

STUDENT NAME	
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**Victorian Certificate of Education
2006**

ENVIRONMENTAL SCIENCE

**Trial Written Examination 2
November 2006**

QUESTION AND ANSWER BOOK

Structure of book

Section	Number of questions	Number of questions to be answered	Number of marks
A	20	20	20
B	9	9	70
			Total 90

Materials

- Question and answer book of 23 pages.
- Answer sheet for multiple-choice questions.
- At least one pencil and eraser.
- One approved scientific calculator

Instructions

- Write your **student name** and **class** in the space provided on this book
- Write your student name and class in the space provided on your answer sheet for multiple-choice.
- All written responses must be in English.
- Time allowed: 15 minutes reading time, 90 minutes writing time

At the end of the examination

- Place the answer sheet for multiple choice questions inside the front cover of this question and answer book

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Please note this is a practice exam only and its degree of hardship and content is different to the end of year Unit 4 exam. VAEE takes no responsibility for your success in completing the actual VCE Environmental Science Unit 4 exam.

SECTION A - Multiple-choice questions

Specific instructions for Section A

Answer all questions.

All questions should be answered on the answer sheet for multiple-choice questions, in pencil.

Choose the response that is **correct** or **best answers** the question, and shade the square on the multiple-choice answer sheet according to the instructions given on that sheet. A correct answer is worth 1 mark; an incorrect answer is worth no marks. No marks will be given if more than one answer is shown for any question. Marks will not be deducted for incorrect answers.

Question One

Which of the following is least likely to be a source of mercury pollution?

- A. bush fires
- B. volcanos
- C. combustion of coal
- D. metal fabrication

Use the following information to answer Questions 2 and 3

The proposed Meander Dam has seen an ongoing debate. There have been quite distinct and opposing interests and views involved. On one hand, farming interests have been promoting its value to primary industries, employment and the wider economy. On the other, environmentalists have been highlighting the loss of valuable habitat and its effect on threatened species such as the Eastern Quoll, as well as economic concerns about the viability of the project.

Question Two

What role is played by special interest groups in debates like this?

- A. They bring to the public attention ideas, concerns and views that may not have been considered at length in the initial consultative process
- B. They slow down development and create undue public expense in dealing with their concerns
- C. Vocal minorities can unduly influence policy at the expense of the major held view
- D. They do not have a role to play, as they lack any credibility and scientific training.

Question Three

What role should the media play in the above debate?

- A. Promote the governments point of view by explaining the governments position on the proposal
- B. Promote a balanced and factual account including aspects from all sides of the debate
- C. Look for sensational aspects that would help attract attention for the media outlet
- D. Promote public alarm by focusing on the impacts of the project

Question Four

The minimum standard required for acceptance of an environmental waste management system by the Victorian Environmental Protection Agency (EPA) is:

- A. Green Globe 21
- B. Agenda 21
- C. ISO 14001
- D. SEPP's

Question Five

A short term exposure to high concentrations of airborne Sulphur dioxide can have serious and immediate health consequences for people that can be best described as

- A. obesity
- B. synergistic
- C. mortality
- D. acute toxicity

Question Six

Ecolabels, like the one to the right, are intended to inform us about the environmental impacts from producing or using a product. Ecolabels set minimum environmental and health standards for specific product categories regarding certain specific qualities or properties they consider appropriate, and through the process of verification (including on-site manufacturer audits), products are identified as meeting the criteria. These compare products with others within the same category, awarding labels to those that are environmentally preferable from their creation through to discarding the product. This process is best known as:



- A. Life Cycle Analysis
- B. Environmental indicators
- C. Community consultation
- D. Risk Analysis

Question Seven

Sulphur dioxide at room temperature can be best described as a:

- A. soft malleable metal
- B. metallic liquid
- C. a colourless gas
- D. yellow solid

Use the following information to answer Questions 8 and 9

After many years of handling Zeegowhats in a Zoo, a keeper starts noticing that every time she handles a Zeegowhat the spines are starting to cause her to get a severe skin irritation. Zeegowhats secrete a mild toxin on their spines to help avoid predation.

Question Eight

The number of times the keeper handles a Zeegowhat would affect the...

- A. persistence
- B. mobility
- C. exposure
- D. toxicity

Question Nine

The next time the keeper handles the Zeegowhat she is more likely than previously to...

- A. be unaffected
- B. have an allergic reaction
- C. suffer chronic toxicity
- D. receive an elevated dosage of the toxin

Question Ten

In the wetlands north of Melbourne, Growling Grass Frogs have consistently returned test results showing heavy metal levels of 2.1mg/kg and above. Yet the immediate environment surrounding the frogs, wetlands, has a much lower level of heavy metal contamination. This is best explained as:

- A. high exposure
- B. high dosage
- C. bioconcentration
- D. synergistic action

Question Eleven

Polychlorinated biphenyls (PCB's) are often used in the manufacture of paints, adhesives and electrical goods such as transformers and capacitors, and have been shown to cause reproductive failure in birds, liver, stomach and immune system abnormalities in other animals. The LD₅₀ for Brown Tree Frogs occurred

at doses as low as .01mg/g. What dose would be required to have a 50% chance of killing a 2.5g Brown Tree Frog?

- A. .025mg
- B. .025g
- C. .004mg
- D. .004g

Question Twelve

Exposure to Methyl Mercury through diet results in the absorption of approximately 95% of the Methyl Mercury through the intestinal walls and into the blood stream. Once in the blood stream it has a half-life of approximately 40 days before it is excreted in the faeces. If a person with no traces of Methyl Mercury had a one time exposure by ingesting .001 grams of Methyl Mercury in their food, then 80 days later you would expect their Methyl Mercury count to be:

- A. 2.375×10^{-4}
- B. 4.75×10^{-4}
- C. 9.5×10^{-4}
- D. 2.5×10^{-4}

Question Thirteen

This year Fraser Island has made the news a number of times because of dingo attacks, one of which took the life of a nine year old boy. Fraser Island has extensive beaches with fine sand that were mined in the past, until the federal government intervened to protect the island's natural heritage. It is popular with tourists, many with four wheel drives, and has a number of permanent local residents, however it is largely unpopulated and relatively unspoiled. The government has acted swiftly to cull more than 30 dingoes in the problem area initially and many more later on. However while this may help ease the concerns of the tourist industry, it has upset the locals as well as conservationist groups who point out that the population of dingoes on the island is one of the few remaining that is almost pure.

After the culling, a risk assessment of the dingo problem was made and certain recommendations aimed at reducing the problem proposed.

More and more, complex situations like this have been the subject of management plans.

An appropriate management plan for Fraser Island would most likely contain:

- A. a cost analysis of risk mitigation measures
- B. an audit, policy, implementation, review and improvement process
- C. a human method for the culling of dingoes and other wildlife on the island
- D. decisions based around the precautionary principle

Question Fourteen

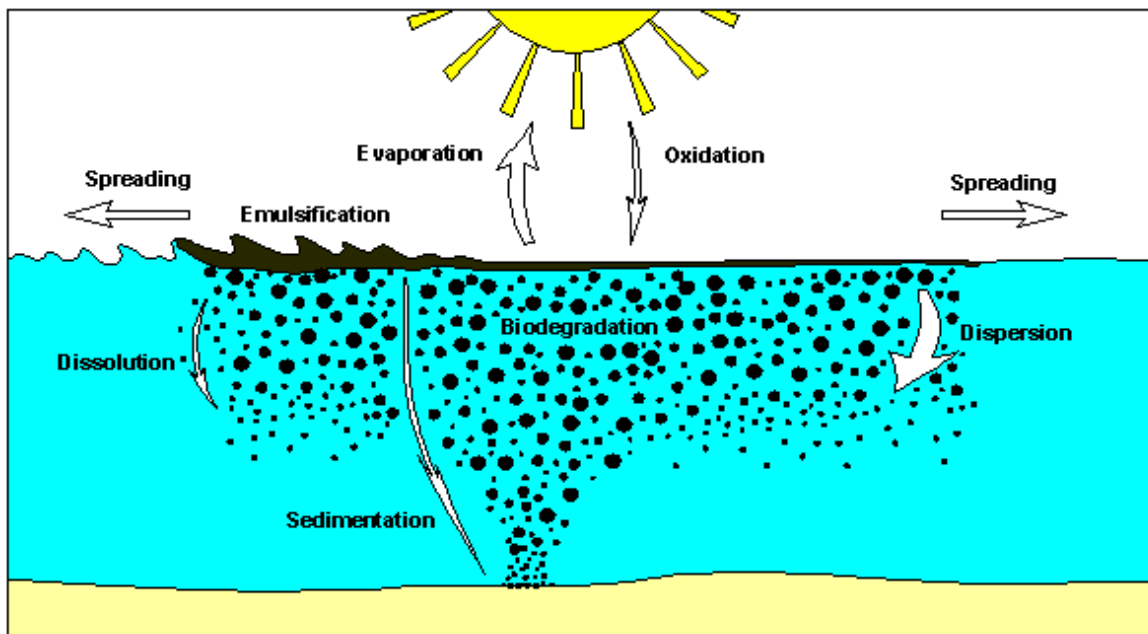
Research has demonstrated that caffeine is a teratogenic substance to many frog species at concentrations as low as 0.12mg/l. One cup of coffee contains 100mg of caffeine.

A teratogenic substance is one that:

- A. causes birth defects
- B. bioaccumulates
- C. causes cancer
- D. acts as a stimulant

Use the following information to answer Questions 15 and 16

The diagram below illustrates some of the processes that may be operating when an oil spill occurs in open water.



Question Fifteen

Most of these processes illustrate:

- A. A source of oil pollution
- B. A sink for oil pollution
- C. Synergistic effects of oil pollution
- D. Bioaccumulation of oil pollution

Question Sixteen

Oil in this situation can be best defined as a pollutant because it:

- A. can no-longer be used in a productive way

- B. it is not naturally found in this system
- C. changes the environment in which it is found
- D. causes harm to the environment

Question Seventeen

Red Roo Tours is an all Australian company that specialises in ecotourism focusing on taking people into the Australian bush to watch and photograph Kangaroos in their natural habitat. The company wants to expand its operation and studies the costs of planning, producing an environmental assessment, costs involved with setting up the expanded business as well as environmental protection measures during the setting up and operation of the business. It then compared these with the return it expects from tourism.

Which of the following would further support environmentally sound decisions to be made by the company?

- A. Profit margin of the tours
- B. Life Cycle Analysis
- C. Conservation status of Kangaroos
- D. Establishment of regulatory frameworks

Question Eighteen



The damage to a German sandstone statue can be seen by comparing the 1908 photograph on the left with the 1969 photograph on the right. The likely cause of this damage is due to:

- A. People climbing on the statue
- B. Acid rain
- C. Poor craftsmanship

- D. Airborne Mercury contamination

Question Nineteen

Mercury's persistence in the environment can be described as:

- A. highly persistent
- B. moderately persistent
- C. low persistence
- D. not naturally found in the environment

Question Twenty

Which of the following statements best illustrates ecologically sustainable development?

- A. Some plant and animal species can increase in abundance
- B. It conforms to all environmental regulatory conditions set out in SEPPs.
- C. Life cycle analysis shows that it does not contribute significantly to global warming.
- D. It can continue for a long time without serious harm to local ecosystems.

SECTION B - Short answer questions

Specific instructions for Section B

Answer all questions in the spaces provided.

Question One

- a. Name and describe the project, including location, timeline and major objectives

(4 marks)

- b. Describe two (2) environmental impacts and / or risks associated with the project

(2 marks)

- c. Suggest mitigation strategies which are or can be applied to reduce impacts / risks associated with the project.

(2 marks)

- d. Describe the EES/EIS or ERA or EMP associated with the project or if none have been developed, describe an outline of an appropriate form of a plan.

(4 marks)

Question Two

An experiment was conducted to study the effect of air pollutants on a native plant species in order to assess the impact of exhaust vents located along the Mullum Mullum Tunnel project. In a series of trials, trays containing 50 *Poa lab.* plants were exposed to various concentrations of Ozone gas and Sulphur dioxide gas in a large glasshouse. Each trial lasted for a week. A new tray of plants was used for each trial. The results of the experiment are shown in the table below.

Trial number	Concentration of ozone (parts per million)	Concentration of sulfur dioxide (parts per million)	Number of plants surviving after the trial
1	0.040	0	50
2	0.080	0	48
3	0.40	0	34
4	1.0	0	17
5	0.0	1.0	50
6	0.0	10	14
7	0.40	10	2
8	1.0	10	0

Table 1. Results of each trial showing concentrations of the Ozone gas and Sulphur dioxide gas and the impact on the *Poa lab.* plants.

- a. What effect does increasing levels of ozone alone have on the plants?

(1 mark)

- b. Which gas alone, at similar concentrations to the other, has the greater effect on the plants?

(2 marks)

- c. What percentage of the plants survived trial 4? Show working out.

(1 mark)

- d. Explain the results for trials number 7 and 8.

(3 marks)

Question Three

- a. Name a pollutant you have studied this year other than Mercury and Sulphur dioxide.

(1 mark)

- b. Explain why the pollutant named in part a. should be considered a pollutant. You should name two properties that define this material as a pollutant.

(2 marks)

- c. Name a source and transport mechanism for this pollutant.

(2 marks)

- d. Describe a management plan or actions that have been taken to monitor and control the impact of this pollutant. Include some evaluation of the effectiveness of these measures, referring to any monitoring or evidence available.

(4 marks)

Question Four

From Cape Otway to Port Campbell and on to Warrnambool, the Victorian coastline is internationally famous as the shipwreck coast. This coastal area is home to the Port Campbell National Park, the famous rock stacks “the Twelve

Apostles”, Loch Ard Gorge, Mutton Bird Island and the now fallen London Bridge.

The Bay of Islands Coastal Park extends from Warrnambool to Peterborough. This park system extends 3 nautical miles off shore with an extensive marine park from Broken head to Pebble point in the Port Campbell Region and on for another thirty seven kilometres of coast to Peterborough.

This Marine Park is famous for whale watching, fishing and wreck-diving. Further offshore there are extensive gas deposits under the sea bed in the Thylacine and Geographe gas fields.

Figure 1.1: Field Location Map



- a. Identify two key management issues or risks that this project must address.

(2 marks)

- b. What must occur after the risks have been identified in order to complete a risk management plan?

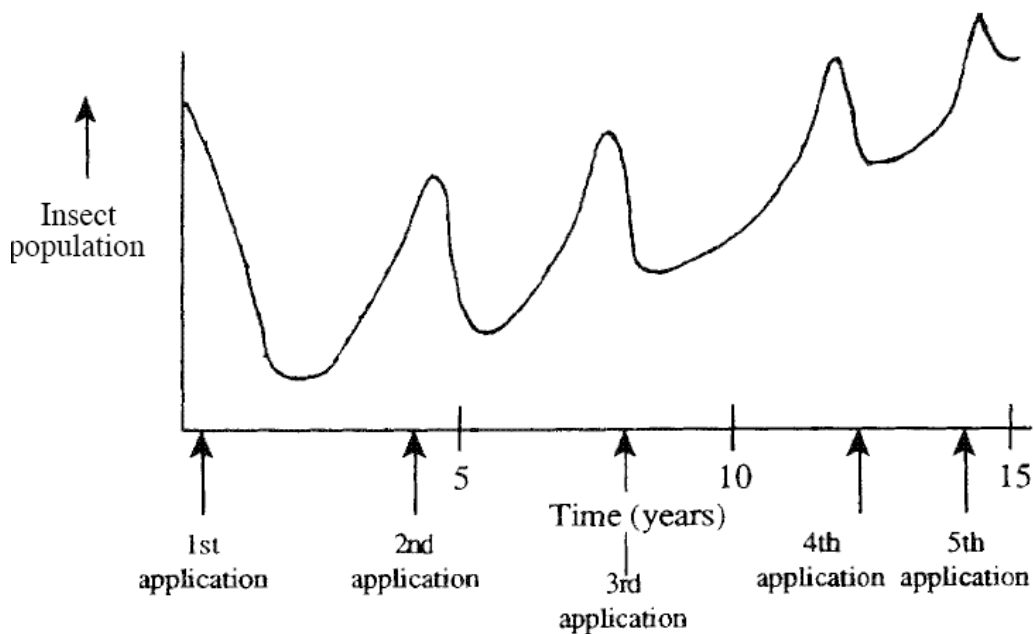
(2 marks)

- c. Describe two management tools that should be used to evaluate this proposal and how they would be used?

(4 marks)

Question Five

A pesticide was used over a period of 15 years in an attempt to control a sap-sucking insect which was destroying crops. Consider the results shown in the graph below.



- a. What comments can you make about the effectiveness of the pesticide?

(2 marks)

The table shows some of the organisms found in the ecosystem surrounding the crops and the average concentration of a particular pesticide within each organism.

Organism	Concentration of pesticide (parts per million)
Birds	26.40
Predatory insects	2.07
Sap-sucking insects	0.23
Soil	0.04

- b. Explain the most likely reason for the differences in the concentration of pesticide.

(2 marks)

Question Six

- a. Describe an ecotourism activity highlighting at least two reasons why it can be called ecotourism.

(3 marks)

- b. Suggest two risks to the environment posed by the activity and what mitigation strategies have been put in place to reduce these risks.

(4 marks)

- c. Is the activity accredited as an ecotourism activity? Discuss the importance of accreditation.

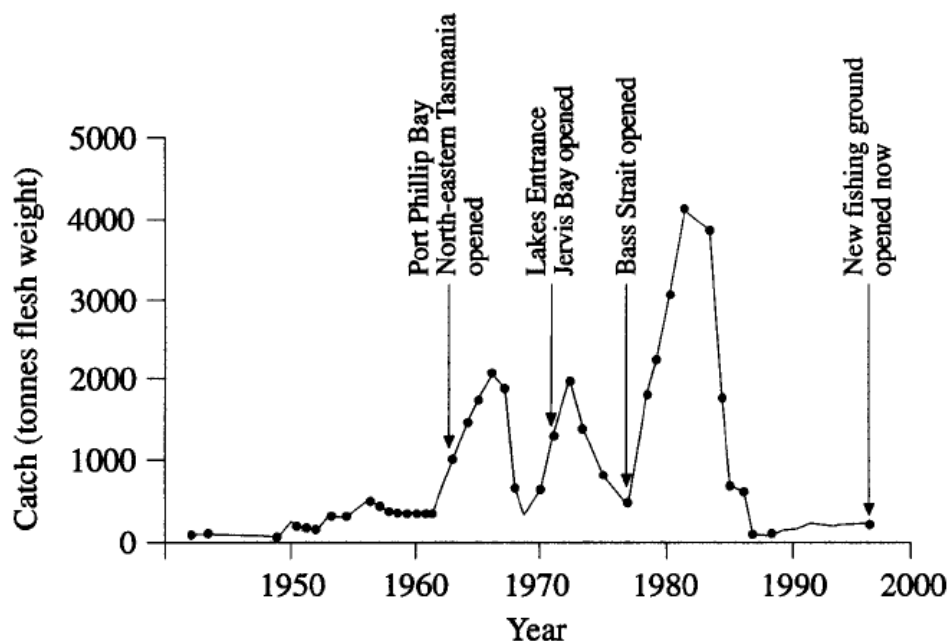
(2 marks)

Question Seven

Scallop fishing started in 1963 in Port Phillip Bay. In 1965 a minimum size limit was introduced and two years later a commercial fishing license was needed. Scallop beds were found off **Lakes Entrance** and eastern Bass Strait in 1970 and fishing started in these areas. In 1976 the first restrictions on catches were introduced as bag limits. The minimum size limit was removed in 1978 and although there is no minimum size limit for scallops, fishing is prohibited when the proportion of scallops of less than 70mm shell length in the catch exceeds 20 percent.

During the same year, fishing in **Port Phillip Bay** was limited to the period between April and December. Fishing was also restricted to daylight hours and limited to four days a week. Low numbers of scallops from 1988 to 1990 saw the voluntary stopping of fishing in Port Phillip Bay. The Victorian government launched a long-term study of the effects of scallop dredging in the Bay with the support from fishermen.

In 1991 the Port Phillip Bay fishery was closed against the advice of the scallop advisory committee. The scallop fishers defeated this closure in court. During Mr. Kennett's election campaign in March 1996, the Premier announced the closure of scallop fishing in Port Phillip Bay as of March 31 1997, offering compensation to license holders. The decision about compensation ended in the courts. Fishing for scallops in Victorian ocean waters continues. Scallops are caught using a harvester. The harvester is made of a rigid steel frame covered in steel mesh. It is towed on a wire cable from the back of the boat and dragged through the sediment on the bottom.



- a. The graph above shows the opening of fishing grounds and total annual scallop catches. Explain why the catch shown in the graph dropped rapidly soon after the opening of each new fishing ground.

(2 marks)

- b. Discuss the positive and negative implications of the scallop fishing example for intergenerational equity.

(4 marks)

Question Eight

Minamata disease was discovered for the first time in 1956 in the fishing community of Minamata City, Japan. It was the biggest pollution problem to strike Japan in the 20th century and there have been numerous cases worldwide since. The case was attributed to Methyl Mercury that was generated during

the production of acetaldehyde at a local chemical manufacturing facility. It used mercury as catalyst before pumping it into the bay.

- a. What is the most likely source of exposure for people of Minamata?

(2 marks)

- b. Is the manufacturing facility an example of a point source or diffuse source of pollution? Explain.

(2 marks)

- c. What are the health implications of ingesting large amounts of Methyl Mercury?

(2 marks)

- d. Suggest what actions could have been put into place when the first cases of poisoning were reported.

(4 marks)

Question Nine

Renewable energy company, Southern Hydro, is working on plans for a new 130 megawatt (MW) boost to Victoria's electricity supplies, with a major upgrade proposed for Victoria's Kiewa Valley hydro-electricity scheme. The proposed hydro-electric power station is the biggest of its kind planned for Victoria for decades and thanks to the use of new engineering technology, it will not require a new dam to be constructed. Southern Hydro is shortly expected to begin a comprehensive planning approval process that will involve all levels of government. This will include an environmental impact study, fieldwork and extensive community consultation.

- a. What steps would need to be followed to produce an Environmental Effects Statement (EES)?

(3 marks)

- b. If the EES for the Southern Hydro scheme is approved, then an Environmental Monitoring Program (EMP) will need to be developed for the project. Name a government agency or regulatory agency that should be involved in the development and monitoring of the EMP. Describe its role.

(2 marks)