Part One: Value 50%

Instructions: For questions 1 – 42 use the answer sheet provided and shade in the appropriate circle. For the matching question write the letter of the diagram on the line next to the number it matches with.

1. Which term below matches the definition: The populations of plants and animals that live together, interacting with their nonliving environment ?
   A. abiotic factors
   B. an ecosystem
   C. biodiversity
   D. sustainable development

2. In which part of a food chain would you find a third order consumer?
   A. first trophic level
   B. fourth trophic level
   C. third trophic level
   D. second trophic level

3. Which choice puts the feeding relationships of a typical food chain in the correct order ?
   A. decomposers - herbivores - carnivores - producers
   B. herbivores - carnivores - omnivores - decomposers
   C. producers - carnivores - herbivores - decomposers
   D. producers - herbivores - carnivores - decomposers

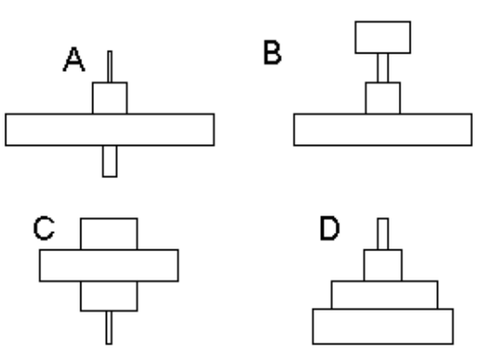
4. Which statement about ecosystems is **NOT** correct ?
   A. All ecosystems go through changes with time
   B. They can, and constantly do, change over time
   C. Ecosystems are collections of populations interacting with their environment
   D. They have the ability to repair damage, but this differs from place to place

5. Which situation is the best example of interspecific competition?
   A. A group of arctic poppies growing out of a soil-filled crack in a rock
   B. A grouse eating spruce needles, while a ptarmigan eats willow bushes
   C. Gillis catching fish in a river pool, only to have a bear sneak up and take it
   D. Two seagulls eating scraps falling out of garbage bags at the incinerator

6. When environmental changes or disturbances happen, which creature would have the best chance of surviving because they have the widest variety of food sources ?
   A. carnivores
   B. decomposers
   C. herbivores
   D. omnivores

7. Which group of terms are all used to describe one similar niche?
   A. Autotroph, first order consumer, producer
   B. Autotroph, heterotroph, consumer
   C. Decomposer, nitrogen fixer, saprobe
   D. Producer, nitrogen fixer, saprobe

8. Which pyramid of numbers diagram could in fact be “sustainable” if each organism at the second trophic level was very tiny in size?



9. Which statement(s) about the nitrogen cycle are correct ?
    1. nitrogen gas is absorbed by plants, increasing the rate of photosynthesis
    2. lightning helps change atmospheric nitrogen into soil nitrates
    3. nitrogen-fixing bacteria on certain plant species roots change nitrogen to nitrates
    4. growing the same crops over and over on the same land can remove valuable nitrates

    A. 1, 2, and 3 are correct
    B. 1, 2, and 4 are correct
    C. 2, 3, and 4 are correct
    D. Only 2 and 3 are correct

10. Which of these four decisions would have the biggest immediate reduction in your "carbon footprint" on the atmosphere ?
    A. idling a cold vehicle in the morning to warm the engine
    B. having a meat free meal at least once a week
    C. sharing rides or using the bus to get to school
    D. warming a room with a propane fireplace instead of an electric heater

11 In ecology, what is a consumer?

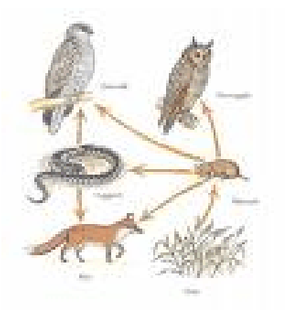
    A. an organism that eats only plants
    B. an organism that eats only animals
    C. an organism that may eat plants or animals
    D. an organism that causes decomposition in dead organisms

12. Shown here are two related, but different, species: a bobcat and a lynx. Both live in coniferous forests, but it is highly unlikely that they will be found in the same geographical area. If they DID happen to live in the same place, what could they do that would remove the competition between them ?

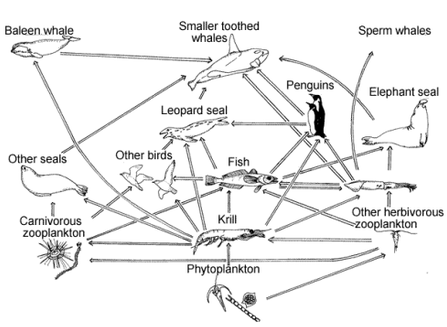
    A. clearly mark its territory, and fight to keep the other cat out of it
    B. each cat could be an opportunistic eater, with no particular favorite kind of prey
    C. hunt for prey at different times, sometimes during the day, sometimes at night
    D. hunt for prey by randomly patrolling the forest during the night

13. Which food web has the best chance of being sustainable over a long term period ?

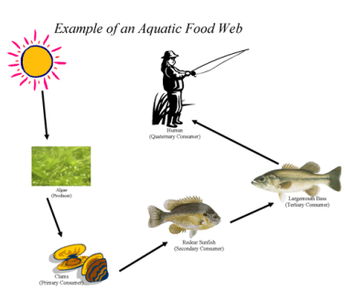
A.



B



C.



D.

14. Which phrase describes biodiversity?
    A. abiotic environment
    B. variety of organisms
    C. sizes of populations
    D. rates of reproduction

15. What term is used to describe an organism that makes its own food from basic nutrients?
    A. autotroph
    B. heterotroph
    C. decomposer
    D. energy source

16. Which of the following is an example of a heterotroph?

    A. mushroom
    B. deer
    C. maple tree
    D. the Sun

17. Which term describes the role that an organism plays in the ecosystem?

    A. trophic level
    B. producer
    C. niche
    D. consumer

18. Although top carnivores are not preyed upon by any other organisms, they may be used for food while alive by which one of the following groups?

    A. carnivores
    B. decomposers
    C. omnivores
    D. parasites

19. What term do we use to describe a group of organisms of the same species living together?

    A. ecosystem
    B. community
    C. population
    D. biome

20. Which of the following is **NOT** an abiotic factor?

    A. Population density
    B. Water
    C. Light
    D. Temperature

21. Which of the following terms best describes the competition between a killer whale and a polar bear for seals as food?

    A. intraspecific
    B. interspecific
    C. non-specific
    D. specific

22. Approximately how much energy is passed on to the next trophic level in a food chain?

A. 5%
B. 10%
C. 25%
D. 100%

23. In which of the following would you find a second order consumer?

A. First trophic level
B. Second trophic level
C. Third trophic level
D. Fourth trophic level

24. What is the maximum number of levels in MOST food chains?

A. 3
B. 4
C. 7
D. no limit

25. Which level of organisms has the least energy available to it?

A. beetle
B. hawk
C. sparrow
D. spider

26. What is the process in which materials and nutrients are broken down by micro-organisms so that the nutrients are available to be re-used?

A. Decomposition
B. Recycling
C. Rotting
D. Scavenging

27. What is the process whereby chemical bonds in food are broken and energy is released?

A. cellular respiration
B. photosynthesis
C. the nitrogen cycle
D. the water cycle

28. What is chemistry?

A. the study of living things
B. the study of energy and motion
C. the study of weather patterns
D. the study of matter

29. Which of the following descriptions is **NOT** part of the information on an MSDS sheet ?

A. Name
B. Spill or leak procedures
C. Health hazards data
D. Classification as ionic or molecular

30. What group devised the rules for naming and writing formulas?

A. WHMIS
B. MSDS
C. IUPAC
D. ALCHEM

31. What does **WHMIS** stand for?

A. Workplace Hazardous Materials Information System
B. Workplace Handling of Materials Information System
C. Working With Hazardous Materials in Society
D. Work and Home Materials Information Standards

32. Which is an <u>ionic</u> compound ?

A. CCl_4
B. SO_2
C. BrCl
D. $Sn(NO_3)_2$

33. What special name is given to substances such as $MgSO_4 \cdot 7H_2O$?

A. Acid
B. Molecular compound
C. Hydrate
D. Base

34. Which is the correct formula?

A. AlO_3
B. Al_2O_3
C. Al_3O_2
D. AlO

35. Which is the correct name for CS_2 ?

A. carbon sulfide
B. carbon sulfate
C. carbide disulfide
D. carbon disulfide

36. Which element naturally exists as diatomic (travels in pairs) molecules?

A. bromine
B. phosphorus
C. carbon
D. gold

37. Which one of the following represents a double replacement reaction?

A. calcium oxide + carbon dioxide ⇒ calcium carbonate
B. methane + oxygen ⇒ carbon dioxide + water
C. sodium + water ⇒ hydrogen + sodium hydroxide
D. phosphoric acid + barium hydroxide ⇒ water + barium phosphate

38. Aluminum reacts with oxygen in the air to form a protective coating. What type of reaction is this?

A. Formation (simple composition)
B. Decomposition
C. Single replacement
D. Combustion

39. What substance is required for combustion?

A. carbon dioxide
B. carbon monoxide
C. oxygen
D. methane

40. Which is the correct formula and corresponding name of a possible molecular compound?

A. K_2O potassium oxide
B. CaO calcium oxide
C. OF_2 oxygen difluoride
D. $CaCl_2$ calcium chloride

41. Which is the correct formula for phosphorus?

A. P
B. P_2
C. P_4
D. P_8

42. If NH_4^+ and P^{3-} combine to form a compound what would the formula be?

A. NH_4P
B. NH_4P_3
C. $NH_4^+P^{3-}$
D. $(NH_4)_3P$

43. Match the letter of the WHMIS symbol to the correct description (8 %)

1. Flammable and combustible material _____
2. Dangerously reactive materials _____
3. Corrosive material _____
4. Oxidizing material _____
5. Biohazardous infectious material _____
6. Poisonous and infectious material causing toxic effects other _____
7. Compressed gas _____
8. Poisonous and infectious material causing immediate and serious toxic effects _____

A  B  C  D 

E  F  G  H 

Part Two Answer all questions in the space provided.

1. Explain the difference between any **five (5)** of the following pairs of terms. For full marks, you must provide an example of each term. (10%)

    A. Interspecific competition and intraspecific competition

    B. Primary succession and secondary succession

    C. Biotic factor and abiotic factor

    D. Niche and habitat

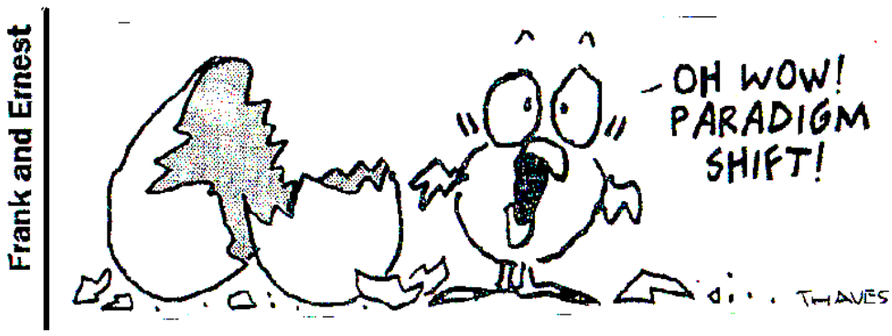
    E. First generation pesticide and second generation pesticide

    F. Food chain and food web

2.A. What is a “paradigm shift” ? (1%)

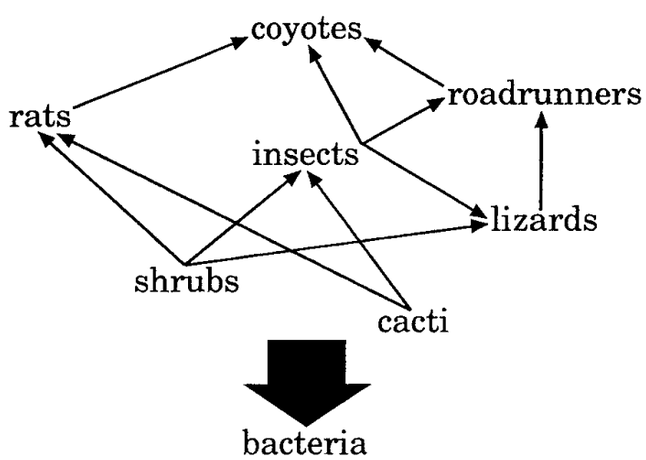
B. What events must happen in order to cause someone to experience a “paradigm shift”? (2%)

C. How is this illustration an example of a paradigm shift ? (2%)



3. A. In a couple of paragraphs, describe how humans have interfered with **either** the carbon cycle **or** the nitrogen cycle. (5 %)

B. Use the food web below to answer the questions that follow:



A. If something wiped out the insect population which organisms would be most affected and why? (2%)

B. Would any species not be affected by the loss of many insects? Why or why not?(3%)

4. Write the correct name for each formula: (10%)

A. $Au(NO_3)_2$ _____

B. NO_2 _____

C. $CuSO_4 \cdot 5H_2O$ _____

D. H_2NO_3 (aq) _____

E. $KMnO_4$ _____

F. CH_4 _____

G. $CaCl_2$ _____

H. Na_2SO_3 _____

I. BeO _____

J. K_2S _____

5. Write the formula for each name: (10%)

A. hydroiodic acid _____

B. ethanol _____

C. sodium nitrate hexahydrate _____

D. phosphorus trihydride _____

E. magnesium iodide _____

F. bismuth (lll) sulfate _____

G. ammonium phosphate _____

H. aluminum sulfide _____

I. silver chloride _____

J. ammonia _____

6. Classify each reaction: (5%)

$2Al\ (s) + N_2\ (g) \rightarrow 2AlN\ (s)$

Reaction type:_____

$2\ Al\ (s) + 3\ CuSO_4\ (aq) \rightarrow Al_2\ (SO_4)_3\ (aq) + 3\ Cu\ (s)$

Reaction type:_____

$2H_2O\ (l) \rightarrow 2H_2\ (g) + O_2\ (g)$

Reaction type:_____

$2\ C_6H_6\ (l) + 15\ O_2\ (g) \rightarrow 12\ CO_2\ (g) + 6\ H_2O\ (g)$

Reaction type:_____

$Pb(NO_3)_2\ (aq) + NaI\ (aq) \rightarrow PbI_2\ (s) + NaNO_3\ (aq)$

Reaction type:_____