

**ENVIRONMENTAL SYSTEMS
STANDARD LEVEL
PAPER 1**

Tuesday 11 May 2004 (afternoon)

45 minutes

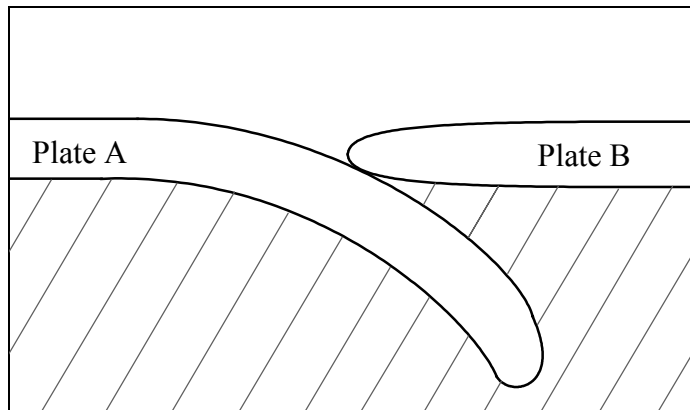
INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.

1. What proportion (by volume) of the Earth's water is fresh?

- A. 0.026 %
- B. 0.26 %
- C. 2.6 %
- D. 26 %

2. What does the diagram below represent?



- A. A constructive plate margin
- B. A destructive plate margin
- C. A mid-oceanic ridge
- D. The troposphere-asthenosphere boundary

3. Why is powdered limestone sometimes spread on lakes?

- A. To encourage the growth of a sustainable crop of fish
- B. To decrease the alkalinity of the water
- C. To reduce the acidity caused by air pollution
- D. To neutralize the effect of methane escaping from organic matter

4. A word is missing from each of the statements below.

A sandy soil drains ... **I** ... freely than a clay soil.

A loam soil is usually ... **II** ... fertile than a sandy soil.

The average particle size in a clay soil is ... **III** ... than in a sandy soil.

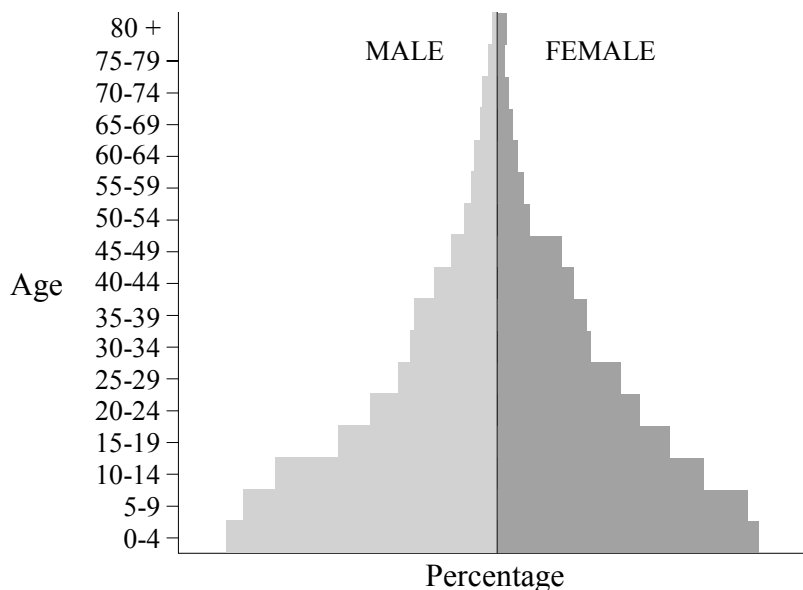
Which of the following contains the correct order of words to complete the three statements above?

	I	II	III
A.	less	less	smaller
B.	more	less	larger
C.	more	more	smaller
D.	less	more	larger

5. Which statement describes a recycling process?

- A. Using old newspapers for the manufacture of cardboard
- B. Control of water consumption by allowing watering of gardens only between certain times
- C. Using plastics instead of timber in furniture manufacture
- D. Re-conditioning old car (automobile) engines for resale

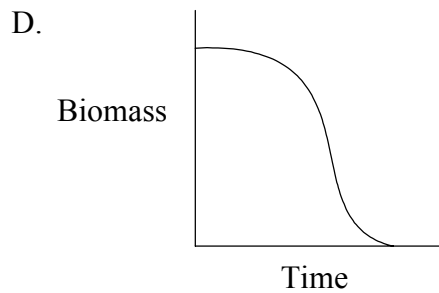
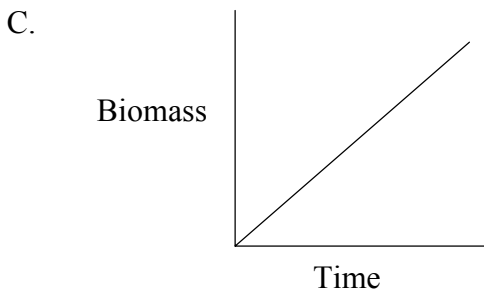
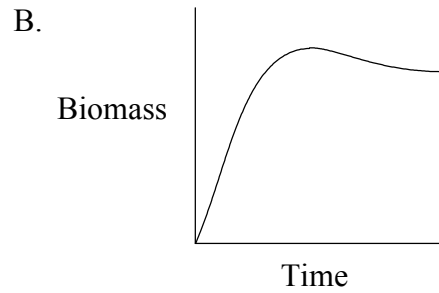
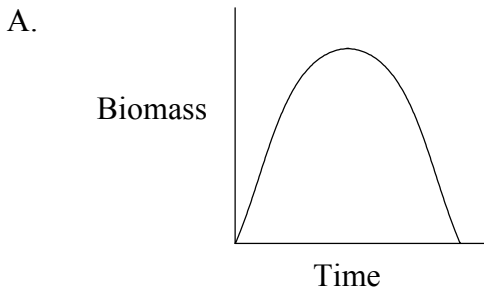
6.



What is the population pyramid diagram above most likely to represent?

- A. A developed country with a low birth rate and a high death rate
 - B. A less developed country with a low birth rate and a low death rate
 - C. A developed country with a high birth rate and a high death rate
 - D. A less developed country with a high birth rate and a high death rate
7. As disease spreads through a population, numbers fall. As the result of a reduction in contact between individuals, the rate of spread of the disease is reduced. This is followed by a recovery in numbers.
- This is an example of
- A. positive feedback
 - B. negative feedback
 - C. demographic transition
 - D. entropy

8. Which diagram best represents the change in the biomass of a forest ecosystem as it passes through a succession from a pioneer community to climax?



9. If a tax were to be placed on fossil fuels proportional to the quantity of carbon dioxide released into the atmosphere when they were burnt, which would be the most likely effect?

- A. Global warming would increase
- B. Generation of nuclear power would decrease
- C. The occurrence of smog in cities would increase
- D. Consumption of fossil fuels would decrease

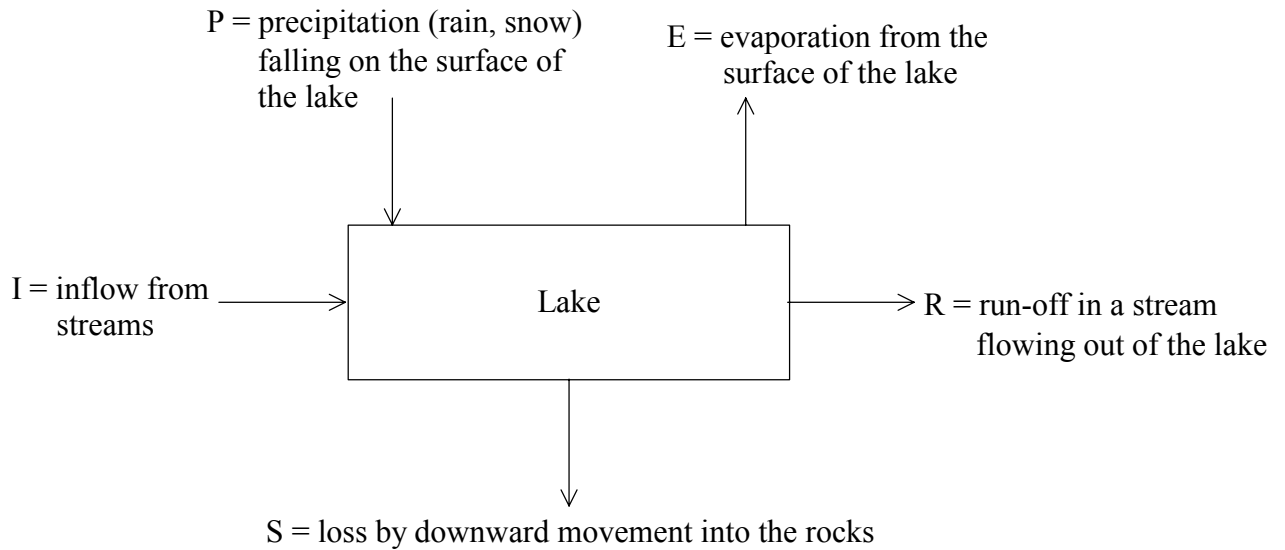
10. If a tropical river were to be accidentally polluted with a pesticide, where is the highest concentrations of the pollutant most likely to be found after several years?

- A. In the water
- B. In crocodiles and other carnivores
- C. In herbivorous fish
- D. In the atmosphere

11. What do outputs from an open system consist of?

- A. Energy only
- B. Matter only
- C. Energy and matter
- D. Neither energy nor matter

12. The diagram below represents the inputs and outputs of water from a lake over a period of time.

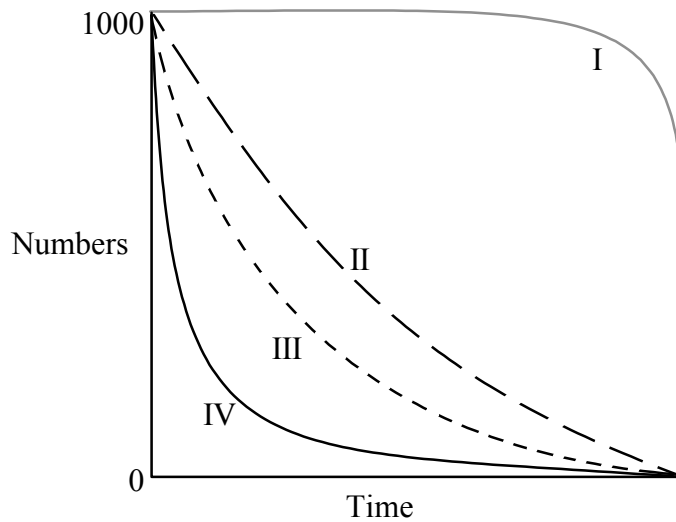


Assuming there is neither a rise nor a fall in the level of the lake, and there are no other inputs or outputs, what is the value of R?

- A. $P + I - E - S$
- B. $I + P + E + S$
- C. $(S + E) \times (I + P)$
- D. $I + P + E - S$

13. Which of the following is most likely to be a parasite?
- A. A fungus in the living tissues of a tree
 - B. A fungus cultivated as a source of food by ants in their nest
 - C. A fungus growing on the decaying branch of a dead tree
 - D. A caterpillar consuming the tissue of a living fungus

14. The graph below shows the number of individual organisms surviving from an initial cohort of 1000, plotted against time. (A cohort is a group of organisms in a population that are born or hatch at about the same time.) Which line on the graph is most likely to represent a *K*-strategist?



- A. I
 - B. II
 - C. III
 - D. IV
15. What is the likely consequence of the isolation of a land mass due to crustal plate movement?
- A. The extinction of most of the organisms
 - B. An increase in the biodiversity of the land mass
 - C. A decrease in the biodiversity of the land mass
 - D. The development of a unique collection of animals and plants

16. Four examples of resources are listed below.

- I. A very small coal deposit that it is uneconomic to mine
- II. An area of rainforest in a national park
- III. The water in a mountain lake
- IV. A school of whales in the southern ocean

Which of the following identifies the types of resources that each of the above represent?

	Replenishable	Renewable	Non-renewable
A.	III	II and IV	I
B.	IV and II	III	I
C.	I and III	II	IV
D.	I	II and IV	III

17. Which statement is correct?

- A. Ocean currents move energy but not matter
- B. Ocean currents move matter but not energy
- C. Ocean currents are driven by the winds and the Earth's rotation
- D. Ocean currents seldom have an effect on climate

18. Which of the following would be most likely to reduce the birth rate in a country?

- A. A decrease in the average age of marriage
- B. An increase in educational opportunities for women
- C. An increase in the carrying capacity of the country
- D. A reduction in the rate of tax paid by families with several children

19. How long would it take a human population with a natural increase rate of 1 % to double?
- A. 10 years
 - B. 50 years
 - C. 70 years
 - D. 100 years
20. What is a reduction in the amount of ozone in the upper atmosphere most likely to lead to?
- A. Damage to plant tissues by ultraviolet radiation
 - B. Rapid global warming
 - C. A decrease in rainfall
 - D. An increase in acid rainfall
21. A population of organisms the size of which remains approximately constant, but which fluctuates over the short-term, may be described as being in a state of
- A. static equilibrium
 - B. stable equilibrium
 - C. positive feedback
 - D. demographic transition
22. What does a group of populations living in the same place, at the same time, and interacting with each other, constitute?
- A. An ecosystem
 - B. A habitat
 - C. A biome
 - D. A community

23. Which of the following best represents an example of sustainable yield management of resources?

- A. Reducing the amount of oil consumed by encouraging the use of smaller vehicles
- B. Switching from fossil fuel power stations to nuclear power stations
- C. Harvesting the timber of a forest at the rate that the trees produce it
- D. Banning the catching of rare fish species

24. Lapse rate is the ... **I** ... in temperature usually expected with an ... **II** ... in height through the ... **III** ...

Which of the following contains the correct order of words to complete the sentence above?

	I	II	III
A.	increase	decrease	troposphere
B.	decrease	increase	ocean
C.	decrease	increase	troposphere
D.	increase	decrease	Earth's crust

25. Which statement(s) describing atmospheric depressions is/are correct?

- I. They are regions of relatively low pressure in which winds spiral inwards and counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.
 - II. They are associated with windy, cloudy and wet weather.
 - III. They are a mechanism by which heat is transferred from one region to another.
 - IV. They are regions of very low pressure, occurring in the tropics and associated with extremely high, often destructive winds blowing towards the centre or "eye".
- A. I, II, III and IV
 - B. I, II and III only
 - C. I and II only
 - D. I only

26. Which statement about soil is correct?
- A. The first stage in the formation of soil is the weathering of parent rock
 - B. Clay soils retain less water than sandy soils
 - C. Humus is the layer of the soil containing most of the inorganic matter
 - D. Soil is classified as a renewable resource
27. How is crude death rate best defined?
- A. The number of deaths per thousand individuals in a population per year
 - B. The total number of deaths per year
 - C. The number of births minus the number of deaths per year
 - D. The annual percentage decrease in population due to deaths alone
28. Why is estimating the carrying capacity for human populations difficult?
- I. Because of the high level of technological development.
 - II. Because populations generally import resources from outside their immediate environment.
 - III. Because birth rate is very low.
- A. I, II and III
 - B. I and II only
 - C. II and III only
 - D. III only

- 29.** China's average family size has fallen from 5.8 to 2.4 in the last 20 years. Which of the following could have produced this change?
- A. High levels of emigration
 - B. Increase in the death rate in rural areas
 - C. Education about contraception methods
 - D. Genetic changes in the population
- 30.** Nitrogen is removed from the atmosphere by
- A. denitrifying bacteria
 - B. lightning
 - C. decomposer organisms
 - D. forest fires
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