and not to be questioned as long as it is the set in force at a given time or for a given place.

**19. State Babylon’s Building Code?**

If a builder has built a house for a man and has not made his work sound, and the house which he has built has fallen down and so caused the death of the householder, that builder shall be put to death. If it causes the death of the householder’s son, they shall put the builder’s son to death. If it causes the death of the householder’s slave, he shall give slave for slave to the householder. If it destroys property he shall replace anything it has destroyed; and because he has not made sound the house which he has built and it has fallen down, he shall rebuild the house which has fallen down from his own property. If a builder has built a house for a man and does not make this work perfect and the wall bulges, that builder shall put that wall into sound condition at his own cost.