UNSW Australia
ELEC4122/GSOE9510

Sample (i.e. previous assessment) questions

In 2010 a student told me he was very concerned about his ability to write good answers in the exam. I later emailed him, after he had successfully finished the course, and asked what advice he had for later students.

> *"Read the questions. Practice with the questions you are given. Use your ideas. The ones from practice will be useful. They will be useful. And prepare for the class-test."*

To do that, start by studying your word list.

PART A – class-test, closed-book
short questions – 5 in 1 hr

QUESTION
Briefly define the defining features of a profession. Explain why a profession has a leadership role within society and provide an example illustrating how engineering performs this role.

QUESTION
Leadership has been associated with achieving goals. To what extent is failure by a group to reach a nominated goal the responsibility of its leadership? Explain your reasons. How else might you assess the effectiveness of a leadership?

QUESTION
Discuss the utility of cost benefit analysis in guiding ethical decision making for engineering projects. In particular, explain the limitations which may apply with this approach.

QUESTION
Should engineers be concerned about the environment? Explain your reasoning, and briefly summarise what this means for engineers fulfilling their key role: design.

PART B – exam, open-book
long questions – 4 in 2 hr

QUESTION
You are an engineer with expertise in microelectronic design. You worked for Company P on product 77 which is unquestionably the best of its type in the world. It is so successful and far ahead of the competition that Company P announced that it would cease microelectronic innovation and restructure. Rather than stay, you found a job in microelectronics at Company Q, which also paid you more money to help persuade you to move. Company Q is based in a different country, but a direct competitor of Company P in the global marketplace. In Company Q you are soon moved to this other country and asked to oversee the design of a new product intended to match, or better, product 77. From an ethical perspective, what use can you make of knowledge you have acquired while at Company P? Explain your reasoning.

QUESTION
You are the engineering manager in a firm that has recently advertised for a new junior engineer. You are leading the interview panel for this position. This panel has agreed on a shortlist of applicants to invite for an interview. However, a colleague then informs you that one of the applicants for the position who did not make the shortlist is actually the niece of the firm's owner. Shortly after you learn this, the owner himself drops by your office and casually mentions that he has great admiration and high hopes for one of his nieces who has recently completed her engineering degree. What would you do and why? Be sure to identify the ethical problems involved and explain how you resolve them.

QUESTION
Consider the following events.
At a team meeting in your workplace, your supervisor mentions a specific problem you are all aware of with an existing product line. The group brainstorms possible ways to proceed with a solution, and decides that Ms C, who is newly appointed to the company's staff, has suggested what seems to be the most promising way to proceed. Your manager thanks you all for your contributions and the meeting is adjourned. When you hear nothing more about this problem, you soon decide that there is no real intention to do anything about it. However, a few weeks later, you and your supervisor (the only representatives of your team) are invited by senior management to a briefing about a problem identified by sales representatives with this same product line. You soon learn it is the same problem your team discussed weeks earlier. Your supervisor then proudly stands up and announces to the room that he can see a way to solve the problem, pretending that he has just thought of it! The idea is exactly that you heard Ms C explain to him.
Comment on the ethics of this situation. What should you do as a professional engineer? Why?

QUESTION

You are a design engineer in a large company and have oversight of the development of a new night-vision system which provides images in 3-D. The system's development was supported by a contract with the Government which has, nevertheless, no obligation to buy it. Your company's senior management believes the system is now ready for trials, although it will probably cause ill-effects in epileptics, as well as nausea and vomiting in some other people. It might, perhaps, even cause loss of consciousness. You are invited to join the discussions about the appropriate procedures for recruiting and involving people in testing the new system.

Identify the ethical issues that should be resolved before allowing the tests to proceed, and give your reasons.

QUESTION

You are employed by a company which has almost completed the testing of a new product, and a launch date involving major media exposure has been set. Prior to this day, final safety testing fell behind time and is only 95% completed the day before the launch. You are the engineer in charge of testing. Absolutely no problems have been identified; all completed tests show generous safety margins; no one anticipates any safety issues could arise from the unfinished routine proving. Management suggests you 'abandon' the rest of the testing, implying it will not provide budgetary support, and asks you to certify that all necessary safety tests are complete.

What would you do and why? Be sure to identify ethical issues.

QUESTION

A friend comes to you for advice. He is installing cables in a new housing development on a former industrial site, where his company has a voluntary agreement with the local authority and residents to place all cable underground. Part- way through the installation, his digging crew uncovers toxic wastes buried 40 cm below ground level. Your friend now believes that immediately changing to overhead installation in the only way to complete the task on time.

What advice would you give him and why? Be sure to identify ethical issues.

QUESTION

(a) You work for Company A which has a partner (Company Z), based in another country (country Π). Company Z is engaged in installing stand-alone systems that deliver safe drinking-water to remote communities in this second country. You know that your company has some intellectual property associated with such systems. You believe that this would improve the technology that delivers the water.

Briefly describe the questions that are relevant when you consider whether or not to transfer this technology to your partner, Company Z.

(b) It turns out that the technology is appropriate. You are now asked to lead a team to facilitate the transfer. Using your knowledge of teamwork, how you would go about assembling and leading such a team. What would you need to be sure about?

QUESTION

You are the chief engineer with a small company H which specialises in the installation of electrical systems (electricity distribution networks, lighting, etc). It finds most business as a sub-contractor for large construction companies. One such contractor was so impressed with the quality of your work that you have been invited (without tender) to help install electrical utilities in remote areas of a less-developed nation. Specifically, you will be responsible for electricity distribution to residents and for lighting in public spaces. Given that no relevant, official local standards yet exist, your CEO suggested that the relevant Australian standards would be perfect for use in these projects.

(a) Comment on whether or not using an Australian standard is the best way to proceed.

(b) Consider street lighting as an example of technology transfer (or even a social experiment). Explain which details of the context would show whether or not this is a suitable transfer and, hence, project to undertake.

(c) Explain what you see as the major risk in this project.

QUESTION

You work in the installation division of Company Z that produces automated systems for air-traffic control. Z's engineering design team is 'famous' for both its creativity and team-spirit. Your division, however, sees things differently. Every 'success' of the design team means trouble for you, as most of their new designs prove impractical to install without major modifications to existing procedures, necessitating expensive re-training. The customer-service division, too, has trouble with the designs. Although technically excellent, they are very difficult to use, requiring intense concentration by users. Instructions come as thick books that nobody reads. Customer-service believes that eventually Z's systems will be associated with an accident. You believe that the company would be more profitable if the design team functioned differently, but Z's senior decision-makers see the current situation as satisfactory because the design team produces designs with the required technical features and the team itself has an international reputation for excellence which sells the products that ensure profitability.

(a) Comment on the usefulness of the ***indicators*** used in this case to measure the performance of the design team.

(b) Use your knowledge of teamwork and consider the company's divisions as members of a team. In what ways do they show excellence (as defined in this course)? Suggest ways that this 'team of divisions' could function more effectively.

QUESTION – NOT GSOE9510 syllabus

Since Australia needs more engineers, the Federal Government recently opened the new Sydney School of Engineering (SSOE). SSOE's Dean is concerned that there is no team-spirit shown by the SSOE undergraduates and, knowing that UNSW's BE students have excellent class morale, she asked ELSOC, PVSOC & all the other societies to mentor the SSOE students, for a negotiable fee of course.

Knowing that you have studied strategic leadership, the student bodies asked you to undertake a ***go/no-go analysis*** for this project.

(a) Identify the ***stakeholders*** in this project and what each would expect from its outcome.

(b) Provide a list of the questions that you would need answered before you could provide a recommendation about whether to go ahead or not. What do you consider to be the critical information? Explain why.