

# Exam WM0324LR (DIGITAL)

## Ethics and engineering for aerospace engineering

January 23, 2013, 14:00-16:00 – WITH ANSWERS

This exam consists of 30 multiple choice questions. Each question only has one right answer. In some questions, you are asked to indicate which statement(s) is/are true. If two statements are true, choose the answer that indicates this. If you do not know the answer, you may make a guess. In the grading of the test, a correction is made for guessing, so it is beneficial for you to always answer the question! You may use a dictionary. Good luck!

1. Which one of the following statements about technocracy is correct
  - A) Technocracy is the notion that scientists and engineers should apply the technical input, while appropriate management and political organs should make the value decisions.
  - B) Technocracy is the notion that engineers should decide what is best for a company or for a society.
  - C) Technocracy maintains that engineers can only be held responsible for the design of products and not for the wider social consequences
  - D) Technocracy maintains that engineers and politicians are equally responsible for the social consequences of technological projects
  
2. Effectiveness and efficiency seem to be two leading objectives in engineering design. This has been criticized from a moral point of view because
  - A) There are no scientific methods to assess these objectives
  - B) There could be an internal conflict between the two of them, meaning that they could not be accomplished simultaneously
  - C) They do not say anything about the validity of the goal of technology
  - D) These are not value-laden objectives
  
3. When assessing moral blameworthiness after something undesirable has happened several criteria must be met. Which one of the following does not belong to these criteria?
  - A) Wrong-doing: a moral norm must be violated or something wrong must have happened
  - B) Legal compliance: a legal standard must be violated
  - C) Foreseeability: the person must have been able to know the possible consequences of his or her action
  - D) Freedom of action: The person responsible must have had freedom of action
  
4. Which one of the following statements is false about the corporate social responsibility
  - A) It includes to the responsibility of the company towards stakeholders
  - B) It challenges the notion that the responsibility of companies is limited to making profits within the limits of law
  - C) It does not impose more limits on the company than what the law prescribes
  - D) It is formulated by the company itself
  
5. An important question in corporate codes of conduct is how they should be enforced. According to the book, for ensuring enforcement (for the outside world) corporations sometimes choose to
  - A) Externally audit their codes, meaning that they will be assessed by a supervising governmental body in terms of their own company codes
  - B) Externally audit their codes, meaning that they will be assessed by an independent accountancy or consultancy firm in terms of their own company codes
  - C) Explicitly include whistle-blowers protection clauses and publicly announce them
  - D) Explicitly include whistle-blowers protection clauses and legally enforce those clauses

6. Which of the following statements is true?
- A) When there is a contradictory recommendation between the codes of conduct, corporate code should take precedence over professional codes
  - B) Engineering codes of conduct are always legally enforced by the professional organization
  - C) Both A and B
  - D) Neither A nor B
7. Which of the following statements is true?
- A) Individual responsibility implies that every member of an organization is responsible for the actions of all other members at the same hierarchical level.
  - B) Hierarchical responsibility implies that only organization's top level is held responsible for the action of (people in) the organization
  - C) Both A and B are true
  - D) Neither A nor B is true.
8. Which one of the following statements is true?
- A) In corporate liability, the corporation is treated as a legal person.
  - B) Strict liability requires defendant to be negligent in order to be liable.
  - C) In limited liability, engineers involved in design are only liable to a certain degree
  - D) All of the above
9. The effectiveness requirement in distributing responsibility requires that
- A) Responsibility should be distributed fairly among all involved parties
  - B) Responsibility should be distributed such that it best prevents harm
  - C) Both A and B
  - D) Neither A nor B
10. Which of the following statements describes the problem of many hands
- A) The collective can reasonably be held responsible for an outcome, while none of the individuals can reasonably be held responsible for that outcome
  - B) The collective cannot reasonably be held responsible for an undesired outcome, while many individuals can reasonably be held responsible for that outcome
  - C) Both A and B are true.
  - D) Neither A nor B is true.
11. Which of the following is not described as part of the "ethical cycle"?
- A) Ethical judgment
  - B) Reflection
  - C) Intuition
  - D) Problem analysis
12. The principle of informed consent states that
- A) Those who could be exposed to the risk should be fully informed about the consequences of that technology
  - B) Those who could be exposed to the risk of new technology should consent to being exposed to those risks
  - C) Both A and B
  - D) Neither A nor B

Questions 13 to 17 are related to the following text and the small supplement on the next page.

## Fume events

(Source: the Wall Street Journal, Up in the Air: New Worries About ‘Fume Events’ on Planes, Sarah Nassauer, 30 July 2009) This is a piece of that article.

<http://online.wsj.com/article/SB10001424052970204900904574302293012711628.html>

Any frequent flier knows that air on a plane can get pretty foul. But can it be toxic? Flight crews and travelers are increasingly concerned with that question, amid growing attention to a particular aspect of the air pumped into planes. Air travelers breathe a combination of recycled cabin air and outside fresh air that has been compressed by the aircraft’s engines—known as “bleed air.” But when the system malfunctions, chemical contaminants can occasionally end up circulating through the airplane, creating a so-called fume event. Some crew claim contaminants can enter cabins.

Airline companies and jet manufacturers say that fume events are rare, and that when they do occur, air quality still exceeds safety standards. But unions representing pilots and flight attendants say the chemicals entering the aircraft cabin can endanger the health of flight crews and passengers.

Some unions have begun warning their members of potential respiratory and neurological dangers. At least two lawsuits have been filed in the U.S. by passengers and airline workers claiming contaminated cabin air made them sick. And investigations by the Federal Aviation Administration and other regulators around the world are seeking to determine what chemicals might be introduced, and what the health effects might be, when compressed engine air becomes contaminated with residues of engine oil, hydraulic fluid or other substances.

Some small studies already completed have generally been inconclusive, largely because of the difficulty of monitoring contamination events that occur so infrequently.

13. Which fallacy (or fallacies) do you read in this piece of text?

- A) Confusion of law and ethics: referring to legal safety standards for justifying possible health risks
- B) Risk fallacy: drawing health related conclusion based on inconclusive research
- C) Both A and B
- D) Neither A nor B

14. As stated above, some health related problems have been observed after fume events but the relationship between these events and health problems has not yet been fully established. Which one of the following is correct?

- A) We are dealing with ambiguity because not yet fully established scientific facts could be interpreted ambiguously
- B) We are dealing with uncertainty because we know that there are health consequences but we cannot meaningfully attribute any probability to them because there is a lack of scientific evidence.
- C) We are dealing with ignorance because we know that there are health consequences but we cannot meaningfully attribute any probability to them because there is a lack of scientific evidence.
- D) None of the above

15. Airline companies emphasize the low probability of these events. What is – based on the case description above – a sufficient criterion for the ethical acceptability of possible health risks of “fume events”?

- A) Those risks are ethically acceptable if the imposed risk is fairly distributed among everybody exposed to that risk
- B) Those risks are ethically acceptable if we can reduce their probabilities as much as reasonably possible
- C) Those risks are ethically acceptable if we clearly and understandably communicate the nature and magnitude of the risk with those who could be exposed to them.
- D) None of the above

16. Let us assume that this problem has been caused by a design flaw. If we now consider the responsibility of the designers of this air circulation system, that would be an instance of

- A) Passive responsibility, because we are looking backward to assign responsibility
- B) Accountability because the designer should be held to account for his or her action
- C) Both A and B
- D) Neither A nor B

As a response to recent publications on “fume events” in the Dutch media, the State Secretary of Infrastructure and the Environment (Mrs. Wilma Mansveld) announced that there is no reason to investigate this matter any further, because there is no urgent problem at hand. Respiratory problems after flying could also be caused by other reasons than “fume events”.

(Source: NRC Handelsblad, Als er mist hangt in het vliegtuig, Kees Versteegh en Sander Voormolen, Wetenschapsbijlage NRC Weekend, 22&23 december 2012, p. 7)

17. How would the precautionary principle advise on this matter?

- A) Precautions must be taken because there is an indication of existence of a hazard
- B) Precautions must be taken even though existence of a hazard is not fully scientifically proven
- C) Both A and B
- D) Neither A nor B

18. Suppose two different technologies X and Y have the same total risk and total benefits. Which of the following statements is true?

- A) X and Y are always equally ethically acceptable
- B) X and Y need not be equally ethically acceptable because the distributions of risks and benefits may be different between X and Y
- C) X and Y need not be equally ethically acceptable because there may be a more attractive alternative to technology X while such an alternative is not available to technology Y
- D) Both B and C are true

19. Legal liability differs from moral responsibility in that:

- A) The law concern only violations of moral norms
- B) Law and ethics never coincide
- C) The law does not care about morality
- D) None of the above

20. What is true about descriptive judgments?

- A) They indicate the rightness or wrongness of something
- B) They include the moral values that underlie the judgment
- C) Both a and B
- D) Neither A nor B

21. Which one of the following is true

- A) It is consistent to accept the premises of the deductive argument and the correctness of the argument and reject its conclusion
- B) The conclusion of an inductive argument is logically contained in the premises
- C) An argument is invalid if all premises are true but the conclusion can be false
- D) None of the above

22. Scientific practice is mainly based on inductive argumentation. The classical examples are natural laws that are being supported by means of measurement results. When is an inductive argument logically valid?

- A) When experiments carried out are relevant for the conclusion
- B) When sufficient experiments are carried out to support that conclusion
- C) When there are no counterexamples to be found
- D) Never, because inductive argument could at best be sound for which A, B and C must be true

23. In a cost-benefit analysis, sometimes a discount rate is applied. What is a discount rate?
- A) A reduction of some costs and benefits over other costs and benefits because of their moral relevance
  - B) A reduction of future benefits over current benefits because the value of money decreases over time
  - C) An increase of future benefits over current benefits to compensate for the decreasing value of money over time
  - D) None of the above
24. The sentence “You cannot bend the rules” is an expression of which moral theory?
- A) Absolutism
  - B) Utilitarianism
  - C) Universalism
  - D) Coherentism
25. What is according to the book a problem of utilitarianism?
- A) It is not clear how to quantify different pleasures and pains.
  - B) Consequences are often unpredictable.
  - C) It can allow an uneven distribution of costs and benefits
  - D) All of the above
26. The freedom principle in utilitarianism states that
- A) Freedom is an absolute value that trumps all other values
  - B) All individuals are free to pursue their own pleasure as long as they do not hinder the pleasure of other individuals
  - C) Everybody is free to reflect on the consequences of his or her action
  - D) None of the above
27. Which one is true about duty ethics?
- A) Duty ethics evaluates actions according to moral rules, laws, norms and principles
  - B) Duty ethics does not consider the consequences of an action for its moral evaluation
  - C) Both A and B
  - D) Neither A nor B
28. In public debates it is very common to compare two types of risk, arguing that if the bigger risk is acceptable then the smaller risk must be acceptable too. To illustrate this with an example: if the statistical risks of flying are lower than those of driving a car, then the risks of flying are acceptable. What is this fallacy called
- A) The sheer size fallacy
  - B) The ostrich’s fallacy
  - C) The technocratic fallacy
  - D) Wishful thinking fallacy
29. What is true about the multiple criteria analysis?
- A) It compares different options with respect to a number of criteria
  - B) It includes the relative importance of each criterion as compared to other criteria
  - C) It presents conclusions based on the aggregation of the scores
  - D) All of the above
30. Which one is true about product liability?
- A) It regulates the liability of manufacturers for defects in a product, without the need to prove that those manufacturers acted negligently.
  - B) It does not include defects that could not have been foreseen given the state of technical and scientific knowledge at the time the product was put into circulation
  - C) Both A and B
  - D) Neither A nor B