107EP02

國立臺北科技大學107學年度碩士班招生考試

系所組別：3220 環境工程與管理研究所乙組

第一節　環境科學　試題

注意事項：

1. 本試題共 20 題，每題 5 分，共 100 分。
2. 請標明題目編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

Question 1

The owners of a large pig farm have built a system to collect the animal waste, process this waste and collect the methane gas produced. The methane gas is then burnt to generate heating for the farm buildings. This system would be classified as using a

A. biomass energy source.

B. fossil fuel energy source.

C. natural gas energy source.

D. non-renewable energy source.

Question 2

Washing machines are approximately 30% more energy efficient than they were 25 years ago. Twenty-five years ago, the average washing machine used 650 kWh per year. What is the approximate energy saving per year, in kilowatt hours, of a new washing machine?

A. 163

B. 195

C. 216

D. 455

Question 3

What are the two main gases produced by human activity that enhance the greenhouse effect?

A. carbon dioxide and ozone

B. methane and carbon dioxide

C. carbon dioxide and water vapor

D. carbon dioxide and sulfur dioxide

Question 4

Mercury bioaccumulates through aquatic food chains.

Which one of the following represents evidence of mercury bioaccumulation?

A. extensive poisoning of fish in an ecosystem

B. the total mass of fish in an ecosystem increasing as the mercury emissions increase

C. the total mass of mercury in fish in a lake being less than the mass of mercury in the plants in the lake

D. predatory fish containing 5 mg of mercury per kilogram of body weight, with the fish they eat containing 1 mg of mercury per kilogram of body weight

Question 5

An environmental management plan was put in place during the construction of a tourist resort. The plan included maintenance of native grasslands. These grasslands are found in the middle of the development and link surrounding habitats.

These grasslands are best described as

A. regulatory frameworks.

B. remnant vegetation providing a wildlife corridor.

C. human intervention reducing ecosystem diversity.

D. habitat modification causing loss of endangered species.

Question 6

Which one of the following is a significant source of sulfur dioxide?

A. bushfires

B. metal smelting

C. nuclear power plants

D. hydro-electric power plants

Question 7

Plants help to clean water, break down pollutants and sequester carbon.

These actions are examples of

A. land degradation.

B. ecosystem services.

C. human intervention.

D. transport mechanisms.

注意：背面尚有試題

Question 8

A company has produced a new manufacturing plan with a major focus on the concepts of 'reduce', 're-use' and 'recycle'. This plan would be considered an example of

A. the precautionary principle.

B. a waste-minimization strategy.

C. an environmental risk assessment.

D. an environmental impact assessment.

Question 9

An analysis of the types of shopping bags used by customers in supermarkets was undertaken. The study involved collecting data on raw materials used, energy consumption involved in manufacturing the different bags, recycling and re-using the bags, and major wastes released into the environment when the bags are disposed of. This type of analysis would be best described as

A. a life-cycle assessment.

B. an environmental risk assessment.

C. an environmental impact assessment.

D. an environmental monitoring program.

Use the following information to answer Questions 10–13.

A large dam is to be constructed to allow a small hydro-electric power plant to provide the electricity supply for a small town. This hydro-electric power plant will replace the current diesel generator.

Question 10

One major environmental advantage of this change would be that hydro-electric power plants

A. last longer than diesel generators.

B. are cheaper to operate than diesel generators.

C. disturb ecosystems less than diesel generators do.

D. use a renewable energy source, while diesel is a non-renewable source.

Question 11

An environmental risk assessment of the dam is to be conducted. The main purpose of the environmental risk assessment is to

A. ensure maximum local employment on the project.

B. minimize the number of people likely to object to the project.

C. eliminate any disruption to the environment during construction.

D. balance any environmental damage against the benefit of the construction.

Question 12

An environmental management plan is developed for the construction of the dam.

Which one of the following should be a major factor in the environmental management plan?

A. The construction cost should be as low as possible.

B. Long-term damage to ecosystems should be minimized.

C. The project should be completed in the shortest possible time.

D. Disruption to local residents should be minimized, both during construction and for future generations.

Question 13

After completion of the work, a group of scientists conducts an evaluation of the effectiveness of the environmental management plan for the project. Which one of the following would be evidence that the environmental management plan has been successful?

A. Electricity is cheaper.

B. The work was completed under budget.

C. No native animals were disturbed during the construction work.

D. Three years later, the ecology of the area downstream of the dam is similar to the ecology of that area before the dam was constructed.

Use the following information to answer Questions 14–19.

Emily lives on a farm. She has two options for a source of electricity: connecting to a nearby hydro-electric power plant or using solar panels. She decides to use solar panels. The power received from the sun is an average of 0.5 kW per square meter when the sun is shining. She places 10 solar panels on her roof. Each panel is 1.0 m2.

Question 14

Which one of the following best indicates the power into the solar panel system when the sun is shining?

A. 0.5 kW

B. 1.0 kW

C. 5.0 kW

D. 50 kW

Question 15

On a cloudy day, the total input to the solar panel system from the sun is 0.75 kW.

Emily measures the output from the system as 0.15 kW.

Which one of the following best gives the percentage efficiency of the system?

A. 15%

B. 20%

C. 50%

D. 75%

Question 16

The solar panel system provides too little power for Emily's needs, so she connects to the newly constructed local hydro-electric power plant, based on a large dam nearby.

Which one of the following describes the overall energy conversion involved in a hydro-electric power plant?

A. heat energy to electrical energy

B. electrical energy to kinetic energy

C. chemical energy to electrical energy

D. gravitational potential energy to electrical energy

Question 17

Roger claims that the hydro-electric power plant is not as environmentally friendly with respect to global warming as the solar panels.

One major reason for this claim is that

A. the heat from the generators warms the atmosphere.

B. carbon dioxide evaporates from the water in the dam.

C. the hydro-electric power plant emits large quantities of a greenhouse gas.

D. the removal of trees to construct the dam results in fewer carbon dioxide sinks.

Question 18

Which one of the following best describes a hydro-electric power plant?

A. a renewable fossil energy source

B. a non-renewable fossil energy source

C. a renewable non-fossil energy source

D. a non-renewable non-fossil energy source

Question 19

Roger maintains that the hydro-electric power plant is an ecologically sustainable development.

A valid reason for this view is that

A. it is more efficient than a coal-fired power plant.

B. the water cools the local atmosphere, hence reducing global warming.

C. it provides a body of water for the local fish, birds and other aquatic animals.

D. it does not consume an energy resource, leaving this resource available for future generations.

Question 20

Certain pollutants are persistent in the environment.

Which of the following is most likely to be correct?

The pollutants

A. are heavy metals.

B. are readily soluble in water.

C. have immediate toxic effects only.

D. can be easily broken down by microorganisms.