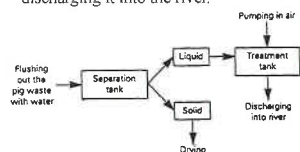


Past HKCEE Questions
Man's Effect on His Environment
Paper I

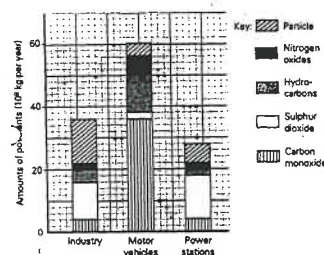
1. The diagram below shows the major steps for treating the waste from a pig farm before discharging it into the river.



- State one advantage of flushing the pig waste more frequently.
- State one general method by which the solid can be separated from the liquid.
- Suggest one use for the dried solid waste.
- State the purpose of pumping air into the treatment tank.
- State the main biological process taking place in the treatment tank.
- State two effects caused by the direct discharge of untreated pig waste into the river.

(HKCEE 1986)

2. The bar chart below shows the amounts of some atmospheric pollutants of a city in one year:



- What is the total mass of pollutants from power stations in a year? (1 mark)
- Which pollutant is produced in the greatest amount in industry? (1 mark)
- Suggest the most effective way to reduce air pollution in this city. Explain your answer. (2 marks)
- State ONE harmful effect of each of the following pollutants to human health:
 (1) particles
 (2) carbon monoxide (2 marks)

- How may sulphur dioxide produced by power stations cause pollution in a nearby pond? (2 marks)
- Suggest ONE other pollutant (not shown in the bar chart) that may be produced by a power station. (1 mark)

(HKCEE 1991)

3. The table below shows the mean monthly concentrations of some common air pollutants collected from September to December, 1988 in 2 different districts, A and B, in Hong Kong:

Air pollutants	Districts	Concentrations ($\mu\text{g m}^{-3}$)			
		Sept.	Oct.	Nov.	Dec.
*Respirable suspended particles	A	78	84	90	108
	B	48	60	72	84
Sulphur dioxide	A	80	96	160	144
	B	64	40	80	56
Nitrogen dioxide	A	16	24	32	40
	B	0	0	0	0

* Respirable suspended particles refer to particles which may be breathed into the human respiratory tract.

- Of these 2 districts, one is Tsimshatsui and the other is Kwai Chung. Which district is Kwai Chung? Explain your answer. (2 marks)
- Suggest two possible long-term solutions which the government should consider to reduce the air pollution problem in district A. (2 marks)
- Suggest an explanation for the changes in the concentrations of respirable suspended particles in both districts from September to December, 1988. (2 marks)
- Describe how the body can prevent the entry of respirable suspended particles. (5 marks)

(HKCEE 1992)

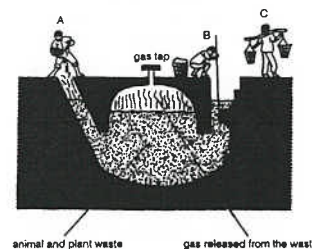
4. The following table shows the quantities of the major types of solid and semi-solid wastes disposed of in Hong Kong in 1988 and their disposal methods:

Waste type	Quantity (tonnes per day)	Disposal method
Domestic waste	4600	incineration (burnt to ashes); landfill
Animal waste	2000	composting (left to decay); landfill; discharged into local water courses after treatment
Fuel ash (煤灰)	2600	deposit in lagoons (煤灰湖); brick manufacturing
Construction waste	6500	landfill
Asbestos (石棉) waste	280	landfill

- Which of the methods listed in the table disposed of the greatest quantity of wastes?
 - From an ecological point of view, suggest a disadvantage of this method. (2 marks)
- Describe the biological process involved in the 'composting' of animal waste. (2 marks)
- When untreated animal waste is discharged into local water courses, many aquatic organisms would die. Explain why this is so. (4 marks)
- State one major source of fuel ash and suggest a possible health hazard of this waste to man. (2 marks)

(HKCEE 1993)

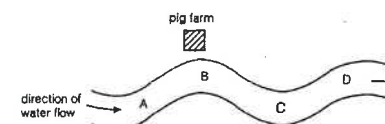
5. The picture on the next page shows an underground pit for collecting animal and plant waste on some Asian farms. The temperature of the waste in the pit is usually quite high, sometimes reaching 60°C or above. A gas mixture is constantly released from the waste. Farmers use this gas as a fuel for cooking and for heating on cold days.



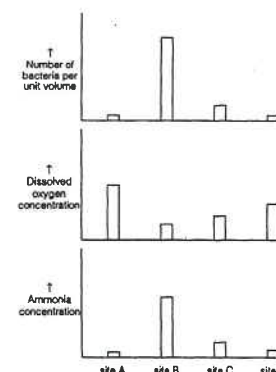
- Explain why the waste is usually at such a high temperature. (3 marks)
- Suggest a possible use of the substance collected from the pit by farmers B and C. (1 mark)
- "This method of waste treatment is a means of conservation." Give two reasons to support this statement. (2 marks)
- Suggest two reasons to explain why this practice is not suitable for Hong Kong. (2 marks)

(HKCEE 1994)

6. The diagram below shows a river and the location of a pig farm:



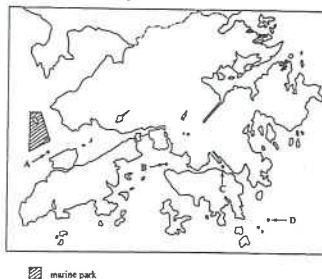
Samples of water were collected from four sites A, B, C and D along the river. They were analyzed and the results are shown in the bar charts below:



- Which site has the highest bacterial population? (1 mark)
 - Explain why this site has such a high population of bacteria. (2 marks)
- Explain the difference in the concentration of dissolved oxygen at site A and site B. (2 marks)
- What change has occurred in ammonia which causes its concentration to decrease from site B to site D? (1 mark)
- Based on your answer in (iii), suggest a

- possible change in the size of the algal population from site B to site D. Explain your answer. (3 marks)
- (v) If the pig farm is to remain at the present location, suggest a way to reduce the water pollution caused by its presence. (1 mark)
- (HKCEE 1995)

7. To monitor the quality of seawater in Hong Kong, water samples were taken for analysis from four different sites A, B, C and D as shown in the map below:



The quantities of suspended solids and bacteria in each water sample are as follows:

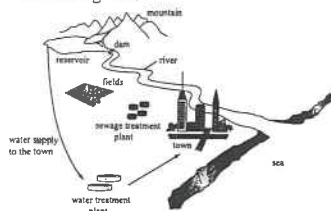
Site	Suspended solids (mg L ⁻¹)	Bacteria (number per 100 ml)
A	8.3	105
B	6.0	1986
C	5.5	23 140
D	2.5	15

- (i)
- Explain how the concentration of suspended solids may affect the population of producers in seawater. (3 marks)
 - Hence, predict which site has the largest population of producers. (1 mark)
- (ii) In Hong Kong, domestic sewage is the main source of organic pollutants in seawater.
- Explain how the bacterial population in seawater may be affected by the amount of organic pollutants present. (3 marks)
 - Deduce which site would contain the greatest amount of organic pollutants. (1 mark)
 - Suggest one reason for the presence of a large amount of organic pollutants at this site. (1 mark)
- (iii) Certain regions of Hong Kong waters have been designated as marine parks.

What is the significance of this for conservation? (1 mark)

(HKCEE 2000)

8. The diagram below shows a town and its surrounding areas:



- Domestic sewage produced in the town is first treated in the sewage treatment plant. The effluent (treated sewage) is then used to irrigate the fields.
 - During sewage treatment, air is bubbled into the sewage continuously. Explain the importance of this step. (3 marks)
 - Suggest two reasons why the practice of using the effluent to irrigate the fields is environmentally friendly. (2 marks)
 - If the same crop is grown in the fields year after year, the annual production of the fields will decrease. Suggest two reasons for this. (2 marks)
 - Uncontrolled deforestation occurs in the mountain areas. Explain one way in which this activity may affect the water supply to the town. (3 marks)
- (HKCEE 2001)

10. Read the passage below and answer the questions that follow:

According to some research, scientists expect the problem of global warming to worsen in coming years. They believe that by the end of this century, the average atmospheric temperature will be increased by 1.4°C to 5.8°C. The main causes of this phenomenon are believed to be over-consumption of fossil fuels and deforestation. Besides global warming, deforestation in areas near a river may lead to serious flooding and other ecological consequences.

- Explain how over-consumption of fossil fuels and deforestation together contribute to global warming. (5 marks)
- Explain briefly how deforestation may cause serious flooding. (3 marks)
- Why are fossil fuels considered to be a

- (d) non-renewable energy source? (1 mark)
- In order to tackle the problem of global warming and to reduce the consumption of fossil fuels, some people suggest using renewable energy sources instead of fossil fuels. Suggest *one* of these renewable energy sources and discuss whether it can be used as the main energy supply in Hong Kong. (2 marks)
- (HKCEE 2006)

Past HKCEE Questions
Man's Effect on His Environment
Paper II

99-53

If untreated sewage is discharged into a river, which of the following changes would occur in the water a short distance downstream from the site of discharge?

	Bacterial population	Algal population	Dissolved oxygen level
A.	increases	increases	increases
B.	increases	decreases	decreases
C.	decreases	decreases	increases
D.	decreases	increases	decreases

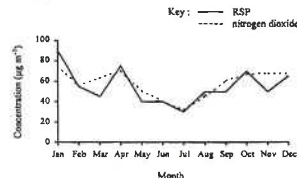
99-55

If the same kind of crop is grown in a field for many years,

- soil erosion will be prevented.
- the population of insect pests will increase.
- the mineral content of the soil will remain constant.
- the level of atmospheric carbon dioxide will decrease.

00.

Directions: Questions 47 and 48 refer to the graph below, which shows the monthly variations of nitrogen dioxide and respirable suspended particulates (RSP) in the atmosphere in Central and Western District of Hong Kong during the year 1997.



00-47

Which of the following statements concerning the graph maybe incorrect?

- The level of RSP in January is twice of that in March.
- The fluctuations in the levels of nitrogen dioxide and RSP follow a similar pattern.
- The levels of nitrogen dioxide and RSP in summer are lower than those in winter.
- The amounts of nitrogen dioxide and RSP released into the atmosphere are greatest in January.

00-48

Exhaust gas from cars is the main source of nitrogen dioxide. Which of the following is not a probable cause of the high level of nitrogen dioxide recorded in December and January?

- The relative humidity of air is lower.

- There are more cars on the road.
- The air temperature is lower.
- There is less rainfall.

00-55

If fertilizers in farmlands are drained into the sea, they may

- poison the fish in the sea.
- promote the growth of algae.
- reduce the oxygen content of the seawater.
- stimulate an increase in the bacterial population.

01-51

In many industrial countries, a lot of trees have been killed as a result of air pollution. Which air pollutant is the major cause of death of these trees?

- ozone
- carbon dioxide
- sulphur dioxide
- carbon monoxide

01-58

Which of the following is not considered as a type of pollution?

- dumping rubbish into the harbour
- releasing exhaust gas from motor cars
- setting the TV to a high volume at midnight
- clearing woodland for building housing estates

01-59

In recent years, fishermen are banned from fishing in the South China Sea in June and July. The purpose of this measure is to

- allow fish to grow and reproduce.
- prevent the occurrence of red tide.
- reduce the level of pollution of seawater.
- avoid catching fish with a high level of toxins.

02-37

Organic fertilizers are more environmentally friendly than inorganic fertilizers because organic fertilizers

- contain more minerals.
- are readily absorbed by crops.
- can increase the yield of crops faster.
- are not easily leached away from the soil.

02-40.

Red tide can be harmful to marine organisms because the algae in the red tide

- may produce toxic substances.
- compete with marine animals for food.
- use up a lot of the oxygen in water at night.

- (1) and (2) only
- (1) and (3) only

- (2) and (3) only
- (1), (2) and (3)

03-46

Which of the following is *not* a harmful effect of large-scale agricultural activities on the environment?

- increase in soil temperature
- increase in pest population
- loss of natural habitats
- soil erosion

04-25

Which of the following farming practices would lead to a rapid growth of algae in nearby ponds?

- spraying the crops with insecticides frequently
- growing a large number of crops within a small area
- adding a large amount of organic matters to the farmland
- applying a large amount of inorganic fertilizers to the farmland

04-37

Aerobic bacteria are important in the process of sewage treatment because they help to

- break down the organic substances in the sewage.
- release energy from the sewage in a usable form.
- remove the excess mineral salts in the sewage.
- break down the detergent in the sewage.

05-8

Timber is considered as a kind of renewable resource because

- it can be reused.
- it can be recycled.
- there is an abundant supply of timber.
- there is a continuous supply of timber.

05-14

Based on the idea that global warming is caused by a steady increase in carbon dioxide concentration in the atmosphere, which of the following may contribute to global warming?

- burning of coal and petroleum
- destruction of tropical rain forest
- depletion of ozone in the atmosphere

- (1) and (2) only
- (1) and (3) only
- (2) and (3) only
- (1), (2) and (3)

05-41

Insecticides are found in the body of penguins living in the South Pole, which is separated from farming areas by oceans. How do insecticides in the farming areas get into the body of penguins?

- The penguins feed on fish that contain insecticides.
- The penguins breathe in air polluted by insecticides.
- The penguins drink seawater contaminated by insecticides.
- The penguins absorb insecticides in the seawater through the body surface.

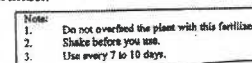
07-24

Which of the following does not contribute to global warming?

- soil erosion
- deforestation
- burning fossil fuel
- release of exhaust fumes from vehicles

07-40

The following shows a label of a chemical fertilizer.



What may happen if we overfeed the plant with the fertilizer?

- Water is drawn out of the roots and there will not be enough water for the plant.
- The roots grow so fast that they will use up the oxygen in soil air.
- The roots absorb too much salt and retain too much water.
- The leaves become so large that they will overlap with one another.

Past HKCEE Questions
Man's Effect on His Environment
Suggested Answers

Paper I

1. (i) avoid accumulation of waste / prevent growth of bacteria / keep the farm cleaner 1
(ii) sedimentation / filtration 1
(iii) as fertilizer 1
(iv) supply oxygen for the bacterial action / for oxidation 1
(v) decomposition of organic matter / respiration of bacteria 1
(vi) • increase in organic matter / suspended solids / bacteria content 1
• decrease in oxygen content +
• increase in turbidity / decrease in light penetration 1
• increase in foul smell 1
• OR any other reasonable effects
(Any 2) [NOT simply pollution]
2. (i) 2.8×10^6 kg (no unit, no mark) 1
(ii) particles 1
(iii) to reduce the number of motor vehicles, because they produce the greatest total amount of pollutants / carbon monoxide / hydrocarbons per year 1
OR other suitable answers
(iv) Particles: irritation of the respiratory tract / reduce the efficiency of gaseous exchange carbon monoxide: decreases oxygen carry capacity of blood 1
(v) it dissolves in raindrops / water increases the acidity of water and affects lives there 1
(vi) hot water / radioactive wastes / carbon dioxide / other suitable answer 1
3. (i) District A because Kwai Chung is an industrial area 1
The factories there produce a lot of sulphur dioxide / nitrogen dioxide / respirable suspended particles in the exhaust during the burning of fossil fuels 1
- (ii) • to reallocate the industrial area to other remote sites 1
• stricter legislation / measures on exhaust from factories 1
• use of precipitators / taller chimneys, etc.
(other reasonable answers) (any 2)
(iii) The concentrations of respirable suspended particles increases due to accumulation of these particles in air 1
OR
September is still a rainy month in Hong Kong 1
and the washout effect of the rainfall on the air might reduce the concentration of suspended particles 1
OR
Other suitable answers with explanation
(iv) • nasal hairs 1
• help to strain large dust particles 1
• the mucous lining of the trachea / nasal cavity 1
• traps tiny dust particles in the mucus 1
• which is moved upwards by cilia into the pharynx and coughed out or swallowed 1
(Any 5)
4. (i) (1) landfill 1
(2) Destruction of habitats / creates pollution / formation of toxic substance 1
(ii) saprophytic bacteria / fungi / decomposers 1
decompose organic matter into minerals / plant nutrients 1
(iii) • animal waste is rich in organic matter 1
• which promotes the growth of bacteria in water 1
• aerobic respiration of bacteria consumes much of the dissolved oxygen 1
• causing suffocation of aquatic organisms / aquatic organisms die due to lack of oxygen 1
• toxic substances produced kill the organisms
(Any 4)

- (iv) power station / burning of coal blocking breathing tract causing respiratory ailments / radioactivity in fuel ash can induce cancer 1
5. (i) The high temperature is due to the breakdown / decay of organic wastes 1
by respiration / activities of microorganisms which release heat 1
(ii) as fertilizer for plant growth 1
(iii) • it causes less pollution to the environment. 1
• it reduces the consumption of fossil fuels / chemical fertilizers. 1
OR
• the wastes can be recycled into useful matters, e.g. fertilizer, fuel (any 2)
(iv) • land in Hong Kong is too expensive / not enough for building such pit. 1
• it is smelly in a crowded area.
• there are problems of collection and transport of wastes. 1
• energy production by this practice cannot meet the great demand in Hong Kong.
• and other acceptable suggestions
(Any 2)
6. (i) (1) site B 1
(2) Pig farm discharges animal waste 1
(ii) A large number of bacteria / decomposers at site B consumes a lot of oxygen
Thus the dissolved oxygen content is lower at site B than at site A
(iii) Ammonia is converted to nitrate
(iv) Algal population increases due to an increasing level of nitrate which is a nutrient for the growth of algae
(v) • To treat the waste before discharging
• To reuse the waste as fertilizer
• To set up laws to control the discharge of waste
(Any 1) 1

7. (i) (1) High concentration of suspended solids reduces the light intensity in water 1
Thus the rate of photosynthesis of the producers decreases and this leads to a drop in the population of the producers 1
Effective communication (C) 1
(2) Site D 1
(ii) (1) The greater the amount of organic pollutants in water, the higher the bacterial population because the organic pollutants provide food for the growth / multiplication of bacteria 1
(2) Site C 1
(3) any one 1
• Slow water current in the harbour
• There is sewage outfall at this site
• Large human population
(iii) To protect endangered species (accept other correct answers) 1
8. (i) (1) Bubbling air into the sewage facilitates the aerobic respiration of microorganisms in the sewage 1
This stimulates the growth / metabolic activities of the microorganisms thus promoting the decomposition of organic substances in the sewage 1
Effective communication (C) 1
(2) any two below: (1,1) 2
• It can save the valuable water resource / recycle the water resource
• It can prevent the contamination of the river with excessive amount of minerals
• It can recycle the nutrients / reduce the demand of inorganic fertilizers / makes use of the effluent as a source of nutrient supply for the crop growth
• It can prevent algal blooming in the river due to the discharge of the effluent
(iii) Pest population may increase / Diseases may spread rapidly among the crop 1
Certain minerals in the soil may become exhausted rapidly 1

- (iii) Any one set below: (1,1,1) 3
- Soil erosion may occur in the mountains
 - This leads to the deposition of silt in the reservoir / a reduction in the water storage capacity of the reservoir thus reducing the water supply to the town
- or
- Soil erosion may occur in the mountains
 - Water in the reservoir may carry a lot of suspended particles / soil minerals
 - The water quality may become poor
- or
- Surface run-off of water increases
 - Less water is gathered in the reservoir
 - thus reducing the water supply to the town
9. (a) Our offspring / future generations may be deprived of the chance of enjoying the fish in meals 1
- (b) Because it leads to extinction of the species / decrease in biodiversity and an increase in the population of its prey 1
- (c) It allows the young fish to reach sexual maturity so that they can carry out reproduction 1
As a result, the production of offspring can compensate for the loss of the fish (effective communication) 1
10. (a) Over-consumption of fossil fuels will generate a large amount of carbon dioxide 1
Deforestation leads to a decrease in the overall photosynthetic activity and hence a reduction in the removal of carbon dioxide from the atmosphere 1
As a result, the carbon dioxide concentration in the atmosphere increases 1
This will trap more heat radiated from the Earth's surface / increase the greenhouse effect resulting in global warming 1
Effective Communication (C) 1
- (b) (any 1 set below) 3
- Soil erosion increases as a result of deforestation
 - because rain falls onto the soil

- directly without the covering of canopy / there is no root systems to hold soil together
- The riverbed of the lower course of the river rises due to sedimentation / rainwater tends to run off on the soil surface leading to a sudden rise in the volume of water.
- or
- **Soil erosion occurs as a result of deforestation**
 - **The riverbed in the lower** course of the river rises due to increased sedimentation
 - Due to deforestation, rainwater tends to run off on the soil surface resulting in a sudden rise in the volume of water
- Thus the river is more likely to flood
- (c) Because the rate of regeneration of the fossil fuels is too slow to have a sustainable supply for human consumption 1
- (d) solar energy / wind / tidal waves / hydroelectric power 1
It is not feasible because the production of energy from this source is not cost-effective in large scale power generation / there is not enough land available for large-scale electricity generation by wind / solar energy / the tidal waves or rivers in HK are too small for power generation 1
(accept alternative answers / approaches)

Paper II

99-53	B
99-55	B
00-47	D
00-48	DELETED
00-55	B
01-51	C
01-58	D
01-59	A
02-37	D
02-40	B
03-46	A
04-25	D
04-37	A
05-8	D
05-14	A
05-41	A
07-24	A
07-40	A