PART ONE: MULTIPLE CHOICE (50 POINTS)

Peter's plant has an excellent environmental reputation. One day over coffee with his manager, Peter learns that ten years ago there was a mysterious loss of 10,000 gallons of one of the petrochemicals the plant receives by pipeline. It was discovered that one of the pipes had corroded and had formed a vertical plume that was still slowly diffusing down into an aquifer approximately 400 ft. below the surface. Because there was no surface or groundwater pollution off the plant property (above 400 ft.), the plant manager decided to do nothing. State law requires that all spills be reported, but what about spills years ago, before the present environmental rules were implemented? The story never reached the press. Should Peter report the spill?

1. An application issue in the case is
   a. Will the courts find this to be a violation of the law that all spills should be reported?
   b. Would the general public, if the incident were made public, conclude that the plant was acting illegally if it failed to report the spill?
   c. Should "spill" be defined in the law in such a way that there is a time frame?
   d. Should the contamination of a deep aquifer be considered a type of pollution?

2. An application issue in the case is
   a. Is failure to report a spill before the law was passed a violation of the law?
   b. Does the plant manager have a greater obligation to the company or the public?
   c. Is pollution of an aquifer 400 ft. below the surface a danger to the public?
d. Would the public consider failure to report the plume an example of bad faith?

3. A conceptual issue in the case is
a. Should "spill" be defined in the law in such a way that there is a time frame for the spill to occur?
b. Should a seepage from a pipeline be considered a "spill"?
c. How is "pollution" defined in the law?
d. Should Peter be morally obligated to correct spills that occurred before the law was passed?

4. A conceptual issue in the case is
a. Should "pollution" be defined to include contamination of water at 400 ft.?
b. Is pollution below 400 ft. a danger to the public?
c. How is "pollution" defined in the law?
d. Should Peter have more moral obligation to his company or the public?

5. Peter discovers that eliminating the contaminating plume would be so expensive that it might force the plant to close and throw the employees out of work. He wonders whether he should risk this possibility to eliminate a possible contamination. As stated here, the issue Peter faces is
a. A moral issue
b. A factual issue
c. A conceptual issue
d. An application issue

6. Peter talks to his wife about what he should do. She says that if he fails to report the spill, even though it was a long time ago, he will be lying. That is, his failure to report the spill would be an instance of lying, whether or not the lying is justified. Peter's wife is MOST DIRECTLY making a claim about
a. A moral issue
b. A factual issue
7. Peter talks to his wife about what he should do. She says that if he fails to report the spill, even though it happened a long time ago, he would be engaging in deception. That is, his failure to report the spill would be an instance of deception, even if it is justified deception. Peter's wife is MOST DIRECTLY making a claim about

a. A moral issue
b. A factual issue
c. A conceptual issue
d. An application issue

8. Peter says at most his failure to report the spill would be a case of deception, not lying. His wife says it would be a case of lying. Peter and his wife disagree about

a. A moral issue
b. A factual issue
c. A conceptual issue
d. An application issue

9. Peter says that deception involves failure to disclose the truth, whereas lying involves an active attempt to get people to believe something that is not true. Peter's wife says that lying includes concealing information. Peter and his wife disagree over

a. A moral issue
b. A factual issue
c. A conceptual issue
d. An application issue

10. In event trees
a. The probability of a given failure mode is determined by multiplying the probabilities of the events leading to that failure mode

b. The probability of a given failure mode is determined by subtracting the probabilities of the final event from the probabilities of the events leading to it

c. The results are not useful if any of the assigned probabilities are conjectural

d. The results are not useful if any possible failure mode has been omitted

11. A factor of safety of at least 3

a. Eliminates the need to determine failure modes

b. Insures that the design is an acceptable risk

c. May be sufficient for some designs, but not for others

d. Is not sufficient for any design

12. The crucial concept of "acceptable risk,"

a. Is a criterion on which both risk experts and laypeople agree. The problem is in determining whether a given design or procedure meets the criterion.

b. Is a criterion which the risk expert tends to say is met if the risk is outweighed by the benefit

c. Is a criterion which the layperson tends to say is met if the risk is outweighed by the benefit

d. Is a criterion which the risk expert tends to say is met if the risks and benefits are equally shared

13. Which of these are the LEAST useful ways of determining the value of human life?

a. Purchasing decisions involving safety

b. Future earnings of the person subjected to risk

c. Extra payments needed for risky jobs

d. Both a and c

14. Studies of the willingness of people to assume risk show that
a. Wealthy people are willing to pay more to avoid risk than poor people

b. People will pay more to avoid some risks than others, even if there is an equal probability of harm in both cases

c. Both a and b

d. Men tend to be more risk-averse than women

15. The electric power company proposes to build a nuclear power plant in your neighborhood. Given the newly deregulated electricity market, the power will be sold out of state because prices are higher there. According to our characterization of the government regulator, she will most typically ask:

a. Does the benefit to the general population outweigh the risk?

b. Is the public being adequately protected from risk?

c. Are those who bear the risk adequately sharing in the benefit?

d. Is the project adequately consented to by the citizens?

16. Suppose it is not possible to get James' informed consent to an action that affects him. Which of the following statements best characterizes what a WEAK paternalist should do in such circumstances?

a. Do what the reasonable and informed person would do in the circumstances, assuming James would most likely do what the reasonable and informed person would do

b. Do what you think the person should do according to your values.

c. Do what would promote the most overall good in the circumstances

d. Do what the expert or professional would do in, even though this may not be what James would want

17. Suppose a biomedical engineer attempts to explain the risks of an experimental treatment to a patient who is dying of cancer. The engineer asks a physician to translate the complicated medical analysis of the possible effects of the procedure into layperson's language and convey it to the patient. The physician warns, however, that the translation into lay terms really distorts the situation rather fundamentally. The engineer urges that the physician be empowered to make the decision for the patient.

a. This is an example of weak paternalism, if the engineer does not think the patient can make a truly "informed" decision.

b. This is an example of weak paternalism, if the engineer thinks one of the choices is better than the other and does not want the patient to make the "wrong" choice.

c. This is an example of strong paternalism, if the engineer thinks the patient cannot fully decide because of
undue pressure from family to make one decision rather than another.

d. This is an example of strong paternalism, if the engineer thinks the "moral agency" of the patient cannot be fully exercised under the circumstances.

18. In the Challenger case, deviance was "normalized" by

a. Making the "impingement erosion" known to the astronauts
b. Lowering acceptable temperature for launch from 53 degrees to 29 degrees.
c. Making the problem of the "impingement erosion" known to the general public
d. Correcting the problem that led to the "impingement erosion"

19. Some technologies have an especially high susceptibility to accidents because of

a. Tight coupling and complex interaction
b. Tight coupling and non-complex interaction
c. Loose coupling and complex interaction
d. Loose coupling and non-complex interaction

20. Space missions and nuclear power plants are examples of

a. Tight coupling and complex interaction
b. Tight coupling and non-complex interaction
c. Loose coupling and complex interaction
d. Loose coupling and non-complex interaction

21. Even though it is not required by law, Engineer Jane wants to design in a back-up warning system on a new airplane because she is convinced that it can provide considerable extra safety and is not very expensive. This is an example of

a. The Malpractice Model, because it goes beyond professional obligation
b. The Good Works Model, because it goes beyond professional obligation
22. A biomedical engineer is so intent on developing a new medical device that she believes will benefit the general public that she tends to forget the welfare of the patient on whom the now-experimental device is being tested. As described, this is an example of

- Groupthink
- Weakness of will
- Self-interest
- Microscopic vision

23. A foreign official makes it clear to you that your firm's oil storage tanks may catch fire and there may be no fire fighters to put out the fire unless your firm contributes $100,000 to his private account. The Foreign Corrupt Practices Act (1997)

- Forbids the payment because it is a bribe
- Forbids the payment because no payments may be made to a foreign government official
- Allows the payment because it is a payment to a government official, and only payments to private citizens are regulated by the law
- Allows the payment because it is a payment for a service to which one is already entitled

24. In contrast to the account of rights we gave in discussing RP morality, where only "negative" rights were enumerated, the United Nations document on human rights enumerates "positive rights" as well, i.e. rights that involve a positive obligation on the part of others, not merely non-interference. Which of the following rights from the UN document is the best example of a positive right?

- Right to life
- Right to work
- Right to peaceful assembly
- Right to security of person
25. John's firm owns 90% of the land devoted to pineapple production in Country X, and few other jobs are available. The workers are paid very low wages. As described, this is best characterized as exploitation because

a. The pineapples are consumed in other countries, not by the producers
b. There is an asymmetrical balance of power between workers and the firm
c. The workers are unhappy with their condition
d. Both a and c

26. Suppose a firm wants to keep a formula secret indefinitely and not to have any aspect of it available to the public. It would be best advised to hold the formula as a

a. Trade secret
b. Patent
c. Trademark
d. Copyright

27. Margaret is a young engineer who works for Company A. She helps design a new process which the company markets. In the design process, she learns a lot about heat transfer. After five years, she takes a job with Company B. Disregarding company policies and legal considerations, when is she clearly stealing Company A's proprietary information?

a. At Company B, she uses knowledge about heat transfer which she acquired at Company A.
b. At Company B, she applies knowledge of how heat transfer theory is used to gained at Company A to a product which is in direct competition with a product made by Company A.
c. At Company B, she is asked to contribute only her knowledge of heat transfer gained at Company A to a product much like the one created at Company A.
d. None of the above

28. Engineer Albert is asked to appear as an expert witness by an attorney, but only, of course, if he can support the attorney's client. Albert should

a. Agree to support the attorney's client before he has looked at the facts, because he knows that another engineer will support the other side
b. Agree to look at the evidence, and then decide whether he can support the attorney's client
c. Agree to testify, but say that he will testify in good conscience, regardless of who pays him

d. Take the case, even if it is not in his area of expertise, since the expert witness on the other side will
correct any mistakes he makes

29. Which of the following illustrates a potential conflict of interest for John?

a. John wants to make his new product safe for the public but also profitable for his employer

b. John owns stock in a company whose parts he is specifying in his design

c. John used to own stock in a company whose parts he is specifying in his design, and most people do not
know that he has sold the stock

d. None of the above

30. Which of the following illustrates an apparent conflict of interest for John?

a. John does not know whether he wants to major in chemical or mechanical engineering

b. John used to own stock in a company whose parts he is specifying in his design, and most people do not
know that he has sold the stock

c. John owns stock in a company whose parts he is specifying in his design

d. None of the above

31. In the Grace Pierce case, the New Jersey Supreme Court

a. Stated that in certain instances, a professional code of ethics may contain an expression of public policy

b. Rejected her appeal because her resignation was premature and she had appealed to the wrong code of
ethics

c. Rejected her appeal and reaffirmed the doctrine of employment at will

d. Both a and b

32. In the Paul Lorenz case, Mr. Lorenz, a mechanical engineer, claimed wrongful discharge.

a. He alleged that he had been fired because of his failure to engage in acts of deception and
misrepresentation concerning the quality of materials used by Martin Marietta in equipment for the space
shuttle program of the National Aeronautics and Space Administration (NASA).

b. He alleged that he had been fired because he disobeyed an order to go ahead with a design for equipment for the NASA space-shuttle program that he believed was unsafe

c. The Colorado Supreme Court ordered that Mr. Lorenz be reinstated in his job.

d. Both b and c

33. The best description if the present status of court interpretation of the "public policy" exception to the common law doctrine of employment at will is that it

a. Is interpreted rather narrowly and is limited to such things as protecting the public from a clear threat to health or safety

b. Is interpreted in such a way as to primarily protect employees from violating their conscience

c. Is usually upheld whenever professionals can show that they have been forced by their employer to violate the code of their professional society

d. Has been shown to never be effective except when an employee has been punished when filing a worker's compensation claim

34. Jane is designing a valve which has a part that can be supplied by either Supplier A or Supplier B. Which of the following considerations is the MOST RELEVANT in arguing that the decision to use Supplier A should be made by Jane, the engineer, rather than the manager, a non-engineer?

a. Supplier A can deliver the part more quickly than Supplier B.

b. The part supplied by Supplier A is 5% cheaper

c. Supplier A is potentially a large customer of Jane's firm

d. The part supplied by Supplier B does not have the same track record as the part supplied by Supplier A.

35. Jane is designing a valve which has a part that can be supplied by either Supplier A or Supplier B. Which of the following considerations is the MOST RELEVANT in arguing that the decision to use Supplier A should be made by the manager rather than the engineer?

a. Supplier A can deliver the part more quickly than Supplier B.

b. The part supplied by Supplier A is 5% cheaper

c. Both a and b
d. The part supplied by Supplier B does not have the same track record as the part supplied by Supplier A.

36. Which of the following is the MOST APPROPRIATE argument for UNCRITICAL loyalty of an employee to employer?

a. Chaos would result if every employee felt qualified to evaluate management's policies
b. Laws cannot be written to prevent every possible abuse by firms, so employees should keep an eye on management decisions
c. Employers can benefit from comments and criticisms of employees who think independently
d. The moral agency of employees should be respected

37. Which of the following is the MOST APPROPRIATE argument for CRITICAL loyalty of an employee to employer?

a. Chaos would result if every employee felt qualified to evaluate management's policies
b. Management decisions often involve matters on which most employees are not expert
c. Employees often do not know all of the facts and considerations that are relevant to management decisions
d. Laws cannot be written to prevent every possible abuse by firms, so employees should keep an eye on management decisions

38. Which is the best example of employee disobedience by contrary action?

a. Dr. Grace Pierce's refusal to carry out the order to perform tests on humans
b. Refusing to participate in a project that damages the environment
c. Belonging to a political group that is not looked on with favor in the community and causes public relations problems for one's employer
d. Contacting the press and revealing a misdeed by your company

39. Some critics argue that DeGeorge's tests for morally permissible whistleblowing are too conservative or restrictive. That is, they would not permit a person to blow the whistle when he should. Which of the following tests or criteria that DeGeorge offers might be subject to this criticism?

a. A person must first exhaust every possible channel within the organization
b. Disclosing the information would actually prevent the harm.
c. Law enforcement agencies must first be contacted
d. Both a and b

40. Which is an example of an idea associated with an anthropocentric ethical viewpoint?
a. Wetlands should be preserved, even if they do not contribute to human well-being
b. Human population should be limited in order to provide better conditions for human well-being
c. Both a and b
d. Animals have certain rights that should be protected

41. Which is an example of an idea associated with a non-anthropocentric ethical viewpoint?
a. Wetlands should be preserved, even if they do not contribute to human well-being
b. Human population should be limited in order to provide better conditions for human well-being
c. Both a and b
d. Global warming should be reversed, if possible, because it could severely damage the prospects for human survival

42. Of the following four groups, which is most likely to be able to bring pressure on an American mechanical engineer who is not a PE to act ethically?
   a. The Texas State Board of Engineering Registration
   b. The National Society of Professional Engineers
c. The National Council of Examiners for Engineering and Surveying
d. The American Society of Mechanical Engineers

43. Of the following four groups, which is most likely to be able to bring legal pressure on a Texas mechanical engineer who is a PE, to act ethically?
   a. The Texas State Board of Registration for Professional Engineers
   b. The Texas chapter of the National Society of Professional Engineers
c. The National Council of Examiners for Engineering and Surveying
d. The Texas Chapter of the American Society of Mechanical Engineers

44. The Board of Ethical Review is associated with
   a. The Texas State Board of Engineering Registration
   b. The National Society of Professional Engineers
c. The National Council of Examiners for Engineering and Surveying
d. The American Society of Civil Engineers

45. Which of the following statements would be the most appropriate argument for universal engineering licensure?
   a. The prices of engineering services might increase
   b. The codes could be more strongly enforced
   c. It is sometimes difficult to decide what activities require an engineer
d. Sometimes people who do not have an engineering degree can do quality engineering work

46. Which of the following are the best arguments for eliminating the so-called "industry exemption"?
   a. It might lead to a situation in which engineers in the workplace have more ability to resist the immoral or unprofessional orders of managers
   b. It is sometimes difficult to identify who is in "responsible charge" and must sign off on designs when there are only a few registered engineers in the firm
c. It would probably decrease the ability to enforce professional standards
d. Both a and b

47. In the argument over reverse discrimination, an argument involving "compensation" is sometimes given in favor of reverse discrimination
   a. The argument tends to be backward-looking
b. The argument is RP in orientation, because it holds that people have been denied a certain level of happiness due to discrimination, and that they should be compensated for this loss by being given an "extra dose" of happiness now

c. Both a and b

d. The argument holds that those who suffered the worst discrimination in the past are dead, and so present members of minorities should not be given special consideration

48. In the argument over reverse discrimination, an argument involving "compensation" is sometimes given in favor of reverse discrimination

a. This is an RP argument, because it holds that people have lost a portion of their moral agency in the past, due to discrimination, and they should be given special considerations that will restore them to their rightful degree of empowered moral agency

b. This argument tends to be backward-looking

c. Both a and b

d. The argument holds that those who suffered the worst discrimination in the past are dead, and so present members of minorities should not be given special consideration

49. The "innocent benefitter" argument sometimes given in the reverse discrimination controversy holds that

a. Minorities have benefitted enough from reverse discrimination and should not benefit further

b. White males have benefitted from discrimination in the past, so there is no injustice if they are discriminated against now

c. Women and minorities are not really as innocent as they are sometimes thought to be in the discrimination against them, so they should not benefit from laws and regulations in their favor

d. Laws against discrimination should benefit only the innocent, i.e. those who do not bring the discrimination on themselves by their own irresponsible action

50. In the argument over discrimination and affirmative action

a. Some of the arguments are utilitarian, such as the argument that including more women and minorities introduces new perspectives into the workplace that can benefit employers

b. The Supreme Court has ruled that Affirmative Action programs are illegal if an unqualified person receives benefits over a qualified one

c. The so-called "auditing" method tends to confirm that racial and ethnic minorities receive more favorable
treatment in the interview and job-offer phases, due to the influence of affirmative action laws

d. Both a and b

51. Historically, medical ethics has been strongly RP in orientation, emphasizing non-maleficence over beneficence. In recent years, utilitarian considerations have entered the picture. Which of the following events represents the utilitarian perspective?

a. The statement of the Belmont Report that persons with diminished autonomy are entitled to protection

b. The use of poor ward patients in government wards for medical research which primarily benefits private-care patients.

c. Objecting to the use of disadvantaged rural black men to study the untreated course of syphilis

d. The objections made to the use of prisoners in medical research

52. In medical ethics, the distinction between therapeutic and non-therapeutic research is important.

a. Non-therapeutic research does not benefit the research subject, and it should be subjected to much more stringent regulations than therapeutic research

b. Non-therapeutic research can only be justified under "weak" paternalism

c. Non-therapeutic research can only be justified under "strong" paternalism

d. Therapeutic research is intended to benefit the public, not the research subject, and so can only be justified if the costs are outweighed by the benefits

53. The textbook proposes a certain position regarding the extent of an engineer's professional (as opposed to personal) obligation to the environment. Which of the following statements best summarizes the textbook's position as to what an engineer's professional obligation should be in this area?

a. Engineers should not be obligated to protect the environment when human health is not at stake

b. Engineers should have the right to refuse to work on an environmental project with which they disagree

c. Engineers should not be required as professionals to take a position on an environmental topic unless it is mandated by law, although they should be free to do so without penalty from their employer if personal conscience dictates

d. Both a and b
54. Which of the following projects in Dr. Holtzapple's research is most suited to address the problem of air pollution? (Note: You must first identify the project as one of the four he mentioned in his talk.)

a. A new method for making synthetic oil
b. A gerotor engine
c. A new strain of corn
d. An electric car

55. Which of the following projects in Dr. Holtzapple's research is most suited to address the problem of third-world debt? (Note: You must first identify the project as one of the four he mentioned in his talk.)

a. A new method for biomass utilization
b. A new method for making synthetic oil
c. A new method for making plastic
d. A new method for making synthetic wood

PART TWO: ESSAY QUESTION (50 POINTS)

Answers
1. d
2. a
3. a
4. a
5. a
6. d
7. d
8. d
9. c
10. a
11. c
12. b
13. c
14. c
15. b
16. a
17. a
18. b
19. a
20. a
21. c
22. d
23. d
24. b
25. b
26. a
27. d
28. b
29. d
30. b
31. d
32. a
33. a
34. d
35. c
36. a
37. d
54-55---not relevant for Fall, 2001. The same is true of the questions on biomedical engineering.