

S.4 BIOLOGY ASSESSMENT TEST

TIME: 100 MINUTES

TOPIC: ECOLOGY

Instructions: Attempt all questions.

SECTION A

1. In the colonization of a bare rock, the next most likely group of plants after lichens are the ☐
A. Grasses B. Mosses C. Shrubs D. Trees
2. Which one of the following correctly describes population density? The number of organisms ☐
A. in a specified area
B. of a particular species in a specified area
C. living either on land or water
D. one which can interbreed and produce viable offspring
3. Which one of the following would not contribute to the accuracy of the capture-recapture method of estimating population size? ☐
A. Using a stable population C. Use of very small marks
B. Capturing animals selectively D. Allowing time before the recapture
4. Which of the following biological processes describes a fungus growing on the leaves of a living potato plant? ☐
A. Predation B. Parasitism C. Competition D. Saprophytism
5. Which one of the following would you expect to increase at successive levels of a food chain? ☐
A. Total number of consumers C. Concentration of pollutants in organisms
B. Total energy content D. Biomass of organisms
6. In a parasitic association between two organisms: ☐
A. Both members benefit. C. Both members suffer harm.
B. Only one member benefits. D. Neither member is harmed.
7. Which one of the following groups of organisms in the same ecosystem is likely to have greatest number of individuals? ☐
A. Primary consumer C. Tertiary consumers
B. Secondary consumer D. producers
8. Which one of the following groups of organisms in a food chain contains the least amount of energy? ☐
A. Tertiary consumers C. Primary consumers
B. Secondary consumers D. Producers
9. Which one of the following would occur if the number of predatory bugs increased in the food chain below? Plants → caterpillars → Predatory bugs → birds ☐
A. Decrease in number of birds C. Increase in number of plants
B. Increase in number of plants D. Decrease in number of plants
10. In which of the following associations do both organisms benefit? ☐
A. Malaria parasite and human B. Tapeworm and human
C. A fungal parasite and plant D. Nitrogen fixing bacteria and leguminous plant

11. Which one of the following methods would be best for estimating the population density of rats in a bush? ☐
- A. Direct counting
B. Quadrant counting
C. Line transect
D. Capture-recapture method
12. Which one of the following would be a correct sequence of plant succession on an abandoned tarmac road? ☐
- A. Mosses → herbs → shrubs → trees
B. Herbs → mosses → shrubs → trees
C. Shrubs → herbs → trees → mosses
D. Mosses → herbs → trees → shrubs
13. Which of the following describes the carrying capacity of a population? ☐
- A. Maximum number of organisms that can reproduce freely in a habitat
B. Area occupied by organisms of different species
C. Maximum number of organisms that can be supported by a specific area.
D. Maximum number of plants that can support animals in a given area
14. To estimate the population of *Tilapia* using a capture-recapture method, 60 fish were captured, marked and released. In the second capture, out of 72 fish, 10 had been marked. The estimated population of *Tilapia* was ☐
- A. 672
B. 780
C. 432
D. 4310
15. Which one of the following is a method of preventing tapeworm infection? ☐
- A. Wearing shoes
B. Proper disposal of faeces
C. Treating infected individual
D. Boiling drinking water
16. Which one of the following is an effect of deforestation? ☐
- A. More oxygen accumulates in the atmosphere
B. More plant nutrients are retained in the soil
C. Formation of soil occurs rapidly
D. More carbon oxide accumulates in the atmosphere
17. Which one of the following activities causes change in the carbon dioxide balance of the atmosphere? ☐
- A. Quarrying
B. Deforestation
C. Discharge of hot water into a lake.
D. Application of fertilizers
18. Which one of the following methods of controlling malaria does not harm the environment? ☐
- A. Draining ponds
B. Use of insecticides such as DDT
C. Spraying oil on of water ponds
D. Introducing fish into ponds
19. There were many termites in leaf litter layer decomposing it while anteaters fed on the termites faster. This relationship can best be illustrated using ☐
- A. Pyramid of Biomass
B. Food web
C. Food chain
D. Pyramid of energy
20. The process in changes in types of organisms in a given location is known as _____ ☐
- A. Competition
B. Habitat
C. Food chain
D. Succession

21. Which one of the following human activities is likely to increase the level of carbon dioxide in the atmosphere?

A. Cutting down trees

B. Using artificial fertilizers

C. Discharging waste in water Bodies

D. Using pesticides

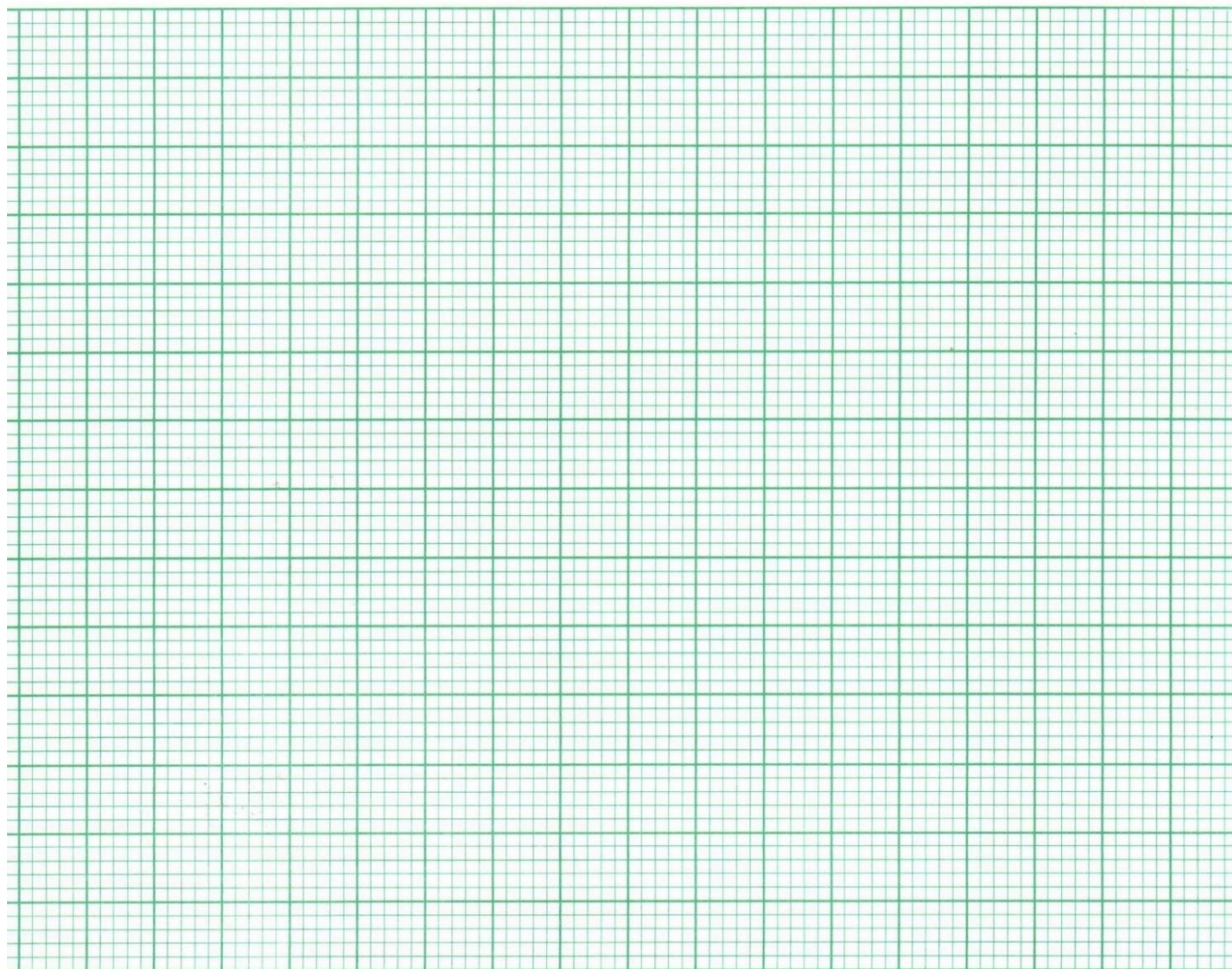


SECTION B

22. . The data below shows the population of mice in a cage for a certain period of time.

Time (months)	0	2	4	6	8	10	12	14	16	18
Number of mice	20	20	65	115	310	455	455	190	145	160

(a) Using a suitable scale, plot the population growth curve for the mice on a graph paper. **(06 marks)**



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(f) (i). Between which two months was the population change greatest? **(01 mark)**

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(ii). Calculate the rate of population change over the period you have given above. **(02 marks)**

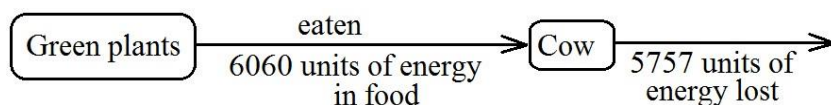
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23. In a food chain, when energy is transferred from one trophic level to another some of it is lost. The figure below shows such a transfer of energy in an out of a cow in a year.



(a) Name the trophic levels shown in the figure. **(02 marks)**

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(b) State two ways in which energy is lost from the cow. **(02 marks)**

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(c) Calculate the percentage of energy taken in during the year, which is retained by the cow. **(02 marks)**

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- (d) In proportion to its body, a calf uses more energy to maintain its body temperature than a cow.
Explain why this is so. (03 marks)

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- (e) In the recycling of materials, how can the energy within the cow be made available to plants? (02 marks)

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SECTION C

24. (a) What is meant by **pollution**? (02 marks)
(b). Explain how the continued use of polythene paper may harm the environment. (10 marks)
(c). Suggest ways of preventing the effects suggested in (b) above. (03 marks)

END

“Don’t ask what the world needs. Ask what makes you come alive, and go do it.”