GENERAL COMMENTS

In the November examination (as it was with the June examination), it was obvious in the marking that teachers are becoming more familiar with what is expected in the course.

The setting panel reflected the emphasis in the teaching of the course on actual detailed studies of real situations rather than memorising large numbers of facts. Similarly, the paper allowed students to use the detailed case studies they had undertaken during the year in responding to questions. Hence, short-answer Question 1, on pollutants, and Question 4, on an environmental project, were 'generic' questions which it was expected would be answered in terms of the major study students had undertaken of one specific pollutant and one environmental project.

Despite some suggestions to the contrary, there was little evidence of students finding insufficient time to complete the examination, although the length of the examination will be closely monitored.

SPECIFIC INFORMATION

Multiple choice

This table indicates the approximate percentage of students choosing each distractor. The correct answer is the shaded alternative.

Question	A	B	C	D	Question	A	B	C	D
	%					%			
1	5	**89**	2	4	**11**	13	1	4	**82**
2	7	4	**84**	5	**12**	3	10	1	**86**
3	**81**	7	9	3	**13**	13	3	3	**81**
4	16	**65**	12	7	**14**	**74**	19	4	3
5	**61**	10	24	5	**15**	5	**86**	7	2
6	4	**64**	9	23	**16**	**86**	8	2	4
7	2	3	5	**90**	**17**	9	**69**	18	4
8	1	**59**	35	5	**18**	6	**65**	24	5
9	2	**93**	2	3	**19**	4	2	11	**83**
10	1	**81**	6	12	**20**	2	5	**89**	4

Selected comments

Question 1

It was intended that this would be a straightforward question to begin the examination. There was no obvious pattern in the incorrect responses.

Question 2

A straightforward question with no obvious incorrect pattern.

Questions 3 to 6

This block of questions gave a simple scenario of a pollutant spill and asked a series of questions related to the scenario. Of these, Question 3 was the most successfully answered. Question 4 required students to realise that being highly volatile it would evaporate quickly from the lake surface and be dispersed by wind, hence reducing its persistence. Most realised that its persistence would be reduced. The toxicity – adverse effect on humans or animals of a standard dosage – would be unaffected by its volatility. Question 5 and 6 were correctly answered by most students. Some responses to Questions 5 and 6 indicate an emphasis on the polluting process with insufficient account given to what happens to the pollutant after it enters the ecosystem.

Question 7

A straightforward question requiring knowledge of the meaning of the term Life Cycle Analysis, with no obvious pattern of incorrect responses.

Question 8

This question asked for a simple application of the Precautionary Principle to a realistic situation. Those students who selected C, did so presumably on the grounds that the term 'precautionary' appeared in it. However, another possible explanation, present also in some later questions, for this choice may be that students tend to take the most extreme precaution or provision; students should learn of the necessity to balance all aspects in environmental assessment.

Questions 9 and 10

This block asked students to assess a realistic situation and draw some conclusions from it. Most students interpreted the graph correctly in Question 9, and teachers are obviously teaching students simple graphical interpretation skills. In Question 10, most students correctly chose **B**; but those that selected D – never – perhaps indicated the reaction mentioned above: of taking the most extreme precautions in environmental assessment rather than balancing up the issues realistically.

Question 11
A straightforward question requiring knowledge of the term 'bioaccumulation'.

Question 12
This question required knowledge of the term 'ecologically sustainable'.

Question 13
This question required applying the concept of sustainability to a scenario. While most students answered correctly, there was evidence of some students taking extreme responses rather than balancing issues in environmental assessment.

Question 14
There was evidence of extreme caution rather than balancing conflicting demands; by the large percentage of students who incorrectly chose B.

Questions 15 to 17
This block of questions tested evaluation of ecological sustainability in a scenario that required interpretation of graphical data, the difficulty increasing through the block. Students coped well with the questions.

Question 18
This question was another simple 'scenario' type question where the required information was given in the stem and students were required to draw conclusions from it. Being later in the multiple-choice questions, it was intended to be a little more demanding. A large number of students selected C (plant exotic salt-tolerant trees) but this would do nothing to alleviate the problem, that is, would not reduce the acidic levels.

Question 19
This question tested whether students understood the term 'exposure'. Some students did not understand from the stem that it was a controlled experiment they were being asked to comment on.

Question 20
This question tested knowledge of the Risk Assessment Process, with no obvious pattern of incorrect responses.

Short-answer questions

Question	Marks	%	Response
Question 1	The nature of the course requires a detailed study of one pollutant. The 'generic' questions (Questions 1 and 4) were designed to enable students to respond in terms of their in-depth study done during the year. All the sections of this question were generally well done, with most students scoring full marks on each section. In general, the more specific the pollutant, the more successful the responses. Some responses quoted a very vague pollutant, which is unlikely to have been the one studied, e.g. 'sewerage'.		
	a 0/2 1/2 2/2 (Average mark 1.72)	 2 24 74	Students needed to clearly state a material which is a pollutant that has a negative impact on human health or the environment, and, for both marks, to give some description in addition to merely naming it.
	b 0/2 1/2 2/2 (Average mark 1.63)	 7 23 71	This required giving the source and some detail in addition to merely naming the pollutant, and was well done.
	c 0/3 1/3 2/3 3/3 (Average mark 2.2)	 4 17 34 45	Responses required some details showing an implicit knowledge of what is meant by transport mechanism and some reference to how pollutant moves away from point of entry.
	d 0/3 1/3 2/3 3/3 (Average mark 2.53)	 6 6 18 71	Students were required to mention a specific population's class (human, animal or plant). The question was well done.

	e 0/3 12 1/3 13 2/3 28 3/3 47 (Average mark 2.08)	The key requirement was to refer to how the pollutant would be ultimately removed from the environment in the absence of human intervention.
	f 0/3 6 1/3 10 2/3 36 3/3 47 (Average mark 2.23)	This response required some reference to human intervention, and some, at least very brief, reference to effectiveness.
Question 2	This question was a 'scenario' type question where all the required data was given in the stem. The marking favored responses where an intelligent interpretation or comment based on course content was made on the data, rather than necessarily looking for the scientifically 'correct' answer, i.e. favouring intelligent thinking about the situation, supported by reasons.	
	a 0/4 6 1/4 11 2/4 39 3/4 28 4/4 16 (Average mark 2.38)	This section sought explicit mention of a transport mechanism for each of the two pollutants, and required this to be related to some pollutant characteristic, e.g. solubility or particle size. For full marks, some reference to weather was required, e.g. predominant wind from the west. A wide variety of responses was given, and wide latitude allowed.
	b 0/2 15 1/2 20 2/2 65 (Average mark 1.49)	Required at least an implicit reference to bioaccumulation (i.e. either the term or a description). Full marks required some reason to be given.
	c 0/2 13 1/2 31 2/2 55 (Average mark 1.41)	The sulfur dioxide concentrations would have decreased (soluble in water) but lead levels remained much the same, perhaps slight decrease. The full 2 marks required some distinction to be made between the two pollutants, i.e. 'They both decreased' did not receive full marks.
Question 3	This question was intended to test scientific interpretation and analysis skills, one of the course outcomes.	
	a 0/2 10 1/2 3 2/2 87 (Average mark 1.76)	It acts as a point source.
	b 0/3 44 1/3 28 2/3 16 3/3 13 (Average mark 0.97)	Concentration = $\text{Mass of solute} / \text{Mass of solvent}$ $= 10 / 10 \times 1000$ = 0·**001** or 1 000 ppm or 1 000 μg per g Full marks were given for the correct answer accompanied by any working at all. Some marks (1 or 2) for any reasonable attempt, even with a wrong answer. Students should realise that if the question says 'Show working and units' they should attempt to do this. Knowledge of **simple** concentration calculations is an essential part of environmental monitoring; a skill that students can reasonably have been expected to pick up if they have done any significant field or laboratory work on monitoring.

	c 0/3 16 1/3 31 2/3 33 3/3 21 (Average mark 1.57)	This question was expected to be within the capability of students who had done any field or laboratory work.
	d 0/3 15 1/3 14 2/3 28 3/3 43 (Average mark 1.98)	This question favored examples which were specific rather than very general, a realistic situation, and explicitly relating the example given to the model. The question was well done.
Question 4	Question 4 was the 'generic' question on a major environmental project which had been studied during the year, as required in the study design. The question was framed to allow students to respond easily in terms of the project they had studied. The project could be either a general project with environmental consequences (such as a major construction project) or project with a specific environmental aim, such as cleaning up a river. Positive or negative projects and impacts were treated equally and any environmental project, no matter how good its aims, will inevitably have some risk - if only of failure. In general, students who used a project which was specific and clearly delineated (in time and location) tended to find answering this question easier. Hence, the project: 'to reduce air pollution from cars over the period 1990–2000 in inner Melbourne' would be easier to score well on than 'air pollution' in general. Especially as parts e) and f), following the study design, require some assessment and evaluation. Students will find it easier to answer questions about projects which are completed, or at least brought to some finality. Where a project was not completed, potential success and discussion of criteria of success were acceptable, but this makes the student's task more difficult.	
	a 0/2 6 1/2 16 2/2 78 (Average mark 1.72)	A clear, delineated project was favoured. At times it was not clear that some of the projects described really were the ones a teacher chose and covered. There is no penalty, other than the difficulty of answering the questions, if a student decides to describe a project different to the one studied.
	b 0/3 11 1/3 15 2/3 32 3/3 42 (Average mark 2.04)	For full marks, the response should have referred very explicitly to the project described, and mention risk of some kind.
	c 0/3 21 1/3 19 2/3 33 3/3 26 (Average mark 1.64)	For the full 3 marks, some management procedure related to the project had to be mentioned, and some group or groups mentioned, and this was well done.
	d 0/4 24 1/4 14 2/4 29 3/4 19 4/4 15 (Average mark 1.87)	Specificity and relation to project was sought. Some mention of life cycle was required for full marks.
	e 0/2 17 1/2 33 2/2 51 (Average mark 1.34)	For full marks students needed to show some understanding of the term 'ecologically sustainable' (not necessarily any definition or description) and relate it to the described project.

	f 0/3 20 1/3 16 2/3 27 3/3 36 (Average mark 1.8)	For full marks students needed to evaluate the success of the project or, if not competed, some criteria that would indicate success.
Question 6	**a** 0/4 18 1/4 12 2/4 28 3/4 20 4/4 22 (Average mark 2.16)	This was another scenario type question on a construction project with environmental consequences. Students were required to mention two measures; the measures had to relate explicitly to the information in the stem, and reference needed to be made to both dust and sediment (in one or other or both of the measures). This was generally well done. Achieving high marks in this type of scenario question relies on relating the comment very directly to the information and data given in the stem, rather than general answers. The main shortcoming was the failure to make reference to ecology of the local water course, i.e. the interaction of life with the environment.
	b 0/4 22 1/4 20 2/4 27 3/4 25 4/4 6 (Average mark 1.73)	
Question 6	**a** 0/4 12 1/4 8 2/4 30 3/4 20 4/4 30 (Average mark 2.48) **b** 0/2 8 1/2 29 2/2 63 (Average mark 1.54) **c** 0/2 15 1/2 44 2/2 42 (Average mark 1.27) **d** 0/2 10 1/2 13 2/2 77 (Average mark 1.67)	Another scenario type question designed to test appreciation of the process of decision making, and particularly of appropriate consultation, relating both to pollutants and management issues. Generally, the question was well done. The two most obvious shortcomings were: • an inability to see both sides of an issue and to appreciate the need, in almost an environmental decision, to weigh up conflicting demands. • the surprisingly few students who seemed to believe that consulting the local community is important. There was little evidence of time constraints as would be indicated by blank pages for the last question.