Aquatic Science Fall Final Exam Review

Safety and Science

1. What is the first thing you should do if you accidentally mess up something in the lab?
   A. Keep on working as if nothing happened
   B. Call your mom
   C. Text your friend who was in the lab the class before you
   D. Notify the teacher

2. Who has the greatest and ***most immediate*** responsibility in overseeing the safety of you and your lab mates during a lab investigation?
   A. The principal
   B. You
   C. OSHA
   D. Your parents

3. Why do we not use a fire extinguisher on a person who is on fire?
   A. It could cause further injury
   B. You could get hurt while using it
   C. You should use the fire extinguisher on a person
   D. Fire extinguishers are heavy

4. If you are on fire, how should someone help put you out?
   A. Use the fire extinguisher
   B. Get the fire blanket
   C. Tell you to stop drop and roll
   D. B and C
   E. A and C

5. Where should broken glass be disposed of?
   A. In the trash can
   B. In the dumpster
   C. In the glass disposal bin
   D. In the recycling bin
   E. Glass should never be disposed

6. What is the primary cause of accidents in the lab?
   A. Inappropriately trained students
   B. Inexperienced teachers
   C. Students doing things they are not supposed to do
   D. All of the above

7. What is the most dangerous thing in a lab?
   A. People
   B. Chemicals
   C. Fire
   D. Goggles
   E. None of the above

Use the following scenario to answer questions 9-20.

Ken is a graduate student at Trow State University. He is completing his doctoral thesis on aquatic microbiological toxicology. He has designed an experiment whereby he hopes to determine how various bacterial toxic byproducts

adversely affect the quality of life of an endangered species of fish called the Unicorn Sailfish that inhabits the waters near Trow State. Once identified, Ken will then attempt to find the potential sources of the pollutants and work with local officials and organizations to limit the production of the pollutants.

Ken has already identified the toxic byproducts in a previous experiment and is now setting up his experiment to see how each byproduct will affect the quality of life of the unicorn sailfish. He decides that he will put several thousand fish in 3 separate fish tanks. To each tank he will add one of the two toxins he identified in his previous study. One tank (a control tank) will receive no treatment. He will then measure the amounts of fish lost in each tank.

Ken finds that toxin B is the toxin primarily responsible for large amounts of fish deaths in his study. In addition toxin B comes from Bossenbroek Gas, gasoline manufacturing plant upstream from Trow State. In an effort to limit the plant's emission of this toxin, Ken first reaches out to the company's CEO who ensures Ken that his research is incorrect. Ken then reaches out to politicians, celebrities, and the general public in an effort to call a moratorium on the Bossenbroek's gas production. With the backing of 95% of Trow State's population, pressure was felt at the local level and the city government called for a moratorium. During the moratorium, the unicorn fish population began to rebound. After years of publicity and pressure from Bossenbroek Gas, the State Government stepped in and declared that the threat to unicorn fish was all "smoke and mirrors" and that Bossenbroek Gas should not be shut down due to such minimal evidence. Three years later, the last unicorn fish died and the species ceased to exist on our planet.

8. What is the Independent variable in Ken's Experiment?
   A. the gasoline
   B. the toxin
   C. the fish
   D. Bossenbroek's gas company
   E. None of the above

9. What was the most probable hypothesis in Ken's experiment?
   A. The toxin that causes the most fish death could be responsible for losses of unicorn fish populations in waters near Trow State
   B. Fish produce a toxin that will cause bacteria to reproduce rapidly
   C. If toxins can be identified, companies can be forced to stop producing them
   D. All of the above are suitable hypotheses for this experiment.

10. Why does this experiment need a control tank?
   A. It doesn't
   B. It gives the researcher something to compare the results of the toxins to.
   C. The control tank establishes how many fish will die in the other tanks
   D. None of the above

11. What is the dependent variable in this experiment?
   A. Toxins
   B. Bossenbroek's gas
   C. the death rate of unicorn fish
   D. none of the above

12. What could be done to increase Ken's claims against Bossenbroek gas?
   A. Meet with a social club to make flyers
   B. Talk to more celebrities
   C. Have multiple independent labs rerun the tests
   D. None of the above

13. What is needed to change Scientific Knowledge?
   A. New materials
   B. Better people
   C. New evidence or data
   D. None of the above…Science doesn't change

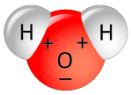
14. What is an independent variable?
   A. The part of the experiment that is controlled by the scientist
   B. The part of the experiment that is controlled by the dependent variable
   C. It is not important in an experiment
   D. None of the above

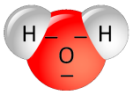
15. Why is it important to have good experimental design?

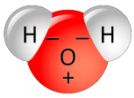
A. It insures the validity of your findings
B. It insures that the data you obtain is relevant and reliable
C. It insures that the experiment can be repeated with similar results
D. All of the above
E. None of the above

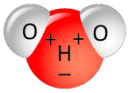
Test: Basic Water Chemistry

16. Which of the following is a correct depiction of a water molecule?

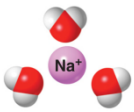
a. 

C. 

b. 

D. 

17. Adhesive forces are those that exist…
    a. Between water molecules and other molecules
    b. Between water molecules
    c. Between other molecules
    d. Between like charged particles
18. Which of the following is definitely the temperature of Solid H_2O?
    a. 2°C
    b. 32°C
    c. 0°C
    d. -10°C
19. What is it called when water molecules "stick" to each other?
    a. Cohesion
    b. Evaporation
    c. Adhesion
    d. Polarity
20. Water molecules are polar because…
    a. They have oppositely charged regions
    b. They are magnetic
    c. They are spherical and therefore have a north and south pole
    d. They have lost electrons
21. Which of the following shows the correct arrangement of water molecules around a positive ion?

a. 

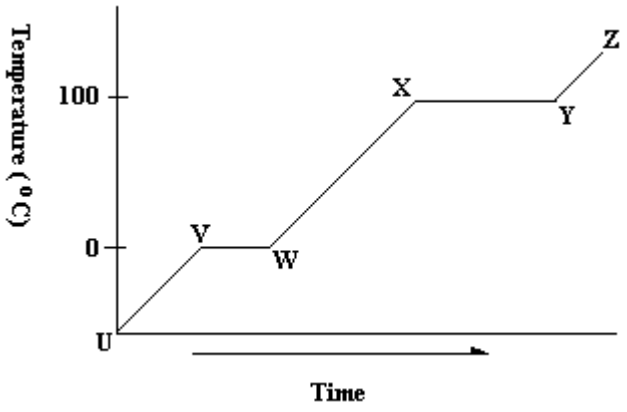
B. 

22. What forces allow water to exhibit capillarity?
    a. Heat and pressure
    b. Density and Viscosity
    c. Cohesion and Adhesion
    d. Density and Polarity
23. Which of the following would you expect to see water perform the most capillary action (crawl the highest)?
    a. Sand
    b. Rocks
    c. Gravel
    d. Pebbles
24. Why does water have the ability to dissolve many other substances?

a. It is a polar molecule.
b. It is wet.
c. It has a high surface tension.
d. It has high specific heat.

25. Which of the following would allow MOST gases to be less soluble?
    a. Shaking the solution
    b. Cooling the solution
    c. Adding pressure to the solution
    d. Increasing the surface area of the solution
26. Why are pollutants difficult to remove from the environment?
    a. The cost of cleaning products is too high.
    b. They dissolve easily in water and water can take it everywhere.
    c. Pollution does not have anything to do with water.
    d. They are toxic and you must wear protective clothing when removing them.
27. A power plant discharges warm water into a stream. This could affect fish populations because the increase in temperature may lead to…
    a. An increased sediment load in the river
    b. An increased dissolved oxygen concentration
    c. A decreased dissolved oxygen concentration
    d. Increased bird populations using the stream for hibernation
28. How is water able to regulate the temperature of the environment?
    a. Its high specific heat allows it to take in a lot of heat during the day drawing heat away from the air and then release that heat at night back into the surroundings.
    b. Its capillarity allows it to take in a lot of heat during the day drawing heat away from the air and then release that heat at night back into the surroundings.
    c. Its surface tension allows it to take in a lot of heat during the day drawing heat away from the air and then release that heat at night back into the surroundings.
    d. None of these because they are all too long.

Answer questions using the following graph.

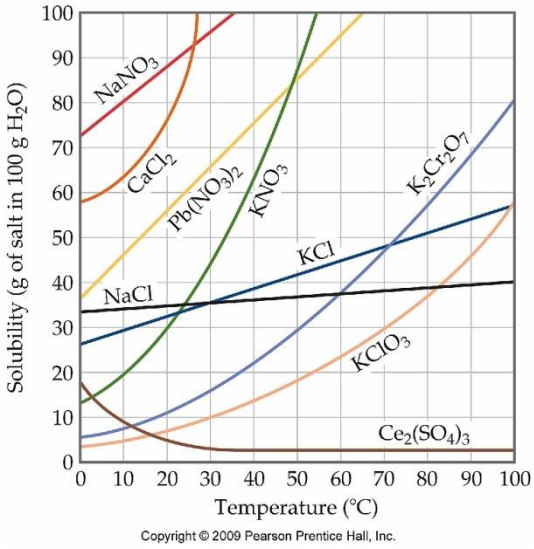


29. Water would still have ice it between which two points?
    a. V and W
    b. W and X
    c. X and Y
    d. Y and Z
30. At what point is water completely frozen?
    a. U
    b. W
    c. X
    d. Z
31. At which points is water boiling?
    a. U and V
    b. V and W
    c. X and Y

d. Y and Z

32. At which points is energy being absorbed without a temperature change?
    a. U and V
    b. V and W
    c. X and W
    d. Y and Z
33. Temperature is:
    A. The measure of coldness
    B. The measure of the average kinetic energy of the particles of a substance
    C. Only recorded in °C.
    D. None of the above

Use the graph to answer the remaining questions.



34. At approximately what temperature will 70g of potassium nitrate (KNO_3) dissolve in 100 mL of water?
    a. 45°C
    b. 45g
    c. 70°C
    d. 70g
35. At approximately what temperature is the solubility of $NaNO_3$ and $CaCl_2$ the same?
    a. 85°C
    b. 25°C
    c. 93°C
    d. 50°C

Aquatic Microbiology

36. What is the primary niche of Bacteria?
    A. Primary Producers
    B. Secondary Consumers
    C. Decomposers
    D. None of the above
37. What is the primary niche of planktonic protists?
    A. Primary Producers
    B. Primary Consumers
    C. Decomposers
    D. None of the above
38. How do "green" plankton get their energy?
    A. Photosynthesis
    B. Respiration
    C. Decomposition
    D. None of the above
39. What is the study of disease called?
    A. Bacteriology
    B. Pathology
    C. Epidemiology

D. None of the above

40. What is the study of Bacteria called?
    A. Bacteriology
    B. Pathology
    C. Epidemiology
    D. None of the above
41. What is the study of spread of disease through populations called?
    A. Bacteriology
    B. Pathology
    C. Epidemiology
    D. None of the above
42. Gram Positive cells are/have:
    A. Bacterial cells
    B. Virus cells
    C. Thick cell walls
    D. B and C
43. What water use allows for the most coliforms?
    A. Recreation
    B. Drinking water
    C. Fish and wildlife habitat
    D. Fish and shellfish consumption
44. What is FRESH water?
    A. Water that has less than 10 ppm of salt
    B. Water that has no salt
    C. Water that is salty
    D. Ice cold water
45. What are water quality standards for drinking water?
    A. 200 coliforms /100ml
    B. 5000 coliforms/100ml
    C. 0 coliforms/100ml
    D. It just has to be clean
46. Which of the following is a bacterium that can be found in surface waters?
    A. *E. coli*
    B. Cryptosporidium
    C. Hepatitis A
    D. Giardia
    E. A and C
47. What does potable mean?
    A. Water good for agricultural applications
    B. Fresh
    C. Water good for industrial applications
    D. Water that is free of contaminants
    E. None of the above
48. Pathogens can cause…
    A. Sickness
    B. Illness
    C. Disease
    D. Death
    E. All of the above
49. Where do fecal coliforms come from?
    A. Cauliflower

B. *E. coli*
C. Pseudomonas
D. Mammalian Feces
E. None of the above

50. Gram Negative bacterial cells…
    A. Stain Navy
    B. Stain Pink
    C. Have negative charged nuclei
    D. None of the above
51. Cocci morphology is…
    A. Rod Shaped
    B. Sandy
    C. Spiral shaped
    D. Sphere shaped
52. The Ecology of aquatic environments is…
    A. Complex
    B. Simple
    C. Extremely irrelevant
    D. None of the above
53. Chlorinated water may have _____ but be loaded with_____.
    A. Very few bacteria / viruses
    B. A lot of bacteria / viruses
    C. Ice in it / contaminants
    D. A funny taste / a diarrhea shot
54. What is the main difference between Gram + and Gram -?
    A. Cell wall Thickness
    B. There is no difference
    C. Color
    D. None of the above
55. Bacillus morphology is…
    A. Rod Shaped
    B. Cone shaped
    C. Spiral shaped
    D. Sphere shaped
56. What are the symptoms of Cholera?
    A. A tummy ache
    B. Some diarrhea
    C. Increased intelligence
    D. Extreme diarrhea and vomit
57. Many water-borne illnesses are transmitted …
    A. Fecal-orally
    B. Oral-fecally
    C. by sexual contact with an infected person
    D. none of the above
58. Why do we do Gram Stains?
    A. Identify cellular arrangement
    B. Identify cellular morphology
    C. It is the first step in bacterial identification
    D. All of these
    E. None of these

59. What is the most beneficial method of prevention of most bacterial pathogens?
    A. Filtering water
    B. Vaccination
    C. Good hygiene
    D. None of the above
60. How many living organisms are typically found in a small sample of natural water?
    A. A few
    B. Hundreds
    C. Millions
    D. None of the above
61. Which of the following is the least effective water treatment method for eliminating harmful microbes?
    A. Boiling
    B. Filtering
    C. Adding Chlorine
    D. All of the above are equally effective.
62. Which of the following is not a kingdom of classification?
    A. Animalia
    B. Protista
    C. Eukariobacteria
    D. Archaebacteria
63. John Snow is known as the father of epidemiology because he:
    A. Found the source of the 2014 ebola outbreak
    B. Was the first to use the information gathered from ill patients to identify the source of an outbreak of cholera.
    C. Found the cure for cholera in London's 1850's Cholera epidemic.
    D. None of the above
64. What will a gram negative streptococcal bacteria look like?
    A. Pink, Round clumps
    B. Pink, Round chains
    C. Navy, Round clumps
    D. Navy, Round chains

Basic Ecology and Dichotomous Keys

65. What is an ecosystem?
    A. All of the biotic and abiotic things in a defined area
    B. All of the living things in an area
    C. All of the abiotic factors in a defined area
    D. None of the above
66. What is a collection of ecosystems?
    A. A biome
    B. A community
    C. A population
    D. A biomass
67. Which of the following is not truly an aquatic plant?
    A. Submerged plants
    B. Riparian plants
    C. Floating plants
    D. Emergent plants
68. Detritis is
    A. Dead plant matter or other organic debris
    B. Keneficial as a nutrient to microscopic populations of decomposers
    C. Decomposing material
    D. All of the above

69. Invasive species are typically:
    A. Non-native species to an ecosystem that have no predators
    B. Harmful to an ecosystem
    C. Keneficial to an ecosystem
    D. A and C
    E. A and B
70. Ecologists study:
    A. Economies
    B. Ecosystems
    C. Ecologists
    D. Ecological economics

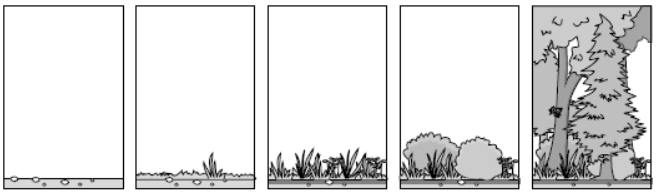
Use the following organisms and their scientific names (which have been made up for the purpose of this test) to answer questions




A. *Micropterus salmoides* B. *Lepomis auritus* C. *Micropterus auritus* D. *Lepomis boops*

71. The process of naming organisms scientifically is called…
    A. Scientology
    B. Binomial Nomenclature
    C. Trinomial Nomenclature
    D. Namological Nomiation
72. Scientific names consist of the…
    A. Species and Family of an organism
    B. Description of an organism
    C. Genus and species of an organism
    D. None of these
73. Scientific names must be _____ when handwritten and _____ when typed.
    A. Latin, Greek
    B. Copied, pasted
    C. Underlined, Italicized
    D. Italicized, underlined
74. Which organisms above are most closely related?
    A. B and C
    B. C and D
    C. A and C
    D. You cannot tell this information from the names or pictures
75. *Micropterus salmoides* and *Micropterus auritus* have…
    A. The same Kingdom, Phylum, Class, Order and Family
    B. Very similar genes (genetically related)
    C. No certain genetic relationship
    D. A and B
    E. A and C

Use the following diagram to answer questions



① Bare rock, no vegetation

② Initially, Lichens break down rock. Later, mosses and grasses appear.

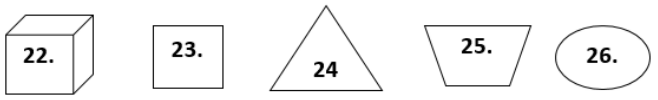
③ Grasses and herbs

④ Fast-growing shrubs

⑤ Forest of spruce, fir, and birch

76. What process is depicted in the diagram?
    A. Ecosystemic Equilibration
    B. Primary Succession
    C. Secondary Succession
    D. None of these
77. Which of the following is a pioneer species?
    A. Grass and herbs
    B. Lichens
    C. Bare Rock
    D. Spruce, Fir, Birch
78. If a tornado completely wipes out number 5 to bare soil, the process will begin again and be called…
    A. Ecosystemic Equilibration
    B. Secondary Succession
    C. Primary Succession
    D. None of these
79. In this scenario, Lichens serve what niche?
    A. They break down trees and soil to create rock
    B. They prepare the bare rock for intermediate species
    C. They are secondary consumers of rock
    D. None of these
80. Our detritus lab is most similar to which phases of this diagram?
    A. 4 and 5
    B. 3 and 4
    C. 1 and 2
    D. None of these
81. In our detritus lab, dead leaves and debris are similar to what in this diagram?
    A. Grass
    B. Bare Rock
    C. Lichens
    D. None of these
82. In our detritus lab, microbes (protists) are similar to what in this diagram?
    A. Lichens
    B. Trees
    C. Grass
    D. Bare Rock
83. What is a dichotomous Key?
    A. An ecologist's book used to observe organisms
    B. A tool used to identify organisms by name
    C. A list of questions that don't really do anything
    D. None of the above

Identify the following objects using the key below

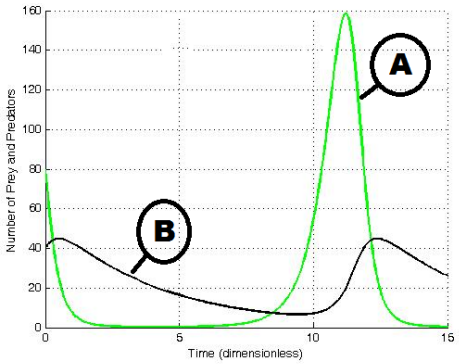


1. Is it 3 dimensional?.....2
   Is it 2 dimensional?.....3
2. It's edges are rounded.....*Funkle dink* **(Mark A)**
   It's edges are linear.....*Drinkie fonk* **(Mark B)**
3. It has distinct linear sides.....4
   It has rounded edges.....*Square shaped* **(Mark C)**
4. It has 4 or more sides.....5
   It has only 3 sides.....*Stankle fandankle* **(Mark D)**
5. It has equivalent inside angles.....*Tangdango danstangle* **(Mark E)**
   It has unequal inside andgles.....*Quoboigan shibonkle* **(Mark AB)**

Population Dynamics and Classification

88. If a population rises above an ecosystem's carrying capacity, the population will most likely:
    A. Hold steady for the foreseeable future
    B. Increase in the near future
    C. Decrease in the near future
    D. None of these
89. Keeping a population at or below an ecosystem's carrying capacity will help to ensure:
    A. Survival of the population over the long term
    B. Population increases beyond carrying capacity
    C. Health within the population
    D. None of these

Use the following graph for



90. In the graph above which letter indicates predators?
91. In the graph above which letter indicates prey?

Use the following organisms to answer 8-16

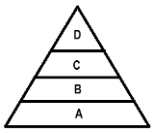
A. 

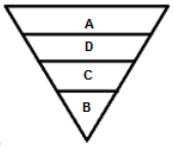
C. 

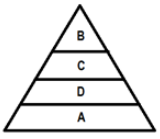
B. 

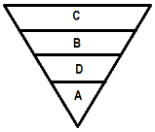
D. 

92. Which is the correctly ordered food chain?
    A. A→D→C→B
    B. A→B→C→D
    C. A→C→B→D
    D. A→B→D→C
93. What would ***most immediately*** happen to this ecosystem if all of the orca died?
    A. Herring populations would decrease
    B. Herring populations would increase
    C. Herring populations would die off
    D. Copepod population would decrease
94. Which is the correct energy pyramid for this food chain?

A. 

C. 

B. 

D. 

95. What do the arrows represent in a food chain?
    A. Energy absorption

B. Energy transfer
C. Eats
D. None of these

96. Nematodes and Platyhelminthes are for the most part:
A. Parasitic
B. Marine
C. Freshwater
D. Flat worms

97. Many nematodes enter the body:
A. Cutaneously
B. Orally
C. Subcutaneously
D. Fecally

98. Many Round and Flatworms have adapted to live:
A. Without oxygen
B. In both Marine and Freshwater environments
C. In extreme environments
D. None of these

99. Platyhelminthes are:
A. Round worms
B. Flat worms
C. Segmented worms
D. None of these

100. Annelids are:
A. Round worms
B. Flat worms
C. Segmented worms
D. None of these

101. Many Platyhelminthes are:
A. Hermaphroditic
B. Roundworms
C. Annelids
D. None of these.

102. Chaetae are:
A. Appendage-like bristles
B. Segments
C. A Species of annelids
D. None of these

103. Setae are:
A. Appendage-like bristles
B. Segments
C. A species of annelids
D. None of these

104. Two main classes of Annelids are:
A. Oligochaeta and Hirudinae
B. Polychaeta and Clitellates
C. Polychaeta and Hirudinae
D. None of these

105. Annelids have:
A. Hearts

B. A hemoglobin-like substance called pseudohemoglobin
C. Complex brains
D. None of these

106. Snails are:
A. Gastropods
B. Bivalves
C. Cephalopods
D. None of these

107. Octopus are:
A. Gastropods
B. Bivalves
C. Cephalopods
D. None of these