

Aquaculture

- 1 The _____ of a fish removes oxygen from the water and forces it through its gills
 - a) Nervous System
 - b) **Respiratory System**
 - c) Digestive System

- 4 The _____ consists of intestines and kidneys and it filters waste from the blood.
 - a) Reproductive System
 - b) Circulatory System
 - c) Sensory System
 - d) **Excretory System**

- 5 The _____ is a lateral line for balance.
 - a) Circulatory System
 - b) **Sensory System**
 - c) Reproductive System
 - d) Excretory System

- 6 The _____ consists of testes, ovaries, produces sperm and egg for the next generation.
 - a) Sensory System
 - b) **Reproductive System**
 - c) Circulatory System
 - d) Excretory System

- 7 The _____ consists of a heart, veins, and arteries.
 - a) Sensory System
 - b) Excretory System
 - c) **Circulatory System**
 - d) Reproductive System

- 8 What is the name of the flap that covers the gills?
 - a) pyloric caecae
 - b) gill raker
 - c) naris
 - d) **operculum**

- 9 Which of the following organs is not part of a fish's digestive tract?
 - a) **gills**
 - b) esophagus
 - c) stomach
 - d) intestines

- 11 What is the purpose of the lateral line in fish?
 - a) taste prey
 - b) locate home

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- c) keep fish from tipping over
 - d) **sense pressures and vibrations**
- 12 How does a fish pump water over its gills?
- a) open and close the operculum
 - b) by swimming
 - c) **all the listed answers**
 - d) by opening and closing it's mouth
- 13 In internal fertilization with fish:
- a) **the male deposits sperm inside the female**
 - b) the male deposits its sperm over the eggs after the female lays them, and then carries the eggs in his mouth
 - c) the male deposits it's sperm over the eggs after the female lays them
- 14 External fertilization with mouth brooders is:
- a) the male deposits sperm over the eggs after the female lays them and then carries them in his mouth until they hatch
 - b) the male deposits sperm inside the female
 - c) **the males deposits sperm over the eggs after the female lays them**
- 15 Which class of fish has a bony skeleton?
- a) Chondrichthyes/Cartilaginous
 - b) Agnatha/jawless
 - c) **Osteichthyes**
- 16 Which class of fish has a cartilage skeleton?
- a) Agnatha/jawless
 - b) **Chondrichthyes/Cartilaginous**
 - c) Osteichthyes
- 19 What do the intestines do?
- a) mechanically break down food
 - b) add oxygen to the blood
 - c) **help absorb nutrients into the bloodstream**
- 21 The layer of mucus/slime that covers the scales of fishes
- a) deflects sunlight
 - b) contains poisonous secretions
 - c) **provides insulation and allows it to slide through the water and away from predators more easily and waterproofs the fish**
- 22 Most fishes produce too many offspring to be supported by their environment. Why does this help to ensure survival of the species?

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- a) the fishes clean up polluted environments
 - b) **only the strongest, best-adapted fishes survive**
 - c) the increased number of fishes raise oxygen levels
 - d) producing offspring doesn't require much energy
- 24 All fish have a(n) _____ of either bone or cartilage.
- a) scale
 - b) **skeleton**
 - c) gill
 - d) ear
- 25 A bony fish will rise in the water when the
- a) swim bladder empties
 - b) fish stops moving
 - c) swim bladder fills with water
 - d) **swim bladder fills with gas (oxygen)**
- 26 An adaptive advantage of a bony skeleton over a cartilage skeleton is:
- a) bony skeletons are heavier
 - b) **bony skeletons are lighter weight**
 - c) none of the listed answers
- 27 Which is not a characteristic of most fishes?
- a) vertebrae
 - b) **single - loop circulation gills**
 - c) operculum
- 28 In most fishes, blood circulates from the heart to the
- a) gills, back to the heart, then to the rest of the body
 - b) the gills, the rest of the body, then back to the heart
 - c) the lungs, to the rest of the body, then back to the heart
 - d) **rest of the body, the gills, then back to the heart**
- 29 A bony fish uses its operculum to
- a) **draw water over it's gills**
 - b) detect vibrations in the water
 - c) regulate salt and water balance
 - d) coordinate muscle activity
- 30 The yellow perch is an example of a
- a) lobe-finned fish
 - b) **bony fish**
 - c) jawless fish
 - d) cartilaginous fish

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- 31 The dogfish is an example of a
- a) bony fish
 - b) jawless fish
 - c) **cartilaginous fish**
 - d) lobe-finned fish
- 32 The skate (ray) is an example of a
- a) jawless fish
 - b) bony fish
 - c) lobe-finned fish
 - d) **cartilaginous fish**
- 34 Using the analogy: Gills is to Filaments as Heart is to Chambers means...
- a) **filaments are part of gills, like chambers is part of a heart**
 - b) gills and hearts pump blood through filaments and chambers
 - c) gills are parts of a filaments, like heart is part of a chambers
 - d) none of the listed
- 35 A yellow perch (or any bony fish) propels itself forward with its
- a) dorsal fins
 - b) pelvic fins
 - c) **caudal fins**
 - d) pectoral fins
- 36 There is a future in aquaculture because:
- a) the supply from fisheries is increasing
 - b) none of the listed answers
 - c) **the demand for fish is increasing**
- 37 The density or crowding of an aquacrop being produced is:
- a) monoculture
 - b) **production intensity**
 - c) ornamental aquaculture
 - d) water recirculation
- 38 Fish who prefer warm temperatures would like to live in an environment from
- a) 70-95 F
 - b) 40-70 F
 - c) 85-100 F
 - d) **65-85 F**
- 40 The amount of food a fish will eat depends on:
- a) water quality

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- b) how big they are
 - c) water temperature
 - d) **all of the listed answers**
- 41 The two most common solid wastes in a recirculating fish tank are:
- a) algae & fish skin
 - b) **uneaten food & feces**
 - c) feces & algae
 - d) leaves & dead fish
- 42 The keeping of fish, plants, and other species for aesthetic or personal appeal:
- a) monoculture
 - b) water recirculation
 - c) production intensity
 - d) **ornamental aquaculture**
- 43 Ammonia comes from:
- a) **fecal and dead or dying material**
 - b) plants
 - c) all of the listed answers
 - d) none of the listed answers
- 44 DO (Dissolved oxygen) can be affected by:
- a) recirculating the water
 - b) **all of the listed answers**
 - c) surface area of the tank, pond, etc
 - d) temperature.
- 45 The production of two or more aquacrop species in the same water facility (tank, pond, etc.):
- a) monoculture
 - b) **polyculture**
 - c) production intensity
 - d) ornamental aquaculture
- 46 Bass are considered a _____ fish.
- a) Anadromous (species migrating from freshwater to the sea)
 - b) marine
 - c) coldwater
 - d) **Warmwater**
- 48 Which of the following is not one of the main purposes of aquacrops:
- a) recreation
 - b) ornamentals
 - c) **bait**

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- d) food
- 49 It's a good idea to have a light in the lid of the aquarium because it helps orient the fish as to direction and time of day, like the sun would
- a) **TRUE**
b) FALSE
- 50 In any aquarium or tank it's best to have the highest ammonia level possible.
- a) TRUE
b) **FALSE**
- 51 The components of water quality for a freshwater tank that are most important and need to be checked often (weekly) include chlorine, pH and salinity.
- a) TRUE
b) **FALSE**
- 52 It is important to store fish food properly to prevent:
- a) insect, rodent or other pest infestation
b) growth of mold loss of nutritional value
c) **all of the listed answers**
- 55 Tilapia are considered to be a
- a) mammal
b) Jawless fish
c) **Bony Fish**
d) cartilaginous fish
- 56 The majority of fish belong to this group.
- a) mammal
b) Jawless fish
c) **Bony Fish**
d) cartilaginous fish
- 57 How does a fish pump water over its gills?
- a) opening and closing the flap
b) opening and closing its mouth that covers its gills
c) swimming
d) **all of the listed answers**
- 58 The fin that provides the fish power to swim through the water is:
- a) pectoral
b) **caudal**
c) dorsal

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- d) adipose
- 60 The practice of keeping water, equipment and facilities used in growing aquacrops clean is known as:
- a) quarantine
 - b) parasite
 - c) symptom
 - d) **sanitation**
- 61 DO (dissolved oxygen) can be affected by:
- a) none of the listed answers
 - b) **all of the listed answers**
 - c) temperature
 - d) recirculating the water
- 63 In aquatic environments plants:
- a) provide shelter and nesting spots for fish
 - b) add DO
 - c) use DO
 - d) **all of the listed answers**
- 64 What part of the recirculating system helps the larger solid wastes settle out of the water?
- a) siphon
 - b) biofilter
 - c) **Clarifier**
 - d) air pump
- 66 Which part of the recirculating system moves dirty water from bottom center of culture tank up to the clarifier?
- a) **siphon**
 - b) air pump
 - c) clarifier
 - d) biofilter
- 67 A species of fish used as live food for other species is known as feeder fish.
- a) **TRUE**
 - b) FALSE
- 69 Water quality components (pH, DO, CO₂, Ammonia) can change slightly throughout the day
- a) **TRUE**
 - b) FALSE

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- 70 Uneaten food left in the tank is a problem because:
- a) it lowers the amount of ammonia in the water
 - b) **it raises the amount of ammonia in the water**
 - c) all of the above
 - d) none of the listed answers
- 71 How do we usually remove solid wastes in a recirculating system?
- a) **the biofilter and filter pad collect it**
 - b) catch them with a net daily
 - c) all of the listed answers
 - d) none of the listed answers
- 72 How is aeration provided in a tank?
- a) where water meets the air (surface)
 - b) through air pump & stones
 - c) moving the water
 - d) **all the above**
- 74 What factors affect how much DO gets into the water?
- a) the surface area of the tank
 - b) if the water is flowing/moving
 - c) the water temperature
 - d) **all of the listed answers**
- 75 What is one reason algae can be a good thing in tanks?
- a) it can increase chlorine levels in the water
 - b) **it can add oxygen and be an additional food source**
 - c) all of the listed answers
 - d) none of the listed answers
- 76 When can algae be a bad thing in tanks?
- a) it can take oxygen out of the water, especially at night
 - b) when it dies/decays it can raise ammonia levels
 - c) it makes the water cloudy and hard to see through
 - d) **all of the listed answers**
- 78 What are change(s) can occur in among fish during breeding?
- a) flare fins
 - b) flare colors
 - c) aggressiveness
 - d) **all of the listed answers**
- 80 Which variation of fish reproduction has the least chance of survival?

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- a) bubble nester
 - b) mouth brooders
 - c) **egg layers**
 - d) live bearers
- 81 What are can you do and/or put in your tank to help with territorial fish issues?
- a) only put two fish per tank
 - b) keep the water a little cooler than their native habitat
 - c) add plants, rocks or anything for them to hide in
 - d) **all of the listed answers**
- 83 Fish only fall into the category of herbivores.
- a) TRUE
 - b) **FALSE**
- 85 It's ok to feed fish in your saltwater tank after you've turned off the lights.
- a) TRUE
 - b) **FALSE**
- 86 The pumps in the salt water tank help recreate the water current that is natural in salt/reef areas.
- a) **TRUE**
 - b) FALSE
- 87 If you are 12 years old you have to have an AZ Game & Fishing fishing license to fish in most AZ lakes, rivers and streams.
- a) TRUE
 - b) **FALSE**
- 88 To what family does the trout belong?
- a) Lepomis
 - b) **Salmonidae**
 - c) Ictalurus
- 90 Fish that lives in salt water but spawns in fresh water.
- a) Eyed egg
 - b) **Anadromous**
 - c) Cock
 - d) Hen
- 93 The average number of pounds of feed eaten by the fish to gain 1 pound of weight.
- a) Intake
 - b) Cubic Feet per Second

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- c) Complete feed
 - d) **Feed Conversion Ratio (FCR)**
- 94 A structure for measuring/controlling water flow
- a) Filter
 - b) Pump
 - c) **Weir**
 - d) Clock
- 95 Containing fully developed eggs; ready to spawn
- a) Total
 - b) **Ripe**
 - c) Prime
 - d) Secure
- 97 Process that takes place within a 30 to 90 minute period after spawning in which the egg becomes turgid with water, loses its stickiness, and can no longer be fertilized.
- a) Shocking
 - b) Kype
 - c) Stripping
 - d) **Water-hardening**
- 99 Fry that obtain nourishment from attached yolk sac
- a) Swim Up Fry
 - b) Hen
 - c) **Alvenis (sac fry)**
 - d) Fingerling
- 100 Male Trout
- a) Hen
 - b) **Cock**
 - c) Sac Fry
 - d) Fingerling
- 101 Female Trout
- a) **Hen**
 - b) Cock
 - c) Sac Fry
 - d) Fingerling
- 104 Feed that supplies 100 percent of the dietary requirements of the fish; used when there is little or no access to natural food
- a) Natural Feed
 - b) Supplement

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- c) Partial Feed
 - d) **Complete feed**
- 105 Process of sharply striking egg trays, siphoning eggs from one container to another, or pouring eggs from incubator trays into tub of water from 2 to 3 feet to detect undeveloped or infertile eggs
- a) **Shocking**
 - b) Water-hardening
 - c) Stripping
 - d) Kype
- 108 The measurement of both forms of dissolved ammonia, ammonium, NH_4^+ ionized, and ammonia, NH_3 , un-ionized
- a) Phosphorus Level
 - b) Water Level
 - c) **Total ammonia**
 - d) pH
- 110 All members of the family are coldwater fish requiring highly pure, highly oxygenated water below which of the following temperatures?
- a) 78
 - b) **68**
 - c) 58
- 112 What is the leading trout-producing state?
- a) **Idaho**
 - b) Indiana
 - c) Iowa
- 114 What is the optimum range and the SET for trout culture water temperature?
- a) 33 to 78; 65
 - b) 39 to 55; 50
 - c) **50 to 60; 59**
- 115 What is the recommended flow rate for raceway and tank culture?
- a) **0.05 to 0.09 fps**
 - b) 0.25 to 0.50 fps
 - c) 0.01 to 0.05 fps
- 116 What is the minimum DO concentration where eggs are hatched?
- a) 5 ppm
 - b) **7 ppm**
 - c) supersaturation
- 117 What is the most economical water hardness range for trout culture?

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- a) 75 ppm to 150 ppm, dissolved solids or more
 - b) 20 ppm to 50 ppm, dissolved solids or more
 - c) **50 ppm to 250 ppm, dissolved solids or more**
- 118 Below which of the following levels must nitrite be held for optimum growth and health?
- a) 0.5 to 0.7 mg/L
 - b) **0.1 to 0.2 mg/L**
 - c) 0.3 to 0.6 mg/L
- 120 What is the optimum water replacement time for raceways?
- a) **20 to 30 minutes, Or 2 to 3 changes per hour**
 - b) 10 to 15 minutes, or 4 to 6 changes per hour
 - c) 60 minutes, or 1 change per hour
- 121 If levels of NH₃, un-ionized ammonia, exceed 0.0125ppm, what happens?
- a) Trout will exhibit erratic behavior
 - b) Trout will die within hours
 - c) **A decline in trout growth and health may occur**
- 122 Fingerlings are grown in raceways until they are about 8 to 14 inches long; they are then sold to restaurants, retail markets, fee-fish operators, or to private owners.
- a) Fingerling production
 - b) Eyed-egg production
 - c) **Food-fish production**
 - d) Fee-fish pond
- 123 Adult trout are reared and held in isolated raceways or ponds until the spawning season when the female is ripe; the eggs are then stripped from the female and fertilized with milt from a male.
- a) **Eyed-egg production**
 - b) Fee-fish pond
 - c) Food-fish production
 - d) Fingerling production
- 125 Eyed eggs are managed in special trays or running water; after hatching, fish are managed until they grow to fingerling size-1 to 6 inches; they are then sold to other growers or to private pond owners.
- a) Food-fish production
 - b) **Fingerling production**
 - c) Eyed-egg production
 - d) Fee-fish pond
- 129 Know the _____ for the strain of rainbow trout you are culturing.
- a) **spawning times**
 - b) production rate
 - c) disease history

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- 130 Maintain broodstock in water temperatures of ____ or less.
- a) **56**
 - b) 58
 - c) 59
- 131 Choose female broodstock with a pronounced _____ and bright color.
- a) dark-colored
 - b) concave
 - c) **distended**
- 133 Take great care not to shake or jar the eggs during their sensitive stage-a period extending roughly _____ hours after fertilization.
- a) 24
 - b) **48**
 - c) 12
- 135 Disinfect eggs received from other hatcheries in _____ to prevent spread of disease.
- a) aluminum buckets
 - b) batches of 1,000
 - c) **a separate facility**
- 136 Maintain eggs _____ in a hatching trough or vertical tray incubator, and ensure that oxygen-rich water flows through them.
- a) in submerged jars
 - b) on floating boards
 - c) **on submerged screen trays**
- 142 Swim-up fry required a feed containing a minimum of _____ protein.
- a) **45 to 50 percent**
 - b) 34 to 45 percent
 - c) 35 to 40 percent
- 143 Once fingerlings are _____ inches long, they can be placed in raceways or ponds.
- a) 1+
 - b) **2+**
 - c) 3+
- 145** Related to or derived from living organisms
- a) **Organic**
 - b) Detritis
 - c) Benthos
 - d) Larva

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147 Parts per million; the addition of 1 pound of a substance to 999,999 pounds of water so that the dissolved substance and the water weigh a total of 1 million pounds

- a) PMM
- b) **PPM**
- c) Ratio
- d) Rate

148 Microscopic organism

- a) Benthos
- b) Detritis
- c) Larva
- d) **Microbe**

150 Organisms living on or in the bottom sediment of a pond

- a) Detritis
- b) **Benthos**
- c) Microbe
- d) Larva

151 An insect or animal that at birth or hatching is unlike its parent and must change to another form before assuming adult characteristics

- a) Microbe
- b) Detritis
- c) Benthos
- d) **Larva**

153 Transfer of energy from one living thing to another in the form of food

- a) **Fish Food Chain**
- b) Community
- c) Population
- d) Ecosystem

154 The layering of temperature and oxygen in a pond

- a) Thermocline
- b) **Stratification**
- c) Community
- d) Population

155 Communities of plants and animals and their climate, soil, and water environments

- a) Community
- b) Population
- c) **Ecosystem**
- d) Biome

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- 157 Group of animal and plant populations living together in the same environment
- a) Ecosystem
 - b) Population
 - c) Biome
 - d) **Community**
- 158 What source of energy do primary producers use to produce food energy?
- a) Primary consumers
 - b) **Sunlight**
 - c) Tertiary consumers
- 159 What are some examples of primary consumers?
- a) **Zooplankton**
 - b) Phytoplankton
 - c) Microbes and benthic organisms
- 161 What are some examples of secondary consumers?
- a) Algae, phytoplankton
 - b) Insect larva, fry, zooplankton
 - c) **Medium-sized fish, crayfish**
- 163 What role do microbes and benthic organisms play in the aquatic food chain?
- a) They act as primary producers
 - b) **They act as decomposers**
 - c) They act as primary consumers
- 165 Fish need oxygen to live; they take _____ from the water and give off _____ as waste product of respiration.
- a) carbon dioxide; dissolved oxygen (DO)
 - b) **dissolved oxygen (DO); carbon dioxide**
 - c) dissolved oxygen (DO); hydrogen sulfide
- 166 While pond water absorbs some oxygen from the air, the major source of DO in ponds is from _____ by aquatic plants.
- a) **Photosynthesis**
 - b) expiration
 - c) decomposition
- 168 When sunlight is not available for photosynthesis, phytoplankton and other aquatic plants use _____ for respiration.
- a) **oxygen**
 - b) chlorophyll
 - c) carbon dioxide

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- 169 Therefore, at night and when it is overcast and dark, both fish and plants _____ available DO in the water.
- a) produce the
 - b) **compete for**
 - c) consume little
- 170 If in winter a pond is frozen over for an extended period and the water temperature just below the ice is 32 degrees F, how do decomposing plants and animals affect the water chemistry?
- a) They keep the water chemistry in balance by ridding the pond of dead organisms
 - b) They provide chemicals and nutrients for algae and aquatic plants
 - c) **They gradually remove oxygen from the water and increase gasses such as carbon dioxide, methane, and hydrogen sulfide**
- 172 During the process described in b, which layer of water contains the most dissolved oxygen?
- a) **Surface**
 - b) Middle
 - c) Lower
- 174 During which season would the aquaculturist be most likely to aerate (add oxygen to) a pond?
- a) Fall
 - b) Spring
 - c) **Summer**
- 175 How does thermal stratification prevent the mixing of upper and lower pond waters?
- a) **The cooler water is denser and heavier, so sinks and cannot mix with the less dense, lighter water near the surface**
 - b) The warm water is denser and heavier, so sinks and cannot mix with the less dense, lighter water near the surface
 - c) Cool dense water traps lighter warmer water beneath it
- 177 During which two seasons does a pond have the best supply of DO at all depths?
- a) Summer and Winter
 - b) Spring and Summer
 - c) **Spring and Fall**
- 178 Phytoplankton produce hydrogen dioxide for fish and other organisms
- a) TRUE
 - b) **FALSE**
- 179 Phytoplankton serve as the main source of food for Zooplankton and some fish
- a) **TRUE**
 - b) FALSE

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- 180 Phytoplankton produce blooms that increase oxygen production in rooted plants
- a) TRUE
 - b) **FALSE**
- 182 Zooplankton feed on phytoplankton and help keep it in balance
- a) **TRUE**
 - b) FALSE
- 183 Benthos convert dead plant and animal matter into organic nutrients recycled by plants into forms suitable for animals
- a) **TRUE**
 - b) FALSE
- 185 Benthos help control accumulations of organic matter on pond bottoms by converting it to safe forms
- a) **TRUE**
 - b) FALSE
- 186 Plankton may make water so turbid that the sun cannot penetrate and DO cannot be produced
- a) **TRUE**
 - b) FALSE
- 188 Plankton may compete with fish at night for available carbon dioxide
- a) TRUE
 - b) **FALSE**
- 189 Plankton may die in numbers too great for conversion by decomposers, and thus release harmful compounds into the water and cause high pH and low DO
- a) **TRUE**
 - b) FALSE
- 190 Plankton may be parasitic or disease causing
- a) **TRUE**
 - b) FALSE
- 192 Benthic organisms compete with fish for food, DO, and space
- a) **TRUE**
 - b) FALSE
- 195 Benthic organisms may injure fish, leaving them susceptible to infections
- a) **TRUE**
 - b) FALSE

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- 196 Alkalinity is a measure of calcium carbonate and bicarbonate ions (both bases) in water to provide an idea of the resistance of that water to changes in pH
- a) **TRUE**
 - b) FALSE
- 197 Water with a low alkalinity acts as a buffer to changes in pH
- a) TRUE
 - b) **FALSE**
- 198 Water with high alkalinity has lower early morning pH levels because carbonate and bicarbonate ions increase the effect of carbon dioxide (an acid) production by phytoplankton during the night
- a) TRUE
 - b) **FALSE**
- 199 Hardness is a measure of the concentration of calcium and magnesium in water
- a) **TRUE**
 - b) FALSE
- 200 Because the same rocks that produce carbonate and bicarbonate also provide calcium and magnesium, and the values for alkalinity and hardness are often expressed as calcium carbonate equivalents
- a) **TRUE**
 - b) FALSE
- 203 Where do hydrogen sulfide build-ups occur in a pond?
- a) In warm upper layers
 - b) **In bottom sediments**
 - c) In algae and aquatic plants
- 204 How can the fish farmer tell if a pond has an accumulation of hydrogen sulfide?
- a) **The sediment will smell like rotten eggs**
 - b) The water will be turbid
 - c) The water will give a high nitrate reading
- 205 At what time of year are concentrations of hydrogen sulfide the highest?
- a) Spring
 - b) Fall
 - c) **Summer**
- 206 What substance can be applied to raise pH and reduce the toxicity of hydrogen sulfide?
- a) Potassium permanganate
 - b) **Lime**
 - c) Table salt

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207 What chemical can be applied to the pond during harvesting to oxidize the hydrogen sulfide in the water?

- a) Lim
- b) Table salt e
- c) **Potassium permanganate**

215 Industrial pollutants are high in _____ and may be discharged directly into water systems.

- a) **Chemicals**
- b) Buffers
- c) Nutrients

217 _____ pollution occurs when industries discharge heated water into lakes and streams.

- a) Chemical
- b) Therapeutic
- c) **Thermal**

222 During periods of high runoff, most of the wastes of cattle, hogs, sheep, and chickens raised on _____ go into nearby streams and ponds during high runoff.

- a) small farms
- b) **feedlots**
- c) concentrated feeds

224 Fish bodies are divided into a

- a) **head, trunk, and tail**
- b) head, fins, and gills
- c) gills, mouth, and scales head, trunk, and gills

225 The _____ control a fish's depth regulation

- a) dorsal fin
- b) gall bladder
- c) **Air bladder**
- d) gills

227 Cattle will supply a higher quality protein rich meat compared to fish.

- a) TRUE
- b) **FALSE**

229 A biological filter helps to strip ammonia.

- a) **TRUE**
- b) FALSE

230 The country which grows the most aquaculture products is

- a) Bolivia

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- b) Japan
 - c) United States
 - d) **China**
- 233 Which of the following crustaceans are cultured in ponds in the southern United States?
- a) lobsters
 - b) **crawfish**
 - c) crabs
 - d) shrimp
- 234 Which of the following is not a common method for spawning channel catfish in ponds?
- a) **McDonald jar**
 - b) fry transfer
 - c) egg transfer
 - d) pen spawning
- 235 The scale for measuring the degree of acidity and alkalinity is
- a) DO
 - b) **pH**
 - c) unionized NH₃
 - d) the Fitzsimmons scale
- 236 The oldest known textbook of aquaculture is
- a) Aquaculture Diary by J. Morgan
 - b) Tilapia Aquaculture by K. Fitzsimmons
 - c) **Carp Culture by Fan Li**
 - d) Trout Culture by B. Franklin
- 238 Raceway culture of trout is an example of _____ fish culture.
- a) intensive
 - b) **extensive**
- 239 The most common unit of measure of trace elements, gases, ions, and pesticides is _____.
- a) milliliter
 - b) gram
 - c) ounce
 - d) **parts per million**
- 240 Pond _____ encourages the production of phytoplankton.
- a) shading
 - b) **fertilization**
 - c) turbidity
 - d) turnover

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- 241 Dissolved oxygen usually reaches a maximum _____.in the late afternoon
- a) all times of the day
 - b) around midnight
 - c) **in the early morning**
- 242 The first link in the food chain is _____.
- a) fry transfer
 - b) **phytoplankton**
 - c) herbivores
 - d) protein
- 243 _____ is the art, science, and business of producing aquatic plants and animals useful to humans.
- a) Agribusiness
 - b) **Aquaculture**
 - c) Agriculture
 - d) Aquascience
- 244 When fish are suspected of getting sick, you should first check the _____.
- a) **water quality**
 - b) feeding rate
 - c) species
 - d) water quantity
- 246 A _____ produces crops or fish from seeds or young fish.
- a) market facility
 - b) hacking facility hatchery
 - c) **grow-out facility**
- 247 _____ is water containing less than .05% total dissolved salts by weight.
- a) Sea water
 - b) Brackish water
 - c) Salt water
 - d) **Freshwater**
- 248 _____ is the amount of elemental oxygen in solution under existing atmospheric pressure and temperature.
- a) Alkalinity
 - b) **Dissolve oxygen**
 - c) pH
 - d) Temperature
- 249 The process that uses light and chlorophyll to convert carbon dioxide and water to sugar, oxygen, and water is called _____.

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- a) dialysis
 - b) hydrologic cycle
 - c) **photosynthesis**
 - d) osmosis
- 250 The lower or abdominal surface of an animal is called the _____ area.
- a) disease
 - b) dorsal
 - c) **ventral**
 - d) zooplankton
- 251 Which word listed below is not a factor to consider when selecting a market for aquaculture products?
- a) **Residue**
 - b) Profitability
 - c) Species
 - d) Quality
- 253 The _____ is the respiratory organ of the fish.
- a) gastrointestinal tract
 - b) **gill**
 - c) lung
 - d) mouth
- 254 Which of the following is not one of the four protective barriers protecting fish against an infection?
- a) mucous
 - b) antibodies
 - c) **dorsal fin**
 - d) scales and skin
- 255 As water temperature increases dissolved oxygen
- a) **decreases**
 - b) increases
 - c) neutralizes
 - d) does not change
- 257 All of the following are examples of variable costs except:
- a) labor
 - b) feed
 - c) electricity
 - d) **taxes**
- 258 In catfish, broken back disease caused by a vitamin C deficiency is a classic example of

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- a) viral disease
 - b) **noninfectious disease**
 - c) parasitic disease
 - d) fungal disease
- 260 Unionized ammonia at a concentration of _____ is lethal to fish.
- a) **0.5 mg/L**
 - b) 0.5 ppm
 - c) 0.5 mg/L and 0.001 mg/L
 - d) 0.001 ppm
- 261 When dissolved nitrogen is abnormally high in water the condition it causes in fish is called
- a) gas bubble disease
 - b) high gas
 - c) **brown blood disease**
 - d) bubbles
- 262 Grass carp, silver carp, and bighead carp are native to:
- a) Japan
 - b) **China**
 - c) Africa
 - d) United States
- 264 Which hormone is involved in the natural spawning process?
- a) estrogen
 - b) gonadatropic hormone
 - c) testosterone
 - d) **all of the listed answers**
- 265 The amount of time it takes to raise market-size hybrid striped bass is
- a) 6 months
 - b) one year
 - c) **two years**
 - d) three years
- 266 As catfish grow, the daily feed consumption to the percentage of body weight _____.
- a) increases
 - b) **decreases**
 - c) stays the same
 - d) varies
- 268 Which one of the following is not a method for treatment of wastewater?
- a) Filtering systems
 - b) Hydroponics

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- c) **effluent to stream**
 - d) Percolation ponds
- 269 What is the first step in building a levee-type pond?
- a) pushing up the levees
 - b) selecting fish
 - c) drilling a well
 - d) **site selection**
- 270 Deep cylindrical tanks similar in operation to raceways are called
- a) troughs
 - b) **silos**
 - c) agitators
 - d) aerators
- 271 If crops were grown on or adjacent to a potential site, what should be checked before proceeding?
- a) **pesticide residues**
 - b) crop residues
 - c) depth of cultivation
 - d) organic matter
- 275 The secret of business success is
- a) control
 - b) **planning**
 - c) motivation
 - d) record keeping
- 276 Brown blood disease is caused by the binding of _____ with the hemoglobin molecule.
- a) nitrate
 - b) ammonia
 - c) oxygen
 - d) **nitrite**
- 277 Which of the following is not a key element of marketing?
- a) Present situation
 - b) **Harvesting**
 - c) Goals
 - d) Plan
- 278 Oyster production has declined in the United States because of the loss of habitat and pollution.
- a) **TRUE**
 - b) FALSE

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- 279 Liming of ponds decreases the pH of the mud thereby increasing the availability of nutrients.
- a) TRUE
 - b) **FALSE**
- 280 Cannibalism is reduced in ponds where hybrid striped bass are raised when they are frequently graded.
- a) **TRUE**
 - b) FALSE
- 281 Clams and oysters are mouth feeders.
- a) **TRUE**
 - b) FALSE
- 282 When raising tilapia, you should raise male and female together for best food production.
- a) TRUE
 - b) **FALSE**
- 284 Smaller fish need more feed relative to their body weight than do larger fish.
- a) **TRUE**
 - b) FALSE
- 285 Tilapia can be raised successfully in open ponds in the northern part of the United States.
- a) TRUE
 - b) **FALSE**
- 286 Not only do predatory birds eat the fish but they can transmit disease to aquaculture facilities.
- a) **TRUE**
 - b) FALSE
- 287 Larger fish have higher metabolic rates.
- a) TRUE
 - b) **FALSE**
- 288 The most commonly cultured catfish in the U.S. is the flathead catfish.
- a) TRUE
 - b) **FALSE**
- 289 The most commonly cultured trout in the U.S. is the Brown trout.
- a) TRUE
 - b) **FALSE**

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290 When catfish are allowed to spawn and hatch naturally, the male will constantly fan the eggs with his fins to help keep the eggs cool.

- a) **TRUE**
- b) **FALSE**

292 Clams are usually sold without the shell, which helps in packaging.

- a) **TRUE**
- b) **FALSE**

293 Europeans stock tilapia in carp ponds to control excess reproduction.

- a) **TRUE**
- b) **FALSE**

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- 294 Zooplankton and phytoplankton, found in ponds, are used by young fish for food.
- a) **TRUE**
 - b) FALSE
- 296 Which one is not a cause of dissolved oxygen depletion in ponds?
- a) **Sunny day**
 - b) Overstocking
 - c) Overfeeding
 - d) Cloudy or rainy day
- 298 After hatching, many fry have a large yolk sac. What is the function of the yolk sac?
- a) Add coloration to the fins
 - b) Provide weight to keep them on the bottom.
 - c) **Provide nourishment.**
 - d) Hold the intestines.
- 299 Optimum temperatures for efficient growth of trout are:
- a) 35-45 degrees F
 - b) **55-65 degrees F**
 - c) 70-80 degrees F
 - d) all temperatures
- 303 The U.S. Fish and Wildlife Service uses more than 70 national fish _____ to produce more than 160 million fish each year.
- a) oceans
 - b) lakes
 - c) **hatcheries**
 - d) rivers or streams
- 304 The U.S. Fish and Wildlife Service also works to conserve wildlife _____.
- a) **habitat**
 - b) breeding
 - c) conservation
 - d) none of the answers listed
- 307 In 1956 the _____ Act created the U.S. Fish and Wildlife Service.
- a) Sport Fisheries Restoration
 - b) Wildlife Restoration
 - c) **Fish and Wildlife**
 - d) none of the answers listed
- 308 The mission of the U.S. Fish and Wildlife Service is to conserve, _____, and enhance fish, wildlife, and their habitats.

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- a) keep
 - b) breed
 - c) assure
 - d) **protect**
- 309 _____ is vital to all life forms on Earth.
- a) Food
 - b) **Water**
 - c) Clean air
 - d) none of the answers listed
- 310 Ninety-seven percent of the water found on Earth is found in the _____.
- a) lakes
 - b) **oceans**
 - c) rivers
 - d) streams
- 311 Fresh water makes up about _____ percent of the water on Earth, and of this amount more than _____ is frozen in the polar icecaps.
- a) 2; one-eighth
 - b) 3; two-thirds
 - c) **3; one-third**
 - d) 3; one-half
- 312 Which of the following is a major user of freshwater?
- a) domestic users
 - b) industry
 - c) agriculture
 - d) **all of the answers listed**
- 315 Water is also vital to hundreds of species of _____ and wildlife.
- a) toads
 - b) amphibians
 - c) **fish**
 - d) snakes
- 316 It has been estimated that the average wetland supports more than _____ species of small game mammals.
- a) **20**
 - b) 30
 - c) 40
 - d) 50
- 317 Which of the following is a way in which we alter wetland habitat?

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- a) pollute fresh water with sewage, industrial waste, pesticides, and petroleum products
 - b) dam rivers and streams drain marshes and swamps
 - c) **all of the answers listed**
- 318 Which of the following is a common pollutant of freshwater habitats?
- a) herbicides, pesticides, fertilizers, and other chemicals used on millions of lawns
 - b) dumping of chemicals, polluted waste water, and raw sewage into many of the nation's waterways
 - c) pesticides and herbicides that farmers use to produce our abundant and cheap food supply wash into streams, rivers, lakes and reservoirs
 - d) **all of the answers listed**
- 319 Pollution of our water had become so bad by the early 1970s that the historically important _____ River was a cesspool.
- a) Stony
 - b) Shenandoah
 - c) **Potomac**
 - d) Savage
- 321 In 1985 a new bill, known as the _____, was passed to protect fresh water.
- a) Clean Water Legislation
 - b) **Clean Water Act**
 - c) Polluted Water Act
 - d) Polluted Water Legislation
- 322 Which of the following is now being done to help reduce pollution in fresh water?
- a) Cities no longer dump untreated, raw sewage into streams and rivers
 - b) Untreated chemicals are no longer dumped straight into the nearest river
 - c) Wastewater left over from the production of paper and steel is now treated before returning to its source
 - d) **all of the answers listed**
- 323 The pesticide _____ could still be found in some fish in the 1980s, even though it has been banned in _____.
- a) DDT; 1962
 - b) **DDT; 1972**
 - c) DDT; 1982
 - d) DDT; 1992
- 324 It is estimated that the CRP reduced pesticide use by _____ million pounds per year.
- a) 30
 - b) 40
 - c) 50
 - d) **60**

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- 326 Which of the following is a way we destroy or damage freshwater habitats?
- a) bulldoze vegetation along a waterway to make way for a road or subdivision
 - b) dam a stream or river
 - c) degrade and destroy stream and river habitats by developing their banks
 - d) **all of the answers listed**
- 329 Including the saltwater fishes, there are more than _____ species of fish in the world.
- a) **20,000**
 - b) 30,000
 - c) 40,000
 - d) 50,000
- 331 The _____ are the largest group of freshwater fishes found in North America.
- a) **minnows**
 - b) golden shiners
 - c) goldfish
 - d) fathead minnow
- 332 _____ were originally native to Asia but have been widely introduced in the United States.
- a) **Goldfish**
 - b) Minnows
 - c) Golden shiners
 - d) Fathead minnows
- 333 The _____ minnow is a favorite bait of anglers and is widely used for fish propagation.
- a) golden shiner
 - b) **fathead**
 - c) carp
 - d) gizzard shad
- 334 Originally introduced from Europe, _____ can now be found from Nova Scotia to southern Manitoba and southward throughout much of the United States.
- a) **carp**
 - b) goldfish
 - c) longnose gars
 - d) gizzard shads
- 337 The _____ is our largest gar, with a rod-and-reel record of 279 pounds.
- a) carp
 - b) longnose gar
 - c) gizzard shad
 - d) **alligator gar**
- 338 Economically, the _____ are very important fishes.

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- a) trout
 - b) pike
 - c) **salmon**
 - d) catfish
- 339 Our largest freshwater trout, the _____, has a rod-and-reel record of over 60 pounds.
- a) brown trout
 - b) rainbow trout
 - c) **lake trout**
 - d) cutthroat trout
- 340 The rainbow trout prefers swift, _____ water, with adequate vegetative cover.
- a) cloudy
 - b) **clear**
 - c) muddy
 - d) none of the answers listed
- 341 The _____ trout prefers slower waters than the rainbow, but otherwise its habitat preference is very similar.
- a) lake
 - b) brook
 - c) cutthroat
 - d) **brown**
- 342 Catfish are largely bottom feeders and appear to be _____ in their feeding habits.
- a) carnivorous
 - b) herbivorous
 - c) **omnivorous**
 - d) none of the answers listed
- 343 _____ catfish prefer larger bodies of water, such as reservoirs and large rivers.
- a) **Channel**
 - b) Blue
 - c) Flathead
 - d) none of the answers listed
- 344 Smallmouth bass prefer rocky, _____ and rivers and may reach 10 pounds or more.
- a) cloudy lakes
 - b) **clear lakes**
 - c) muddy lakes
 - d) none of the answers listed
- 346 The _____ is a widespread sunfish, ranging over most of the eastern half of the United States.

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- a) black crappie
 - b) redear sunfish
 - c) longear sunfish
 - d) **bluegill sunfish**
- 347 _____ prefer still, quiet, clear waters, with sand or mud bottoms and abundant submerged vegetation.
- a) Walleye
 - b) White crappie
 - c) **Black crappie**
 - d) White bass
- 348 The _____ is our only large perch, reaching 3 feet and 20 pounds.
- a) **walleye**
 - b) white bass
 - c) black crappie
 - d) redear sunfish
- 350 _____ is a form of agriculture.
- a) Steel production
 - b) Paper production
 - c) **Aquaculture**
 - d) none of the answers listed
- 352 Aquaculture helps _____ by providing fish to restock streams, rivers, oceans, and lakes.
- a) hatcheries
 - b) **fisheries**
 - c) lakes
 - d) rivers or streams
- 353 Aquaculture is a _____ part of U.S. food production.
- a) **major**
 - b) minor
 - c) small
 - d) medium
- 354 Aquaculture developed rapidly in the United States from the _____ to the _____.
- a) 1950; 1960
 - b) 1960; 1970
 - c) 1968; 1978
 - d) **1983; 1993**
- 356 The state of _____ leads in trout production; the state of _____ leads in catfish production.

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- a) Iowa; Louisiana
 - b) Iowa; Arkansas
 - c) Idaho; Arkansas
 - d) **Idaho; Mississippi**
- 357 _____ and _____ are examples of coldwater fish.
- a) Catfish; crawfish
 - b) **Trout; salmon**
 - c) Baitfish; catfish
 - d) Crayfish; baitfish
- 358 Which of the following is a stage of evolution for all agricultural activities?
- a) a craft
 - b) a hunting-gathering activity
 - c) an object of husbandry
 - d) **all of the answers listed**
- 359 Which of the following are significant aquatic species cultured in the United States?
- a) crawfish
 - b) catfish
 - c) salmon
 - d) **all of the answers listed**
- 360 Which of the following is an activity that is a part of aquaculture and often become a separate industry.
- a) harvesting
 - b) hatchery
 - c) grow-out
 - d) **all of the answers listed**
- 362 _____ is an important chemical obtained from aquatic plants.
- a) **Carrageen**
 - b) Phycocolloid
 - c) Phytoplankton
 - d) none of the answers listed
- 363 Less feed is required to produce one pound of _____ than to produce one pound of beef.
- a) perch
 - b) tilapia
 - c) walleye
 - d) **catfish**
- 364 Aquatic animals _____ require large amounts of energy to regulate their body temperature.
- a) **do not**

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- b) do
 - c) usually
 - d) none of the answers listed
- 367 As a group, colorful, small fish used in aquariums are called _____.
- a) aquarium fish
 - b) **ornamental fish**
 - c) tropical fish
 - d) none of the answers listed
- 368 After spawning, small eels called _____ migrate upstream from the sea.
- a) small eels
 - b) little eels
 - c) **elvers**
 - d) little elves
- 369 Successful culture of any aquatic animal requires a stable supply of _____.
- a) animals
 - b) **seed**
 - c) plants
 - d) none of the answers listed
- 370 Which of the following make up a market?
- a) prepared, easy-to-use forms of the product
 - b) desire by consumers
 - c) price consumers can afford
 - d) **all of the answers listed**
- 371 Which of the following is a salmonid?
- a) salmon
 - b) trout
 - c) **all of the answers listed**
 - d) none of the answers listed
- 373 Which of the following is a body system found in animals, including aquatic animals?
- a) digestive
 - b) skeletal
 - c) muscular
 - d) **all of the answers listed**
- 374 The United States ranks _____ in the production of aquaculture products.
- a) 1st
 - b) 6th
 - c) 10th

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d) **14th**

375 The consumption of fish and seafood compared to beef, poultry, and pork is _____.

- a) **low**
- b) high
- c) the same
- d) none of the answers listed

376 _____ is the not primary concern of an aquatic enterprise.

- a) **Production**
- b) Where an aquacrop will be sold
- c) How an aquacrop will be sold
- d) none of the answers listed

377 _____ and processors are both basic buyers of aquatic products.

- a) Distributors
- b) **Consumers**
- c) Suppliers
- d) none of the answers listed

378 Off-flavor in catfish is caused by _____ .

- a) blue-green algae
- b) **minute amounts of chemicals produced from an algae imbalance**
- c) large amounts of chemicals produced from an algae imbalance
- d) none of the answers listed

379 Generating consumer demand is a part of _____ _____.

- a) **product pull**
- b) product push
- c) product haul
- d) product tow

380 Convincing wholesalers and retailers to carry a product is _____ _____.

- a) product pull
- b) **product push**
- c) product haul
- d) product tow

381 Which of the following is an activity that is a part of marketing?

- a) transporting
- b) assembling
- c) grading
- d) **all of the answers listed**

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- 382 Enticing the buyer to purchase a product is called _____.
- a) **promotion**
 - b) progress
 - c) support
 - d) publicity
- 383 Which of the following is a country that is in the top four in producing aquaculture?
- a) China
 - b) Italy
 - c) France
 - d) **all of the answers listed**
- 384 Which of the following is a general quality control procedure?
- a) Sensory
 - b) Chemical
 - c) Microbiological
 - d) **all of the answers listed**
- 385 Which of the following is a quality control function?
- a) Special Problems
 - b) Records and Reporting
 - c) Sampling Schedules
 - d) **all of the answers listed**
- 386 Name the agency with which fish processors have contracted voluntarily for plant inspection.
- a) Food and Drug Administration (FDA)
 - b) United States Department of Agriculture (USDA)
 - c) **National Marine Fisheries Service (NMFS)**
 - d) U.S. Department of Commerce
- 387 Which species of fish have a problem with off-flavor?
- a) trout
 - b) **catfish**
 - c) salmon
 - d) crawfish
- 388 Which of the following is an aquaculture product that results from further processing?
- a) vacuum marination
 - b) enrobing
 - c) use of phosphates
 - d) **all of the answers listed**
- 389 For what do the initials HACCP stand?

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- a) Hazard Awareness Critical Condition Preparedness
 - b) Have A Catfish Consume Particles
 - c) **Hazard Analysis and Critical Control Point**
 - d) How A Catfish Controls Poisons
- 390 Sexual reproduction involves the production of eggs from the _____ and sperm from the testes.
- a) **ovaries**
 - b) thyroid
 - c) gonad
 - d) urophysis
- 391 With a _____, predatory birds can be killed around fish ponds.
- a) bow and arrow
 - b) gun
 - c) **permit**
 - d) scarecrow
- 392 _____ stealing fish from ponds can become a problem.
- a) Large birds
 - b) Predators
 - c) **Humans**
 - d) none of the answers listed
- 393 Management is the secret ingredient to successful _____.
- a) spawning
 - b) habitats
 - c) **aquaculture**
 - d) environments
- 394 Channel catfish spawn when the water temperature is between _____.
- a) 65-75 degrees F
 - b) **75-85 degrees F**
 - c) 55-65 degrees F
 - d) 85-95 degrees F
- 395 Oxygen levels of _____ ppm are lethal for fish.
- a) **1**
 - b) 2
 - c) 3
 - d) 4
- 396 _____ hatch in freshwater, swim to saltwater, mature, and return to fresh water.
- a) **Salmon**

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- b) Rainbow trout
 - c) Catfish
 - d) Tilapia
- 397 Water temperatures above _____ degrees F are lethal for trout.
- a) 55
 - b) 65
 - c) **75**
 - d) 85
- 398 What is the scientific name for the majority of cultured catfish?
- a) Salvelinus
 - b) Oncorhynchus
 - c) **Ictaluridae**
 - d) Salmo
- 399 When do catfish spawn?
- a) when water temperature is between 55-65 degrees F
 - b) when water temperature is between 65-75 degrees F
 - c) **when water temperature is between 75-85 degrees F**
 - d) when water temperature is between 85-95 degrees F
- 400 Besides fertilizing the eggs, what role does the male catfish play?
- a) defend nest
 - b) selects nest
 - c) prepares nest
 - d) **all of the answers listed**
- 401 What is the optimum temperature for growing catfish?
- a) 65 degrees F
 - b) 75 degrees F
 - c) **85 degrees F**
 - d) 95 degrees F
- 402 At what weight are catfish harvested?
- a) 1 pound
 - b) **1.25 pounds**
 - c) 1.5 pounds
 - d) 2.25 pounds
- 403 Which of the following is a type of incubator used for trout?
- a) Upwelling incubators
 - b) California trays
 - c) Vertical tray or Heath incubators

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d) **all of the answers listed**

404 In a trout hatchery, how many fry can be stocked in a trough 10 ft. long and 18 in. wide with 3 to 4 in. of water?

- a) **30,000**
- b) 40,000
- c) 50,000
- d) 60,000

405 Which of the following should be considered when selecting a species of tilapia?

- a) cold tolerance
- b) growth rate
- c) **all of the answers listed**
- d) none of the answers listed

406 Tilapia are native to what parts of the world?

- a) Africa and Europe
- b) China and Africa
- c) **Africa and Middle East**
- d) Japan and Middle East

407 What is the major problem associated with the pond culture of tilapia?

- a) **High level of uncontrolled reproduction**
- b) Low level of uncontrolled reproduction
- c) No level of uncontrolled reproduction
- d) none of the answers listed

408 At what size can tilapia reach sexual maturity?

- a) between 10-50 gm
- b) between 20-70 gm
- c) between 30-90 gm
- d) **between 50 and 100 gm**

409 Trout grow best in water temperatures of _____.

- a) **50-68 degrees F**
- b) 50-68 degrees C
- c) 35-45 degrees F
- d) 30-40 degrees C

410 Which of the following is a type of incubator system used in fish culture?

a) **3**

411 Trout fry are fed when 50 percent _____.

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- b) **swim up**
- c) swim down
- d) are hatched
- e) none of the answers listed

412 In nature, most finfish are seasonal breeders. Reproductive cycles are controlled by _____ produced by endocrine glands.

- a) cells
- b) **hormones**
- c) the pituitary gland
- d) the environment

413 This gland controls the pituitary gland.

- a) Thyroid gland
- b) **Hypothalamus**
- c) Interrenal
- d) Testis

414 _____ gland controls growth, ion balance, interrenal gland, color change, thyroid gland and reproduction and gonads in fish.

- a) Pancreas
- b) Hypothalamus
- c) Testis
- d) **Pituitary**

415 The gland that controls growth, reproduction, metabolism and nutrient assimilation is the _____.

- a) pituitary gland
- b) **thyroid gland**
- c) hypothalamus gland
- d) pineal gland

416 This gland counteracts stress and ion balance in fish.

- a) hypothalamus
- b) thyroid gland
- c) pituitary gland
- d) **interrenal (adrenal gland)**

417 The functions of this gland include metabolic effects, controls secondary sex characteristics and sperm production.

- a) Ovary
- b) **Testis**
- c) Pancreas
- d) Pineal gland

- 418 The functions of this gland include metabolic effects and yolk and egg production.
- a) **Ovary**
 - b) Testis
 - c) Pancreas
 - d) pineal gland
- 419 This gland provides information about day/night and seasonal time.
- a) Pancreas
 - b) Ovary
 - c) Testis
 - d) **Pineal gland**
- 420 The _____ gland controls calcium levels.
- a) pineal
 - b) **ultimobranchial**
 - c) Interrenal
 - d) thyroid
- 421 The _____ controls calcium balance.
- a) pineal gland
 - b) ultimobranchial gland
 - c) **stannius corpuscles**
 - d) hypothalamus
- 422 Controlled light periods, also known as _____, have been used with several species of fish to manipulate spawning time.
- a) photohormones
 - b) photogenes
 - c) **photoperiods**
 - d) photoHCG
- 423 _____ are the basic unit of inheritance.

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- a) **Genes**
- b) Photoperiods
- c) Chromosomes
- d) none of the answers listed

424 Channel catfish, *Ictalurus punctatus*, is the most important species of aquatic animal commercially cultured in the _____.

- a) Mexico
- b) Canada
- c) Europe
- d) **United States**

425 At least _____ species of catfish exist in North America, but only 7 have been cultured or represent potential for commercial production.

- a) 9
- b) 19
- c) 29
- d) **39**

426 Channel catfish are cavity spawners and will spawn only in _____.

- a) secluded, very dark areas
- b) **secluded, semi-dark areas**
- c) open, light
- d) open, semi-dark

427 In production points, the growth rate of channel catfish is determined by _____.

- a) quantity and quality of food fed
- b) water temperature
- c) length of time held at different water temperatures
- d) **all of the answers listed**

428 Intensive catfish culture can set a producer up for problems with many _____.

- a) bacteria
- b) **diseases**
- c) fungi
- d) sac fry

429 In Mississippi, channel catfish processing plants will not send a harvesting crew more than _____ miles from the plant.

- a) 10
- b) 25
- c) 35
- d) **50**

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- 430 Trout grow naturally in the streams and lakes of the northern half of _____.
- a) China
 - b) Canada
 - c) Mexico
 - d) **the United States**
- 431 _____ is the process of removing impurities or making clear.
- a) Conditioning
 - b) **Clarification**
 - c) Grading
 - d) Metabolism
- 432 *Salmo salar* is the scientific name for _____.
- a) Steelhead
 - b) Sea trout
 - c) **Atlantic Salmon**
 - d) Pink salmon
- 433 *Salmo trutta* is the scientific name for _____.
- a) Chinook Salmon
 - b) Atlantic Salmon
 - c) Steelhead
 - d) **Sea trout**
- 434 The scientific name for Steelhead is _____.
- a) **Oncorhynchus mykiss**
 - b) *Oncorhynchus gorboscha*
 - c) *Oncorhynchus keta*
 - d) *Oncorhynchus nerka*
- 435 The scientific name for Pink salmon is _____.
- a) *Oncorhynchus nerka*
 - b) *Oncorhynchus mykiss*
 - c) *Oncorhynchus keta*
 - d) **Oncorhynchus gorboscha**
- 436 The scientific name for Chum salmon is _____.
- a) *Oncorhynchus mykiss*
 - b) *Oncorhynchus gorboscha*
 - c) **Oncorhynchus keta**
 - d) *Oncorhynchus nerka*
- 437 *Oncorhynchus nerka* is the scientific name for _____.

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- a) Chum salmon
 - b) **Sockeye salmon**
 - c) Pink salmon
 - d) Coho salmon
- 438 Oncorhynchus kisutch is the scientific name for _____.
- a) **Coho salmon**
 - b) Chum salmon
 - c) Pink salmon
 - d) Sockeye salmon
- 439 Oncorhynchus tshawytscha is the scientific name for _____.
- a) Pink salmon
 - b) Coho salmon
 - c) **Chinook salmon**
 - d) Chum salmon
- 440 Masu, cherry, yamama and sima salmon's scientific name is _____.
- a) Oncorhynchus kisutch
 - b) Oncorhynchus tshawytscha
 - c) **Oncorhynchus masou**
 - d) Oncorhynchus nerka
- 441 Pacific salmon are cultured by which of the following methods?
- a) farming
 - b) ranching
 - c) **all of the answers listed**
 - d) none of the answers listed
- 442 As a carnivorous fish, salmon require a _____ diet.
- a) low-grain
 - b) low-protein
 - c) high-grain
 - d) **high-protein**
- 443 Salmon products are highly valued and are in heavy demand throughout _____.
- a) Europe
 - b) the United States
 - c) Canada
 - d) **the world**
- 444 In general, tilapia are extremely hardy animals and can tolerate relatively _____ water quality conditions.
- a) **poor**

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- b) good
 - c) adequate
 - d) fertile
- 445 Tilapia can withstand high water temperatures up to _____.
- a) **95 degrees F**
 - b) 100 degrees F
 - c) 105 degrees F
 - d) 110 degrees F
- 446 _____ is the most popular method of growing tilapia.
- a) Fisheries
 - b) Hatcheries
 - c) **Pond culture**
 - d) none of the answers listed
- 447 _____ are best harvested by seining and draining the pond.
- a) Channel catfish
 - b) **Tilapia**
 - c) Trout
 - d) Salmon
- 448 Hybrid striped bass generally refers to a cross between striped bass and _____ bass.
- a) **white**
 - b) black
 - c) spotted
 - d) guadalupe
- 449 Spawning runs for striped bass species occur from late _____ to late May depending on location.
- a) February
 - b) **March**
 - c) April
 - d) January
- 450 The hybrid striped bass fry are generally stocked at a rate of _____ per acre at two to ten days of age.
- a) 10,000 to 50,000
 - b) 50,000 to 100,000
 - c) **100,000 to 200,000**
 - d) 200,000 to 300,000
- 451 The _____ cultured grass carp, silver carp, and bighead carp for food for several thousand years.

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- a) **Chinese**
 - b) Americans
 - c) Europeans
 - d) Japanese
- 452 The grass carp was introduced into the United States in _____.
- a) 1953
 - b) **1963**
 - c) 1973
 - d) 1983
- 453 Grass carp, silver carp, and bighead carp for potential broodstock should be selected at one to two years of age and stocked in broodfish _____.
- a) lakes
 - b) reservoirs
 - c) **ponds**
 - d) streams
- 454 _____ are susceptible to the usual array of diseases and parasites, and they respond to the usual treatments and prevention.
- a) Channel catfish
 - b) Hybrid striped bass
 - c) **Carp**
 - d) Trout
- 455 _____ U.S. market is the sale of grass carp to control vegetation.
- a) **One**
 - b) Two
 - c) Three
 - d) Four
- 456 _____ traditionally leads as the baitfish producer.
- a) **Arkansas**
 - b) Alabama
 - c) Louisiana
 - d) Mississippi
- 457 Of about 100 species of fish used as bait in the United States, only _____ are raised in significant quantities.
- a) **four**
 - b) five
 - c) six
 - d) seven

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- 458 Which of the following fish are raised in significant quantities in the United States?
- a) the white sucker
 - b) the golden shiner
 - c) the fathead minnow
 - d) **all of the answers listed**
- 459 Under certain water quality and algae conditions, golden shiners produce only _____ pounds per acre per year.
- a) 50
 - b) 100
 - c) 200
 - d) **300**
- 460 A microsporidean, *Pleistophora ovariae*, can progressively damage the ovaries of female _____.
- a) white suckers
 - b) fathead minnows
 - c) **golden shiners**
 - d) goldfish
- 461 Red drum feed throughout the water column, but mainly at the _____.
- a) top
 - b) middle
 - c) **bottom**
 - d) none of the answers listed
- 462 Ornamental fish are susceptible to disease. _____ and low dissolved oxygen levels are common stressors.
- a) **Temperature**
 - b) Lack of space
 - c) Bacteria
 - d) Fungi
- 463 Most of the domestically bred ornamental fish are cultured at the more than 300 farms located near _____.
- a) Jacksonville, Florida
 - b) **Tampa, Florida**
 - c) Atlanta, Georgia
 - d) Miami, Florida
- 464 Ornamental fish are normally shipped by _____ to their market, like pet shops and aquaria.
- a) **air express**
 - b) ground

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- c) the post office
 - d) none of the answers listed
- 465 The most commonly reared pike, the northern pike, may weight more than _____ pounds.
- a) 14
 - b) 24
 - c) 34
 - d) **44**
- 466 The U.S. sturgeon fishery began with production of American caviar in _____.
- a) 1655
 - b) 1755
 - c) **1855**
 - d) 1955
- 467 _____ have little value in commercial fisheries, but they are popular sport fish.
- a) Sturgeons
 - b) **Sunfishes**
 - c) Walleyes
 - d) Whitefish
- 468 Walleye have been artificially propogated since the late 1800s, but spawning and rearing remained inefficient until the _____.
- a) **1960s**
 - b) 1950s
 - c) 1970s
 - d) 1980s
- 469 Decreasing supplies from natural stocks caused by contamination of the Great Lakes created shortages of _____.
- a) walleye
 - b) yellow perch
 - c) **whitefish**
 - d) sunfish
- 470 Which of the following is included in proper management of aquatic production?
- a) predators
 - b) control of water
 - c) control of disease
 - d) **all of the answers listed**
- 471 Which of the following is a harassment technique used to frighten birds away from ponds?
- a) flashing lights
 - b) gunfire

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- c) fireworks
 - d) **all of the answers listed**
- 472 An important management procedure in crawfish culture is the manipulation of water level and _____.
- a) quantity
 - b) **quality**
 - c) vegetation
 - d) none of the answers listed
- 473 Which of the following is a plant that is considered desirable in a crawfish pond?
- a) smartweed
 - b) alligatorweed
 - c) water primrose
 - d) **all of the answers listed**
- 474 Few _____ cause problems in crawfish.
- a) **diseases**
 - b) plants
 - c) habitats
 - d) none of the answers listed
- 475 Worldwide, more than _____ species of prawns and shrimp exist.
- a) 50
 - b) 100
 - c) 200
 - d) **300**
- 476 In the United States, commercial aquaculture of the freshwater prawn began in _____ and developed most rapidly there.
- a) Alaska
 - b) **Hawaii**
 - c) California
 - d) Mississippi
- 477 Freshwater prawns require warm temperatures of about _____.
- a) 72 degrees F
 - b) **82 degrees F**
 - c) 92 degrees F
 - d) 102 degrees F
- 478 Which of the following is a phase for prawn culture technology?
- a) grow-out
 - b) hatchery

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- c) nursery
 - d) **all of the answers listed**
- 479 In which order does shrimp aquaculture occur?
- a) **(1) maturation and reproduction for production of seedstock (larvae); (2) the hatchery for production of postlarvae; (3) grow-out to the adult stage in raceways or ponds**
 - b) (1) the hatchery for production of postlarvae; (2) maturation and reproduction for production of seedstock (larvae); (3) grow-out to the adult stage in raceways or ponds
 - c) (1) grow-out to the adult stage in raceways or ponds; (2) the hatchery for production of postlarvae; (3) maturation and reproduction for production of seedstock (larvae)
 - d) (1) the hatchery for production of postlarvae; (2) maturation and reproduction for production of seedstock (larvae); (3) grow-out to the adult stage in raceways or ponds
- 480 As soon as the shrimp come out of water, they should be placed _____.
- a) in a bucket of water
 - b) **on ice**
 - c) in a vat
 - d) in the refrigerator
- 481 In pond systems, shrimp stocking rates range from 2,300 to _____ per acre.
- a) **220,000**
 - b) 250,000
 - c) 280,000
 - d) 310,000
- 482 Most U.S. producers stock shrimp grow-out ponds at _____ per acre and manage the ponds using intensive management techniques (increased water exchange, aeration, etc.)
- a) 50,000 to 100,000
 - b) 100,000 to 150,000
 - c) **150,000 to 200,000**
 - d) 200,000 to 250,000
- 483 In a low stocking density situation (300 lbs. per acre) there often is enough _____ for shrimp to survive.
- a) **natural food**
 - b) water
 - c) oxygen
 - d) none of the answers listed
- 484 For shrimp, the best treatment for disease seems to be _____.
- a) good nutrition
 - b) water quality
 - c) **in prevention**
 - d) low stress

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- 485 While crab meat is _____ priced, ocean fisheries provide most of the crab for the markets.
- a) **high**
 - b) low
 - c) well
 - d) extremely
- 486 One reason the market-sized adult lobster is not profitable is the _____ required to grow a lobster to market size.
- a) 2-3 years
 - b) 3-4 years
 - c) 4-5 years
 - d) **5-6 years**
- 487 Which of the following is a reason for the decline in domestic production of oysters?
- a) loss of habitat
 - b) overfishing
 - c) natural disasters
 - d) **all of the answers listed**
- 488 Which of the following is a species of oysters?
- a) the European oyster
 - b) the American oyster
 - c) the Pacific oyster
 - d) **all of the answers listed**
- 489 The two species that make up the majority of oysters are _____.
- a) the American and the Olympia oysters
 - b) the European and the Olympia oysters
 - c) **the American and Pacific oysters**
 - d) the Pacific and the European oysters
- 490 What is the name for young oysters?
- a) **spat**
 - b) spatch
 - c) sputs
 - d) spots
- 491 Which of the following is a serious disease that affects adult oysters?
- a) Dermocystidium marinum (Dermo)
 - b) Minchinia nelsoni (MSX)
 - c) M. costalis (SSO)
 - d) **all of the answers listed**
- 492 Which fo the following is a major predator for oysters?

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- a) flatworms
 - b) oyster drills
 - c) starfish
 - d) **all of the answers listed**
- 493 Which of the following is a trend that encourages aquaculture of hard clams?
- a) Declining harvests in New York, New Jersey, and Virginia--major producers in the past
 - b) A chronic shortage of smaller size clams--littlenecks and cherrystones--and a strong demand
 - c) The increased price of small clams
 - d) **all of the answers listed**
- 494 The hard clam is harvested commercially in _____ states.
- a) 6
 - b) **16**
 - c) 26
 - d) 36
- 495 Clams can be grown at relatively high densities of _____ per acre.
- a) **1-2 million**
 - b) 2-3 million
 - c) 3-4 million
 - d) 4-5 million
- 496 In the United States, the _____ is the only indigenous mussel species cultured commercially.
- a) **blue mussel**
 - b) mediterranean mussel
 - c) blue and mediterranean mussel
 - d) none of the answers listed
- 497 Heliculture is the process of farming or raising _____.
- a) lobsters
 - b) mussels
 - c) clams
 - d) **snails**
- 498 Snails reach adulthood _____ after hatching.
- a) **10 to 15 weeks**
 - b) 20 to 25 weeks
 - c) 30 to 35 weeks
 - d) 35 to 40 weeks
- 499 Which fo the following is a predator to the snail?
- a) frogs

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- b) rats
 - c) weasels
 - d) **all of the answers listed**
- 500 The largest and most commercially important series of abalone, the red abalone, occurs mostly in _____ waters.
- a) **California**
 - b) Florida
 - c) Gulf of Mexico
 - d) Alaska
- 501 The most common frog in the United States is the _____.
- a) **leopard frog**
 - b) bullfrog
 - c) tree frog
 - d) dart frog
- 502 Metamorphosis from tadpole to frog can take from _____ year(s), depending on the temperature and food supply.
- a) 2 months to 1
 - b) 5 months to 1
 - c) **5 months to 2**
 - d) 8 months to 3
- 503 What is a culture problem encountered by frog producers?
- a) predators of frogs and tadpoles, such as humans, fish, birds, bats, alligators, crawfish, and other frogs
 - b) territorial nature of bullfrogs
 - c) refusal to eat anything but live, moving food
 - d) **all of the answers listed**
- 504 Handling frogs during hot weather increases the chance _____.
- a) of death
 - b) that it will not produce young
 - c) **of disease**
 - d) of predation
- 505 Which of the following is a reason that plant aquaculture is more prevalent in other countries?
- a) a higher percentage of people live close to coastal areas
 - b) other countries have been practicing aquaculture, in general, much longer
 - c) population density is much larger, with less area per capita for traditional agriculture
 - d) **all of the answers listed**

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506 Commonly referred to as seaweeds, the worldwide harvest of these attached algal forms was an estimated 5.3 billion pounds valued at about _____.

- a) \$700 million
- b) \$800 billion
- c) **\$800 million**
- d) \$900 billion

507 For which of the following has seaweed been harvested?

- a) medicine
- b) food
- c) fertilizer
- d) **all of the answers listed**

508 Which of the following freshwater plant aquacrops serve as feed and fuel?

- a) water hyacinth
- b) duckweed
- c) water spinach
- d) **all of the answers listed**

509 The science of _____ draws heavily on findings of chemistry, biochemistry, physics, microbiology, physiology, medicine, genetics, mathematics, endocrinology, cellular biology, and animal behavior.

- a) water quality
- b) **nutrition**
- c) diet
- d) vitamins

510 Dietary requirements set the necessary levels for _____.

- a) amino acids
- b) energy
- c) protein
- d) **all of the answers listed**

511 Which of the following is part of the digestive system of fish?

- a) pylorus
- b) mouth
- c) pharynx
- d) **all of the answers listed**

512 _____ consume primarily animal material. Foods consumed by this type of fish may be as small as a microscopic crustacean or insect or as large as an amphibian or a small mammal.

- a) Omnivores
- b) Herbivores

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- c) **Carnivores**
 - d) none of the answers listed
- 513 _____ subsist primarily on vegetation and decayed organic material in the environment.
- a) **Herbivores**
 - b) Carnivores
 - c) Omnivores
 - d) none of the answers listed
- 514 _____ consume almost any food source, either plant or animal in origin.
- a) Carnivores
 - b) Herbivores
 - c) **Omnivores**
 - d) none of the answers listed
- 515 Fish can be classified according to their feeding habits such as _____.
- a) strainers
 - b) predators
 - c) grazers
 - d) **all of the answers listed**
- 516 Which of the following is an environmental influence on fish feeding behavior?
- a) time of day
 - b) sensory use
 - c) season of the year
 - d) **all of the answers listed**
- 517 Because fish are cold-blooded, they expend _____ energy to maintain body temperature
- a) **no**
 - b) lots of
 - c) tons of
 - d) just a bit of

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- 518 Which of the following is a factor that affects energy use by fish?
- a) reproduction
 - b) growth
 - c) activity
 - d) **all of the answers listed**
- 519 Fish digestibility of fat varies, depending on _____.
- a) water temperature
 - b) amount in the diet
 - c) type of fat
 - d) **all of the answers listed**
- 520 Proteins are long chains of amino acids linked by bonds called _____.
- a) essential amino acids
 - b) **peptide bonds**
 - c) essential fatty acids
 - d) antioxidants
- 521 Which of the following is a purpose for protein in the nutrition of fish?
- a) meet requirements for functional proteins--enzymes and hormones--and structural proteins
 - b) provide energy
 - c) supply amino acids
 - d) **all of the answers listed**
- 528 Many diets contain other ingredients that can affect the fish. These ingredients may include substance(s) such as _____.
- a) antibiotics
 - b) water
 - c) fiber
 - d) **all of the answers listed**
- 529 When formulating diets for fish, _____ is the first consideration with the energy being adjusted to the optimal ration.
- a) fat
 - b) **protein**
 - c) carbohydrates
 - d) fiber
- 530 Major ingredients of a fish diet should be subjected to a complete analysis to assure the producers of its quality and this analysis should include _____.
- a) essential fatty acids
 - b) proximate composition (protein, fat, ash)

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- c) limiting amino acids
 - d) **all of the answers listed**
- 531 Which of the following is a processing method that prepare fish feeds?
- a) moist or semimoist
 - b) steam pelleting
 - c) extrusion
 - d) **all of the answers listed**
- 532 The _____ process uses the feed mixture in the form of a dough.
- a) **extrusion**
 - b) steam pelleting
 - c) moist or semimoist
 - d) crumbling
- 533 _____ are prepared by adding moisture and a binding agent to the dry feed ingredients.
- a) Crumbling feeds
 - b) Extrusion feeds
 - c) **Moist or semimoist feeds**
 - d) Microencapsulation feeds
- 534 _____ prepares diets for small fish.
- a) Microencapsulation
 - b) **Crumbling**
 - c) Extrusion
 - d) Steam pelleting
- 535 _____ is the coating of small feed particles with a substance that is insoluble in water but digestible by the enzymes in the digestive tract of the fish.
- a) extrusion
 - b) Crumbling
 - c) **Microencapsulation**
 - d) Steam pelleting
- 536 Form and size of catfish feed available include which of the following type(s)?
- a) floating pellets
 - b) meal
 - c) crumbles
 - d) **all of the answers listed**
- 537 Which of the following is a mechanical feeder for catfish?
- a) automatic
 - b) blower-type
 - c) demand

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d) **all of the answers listed**

538 First-feeding trout fry should be fed a small amount by hand at least _____ per day until all the fish are actively feeding.

- a) 4
- b) 6
- c) 8
- d) **10**

539 A _____ consists of a hopper for holding the feed pellets and a movable disc below the hopper opening that is attached to a pendulum extending to the water.

- a) automatic feeder
- b) blower-type feeder
- c) **demand feeder**
- d) none of the answers listed

540 During normal production, trout should be fed _____ days per week with a high quality commercially prepared diet formulated for trout.

- a) 4
- b) 5
- c) 6
- d) **7**

541 In trout, the minimum temperature for growth is approximately _____.

- a) **38 degrees F**
- b) 48 degrees F
- c) 58 degrees F
- d) 68 degrees F

542 When feeding tilapia sinking pellets, they may be _____.

- a) placed in demand feeders
- b) slowly fed by hand, allowing time for the fish to eat the feed before it sinks through or is swept out of the cage
- c) placed in shallow, submerged trays
- d) **all of the answers listed**

543 The feed requirements for fish change with _____.

- a) health
- b) age
- c) size
- d) **all of the answers listed**

546 For what do the initials "FCR" stand?

- a) Food Conversion Rate

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- b) **Feed Conversion Ratio**
- c) Feed Conversion Rate
- d) Feed Constant Ratio

547 Daily observation of fish behavior and feeding activity allows early detection of problems when they do occur so that a _____ can be made before the majority of the population becomes sick.

- a) summary
- b) conclusion
- c) **diagnosis**
- d) opinion

548 Which of the following is a protective barrier(s) to protect against infection?

- a) inflammation
- b) mucus
- c) scales and skin
- d) **all of the answers listed**

549 Which of the following is a stressor(s) in fish?

- a) chemical
- b) biological
- c) physical
- d) **all of the answers listed**

550 What is a type(s) of chemical stressor in fish?

- a) diet composition
- b) poor water quality
- c) pollution
- d) **all of the answers listed**

551 What is a type(s) of biological stressor in fish?

- a) microorganisms
- b) population density
- c) other species of fish
- d) **all of the answers listed**

552 What is a type(s) of physical stressor in fish?

- a) **Dissolved gases**
- b) population density
- c) diet composition
- d) shipping

553 What is a type(s) of procedural stressor in fish?

- a) disease treatments
- b) handling

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- c) shipping
- d) **all of the answers listed**

555 _____ is a physical barrier that inhibits entry of disease organisms from the environment into the fish.

- a) Scales and skin
- b) **Mucus (slime coat)**
- c) Inflammation
- d) Antibodies

556 _____ function as a physical barrier protecting the fish against injury.

- a) Mucus (slime coat)
- b) **Scales and skin**
- c) Antibodies
- d) inflammation

558 _____, a specific cellular response, are molecules formed to fight invading proteins or organisms.

- a) Inflammation
- b) Antigens
- c) **Antibodies**
- d) Mucus (slime coat)

559 Which of the following is a type(s) of infectious disease?

- a) viral
- b) parasitic
- c) bacterial
- d) **all of the answers listed**

560 Noninfectious diseases can be broadly categorized as _____.

- a) genetic
- b) environmental
- c) nutritional
- d) **all of the answers listed**

561 Which of the following is a parasitic disease in fish?

- a) ichthyophthiriasis
- b) tapeworms
- c) trichodiniasis
- d) **all of the answers listed**

562 All fish are susceptible to tapeworms, especially _____.

- a) catfishes
- b) black basses

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- c) Chinese carps
 - d) **all of the answers listed**
- 563 Which of the following is a type(s) of tapeworm?
- a) catfish
 - b) Asian
 - c) bass
 - d) **all of the answers listed**
- 564 All freshwater fish are susceptible to _____, which are parasitic branchiurans of the genus Anguillosoma.
- a) **fish lice**
 - b) fish grubs
 - c) cortiasis disease
 - d) anchor parasites
- 565 _____ is a protozoan parasite, Myxobolus cerebralis, that affects the nervous systems of trout species.
- a) Anchor parasites
 - b) Cortiasis disease
 - c) **Whirling disease**
 - d) Fish lice
- 566 Bacteremia is literally bacteria in the _____.
- a) **blood**
 - b) digestive system
 - c) reproductive system
 - d) endocrine system
- 567 Enteric redmouth disease occurs in salmonids throughout _____.
- a) China
 - b) Canada
 - c) much of the United States
 - d) **Canada and much of the United States**
- 569 Fish with chilodonelliasis have _____ gills that sometimes bleed when touched.
- a) bright green
 - b) **bright red**
 - c) bright yellow
 - d) bright pink
- 570 Which of the following is a viral disease in fish?
- a) Infectious Pancreatic Necrosis (IPN)
 - b) Channel catfish Virus Disease (CCVD)

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- c) Infectious Hematopoietic Necrosis (IHN)
 - d) **all of the answers listed**
- 571 Which of the following is a noninfectious disease in fish?
- a) Acidosis
 - b) Oxygen starvation
 - c) Alkalosis
 - d) **all of the answers listed**
- 572 _____ is caused by a drop in the pH to a level too low for the species.
- a) Alkalosis
 - b) Oxygen starvation
 - c) **Acidosis**
 - d) Pfiesteria
- 573 Any toxic substance or toxic levels of a substance in water can _____ fish.
- a) **poison**
 - b) kill
 - c) drown
 - d) suffocate
- 575 Water supersaturated with oxygen or nitrogen causes _____.
- a) brown blood disease
 - b) **gas bubble disease**
 - c) Alkalosis
 - d) Pfiesteria
- 576 The most obvious sign of sick fish is the presence of _____.
- a) flies
 - b) predators
 - c) **dead or dying animals**
 - d) vultures
- 581 This method of disease treatment is the medication is in some way introduced into the stomach of the sick fish.
- a) **feeding**
 - b) flush
 - c) dip
 - d) injections
- 582 _____ given to fish cause the fish to produce antibodies to a specific disease, giving them immunity to the disease.
- a) Injections
 - b) **Vaccines**

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- c) Feed
 - d) none of the answers listed
- 583 Which of the following is an advantage(s) of immunizations in fish?
- a) vaccination is convenient and economical
 - b) does not produce antibiotic resistant bacteria
 - c) can be applied to control viral and bacterial diseases
 - d) **all of the answers listed**
- 585 _____ is the measure of the total concentration of all dissolved ions in water.
- a) **Salinity**
 - b) Conductance
 - c) Solubility
 - d) Liming
- 587 _____ determine the basic suitability of water for fish survival.
- a) **Dissolved gases**
 - b) Dissolved oxygen
 - c) Carbon dioxide
 - d) Lime requirement
- 588 Aquatic life requires _____. It varies greatly in natural surface water and is characteristically absent in groundwaters.
- a) carbon dioxide
 - b) hydrogen sulfide
 - c) **dissolved oxygen (DO)**
 - d) ammonia
- 589 _____ is one of the basic products of organic matter decomposition and acts as an intermediate stage in the conversion of ammonia to nitrate.
- a) Chlorine
 - b) **Nitrite**
 - c) Chloride
 - d) Nitrogen
- 590 Nitrogen and methane are considered to play a critical role only at _____ levels.
abnormally high abnormally low various low
- 592 Water for aquaculture comes from which of the following source(s)?
- a) pumping
 - b) surface water
 - c) ground water
 - d) **all of the answers listed**

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593 Whether the water is tested in a laboratory or in the field by an aquaculturalist, a general test method includes _____.

- a) electronic meters
- b) titrimetric
- c) colorimetric
- d) **all of the answers listed**

594 Some management factors include _____.

- a) vegetation control
- b) pond fertilization
- c) insect control
- d) **all of the answers listed**

595 Which of the following is a method to treat wastewater?

- a) percolation ponds
- b) settling ponds or vats
- c) irrigation water
- d) **all of the answers listed**

596 With the large production of catfish in the United States, _____ are the most common type of structure for raising fish.

- a) raceways
- b) **ponds**
- c) tanks
- d) cages

597 Which of the following is a type(s) of pond?

- a) excavated
- b) natural
- c) impoundment
- d) **all of the answers listed**

598 What is an advantage of using a natural pond?

- a) **Presence of natural foods**
- b) Drainable
- c) Moderate construction cost
- d) all of the answers listed

599 What is an advantage of using an impoundment pond?

- a) Presence of natural foods
- b) Moderate construction cost
- c) **Drainable, allowing control of water level**
- d) all of the answers listed

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- 600 What is an advantage of using an excavated pond?
- a) **Applicable to many types of soils and topography**
 - b) No construction cost
 - c) Drainable
 - d) Easy to harvest
- 601 What is an advantage of using a levee?
- a) Low level of management required
 - b) No construction cost
 - c) **Harvesting is easy with correct equipment**
 - d) all of the answers listed
- 602 Most raceways in the United States are made of _____.
- a) stone
 - b) **concrete**
 - c) metal
 - d) plastic
- 603 Which of the following is an advantage of using cage culture of fish?
- a) Catching is simplified
 - b) Many types of water resources can be used
 - c) A relatively low initial investment is all that is required in an existing body of water
 - d) **all of the answers listed**
- 604 Which of the following is a disadvantage of using cage culture of fish?
- a) The incidence of disease can be high, and diseases may spread rapidly
 - b) Feed must be nutritionally complete and kept fresh
 - c) Low dissolved oxygen syndrome (LODOS) is an ever-present problem and may require mechanical aeration
 - d) **all of the answers listed**
- 605 Recirculating systems will work effectively if they accomplish _____.
- a) Biological filtration to remove waste ammonia and nitrite
 - b) Aeration
 - c) Removal of particulate matter
 - d) **all of the answers listed**
- 606 Which would be the daily routine for managing a recirculating system?
- a) check pump strainer
 - b) feed fish
 - c) test water-quality
 - d) **all of the answers listed**
- 607 No one should enter an aquaculture business without _____.

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- a) having a master's degree
 - b) creating a budget
 - c) **counting the costs**
 - d) having a bachelor's degree
- 610 Managing an aquaculture business involves _____.
- a) responding and acting when problems occur
 - b) setting goals and objectives
 - c) recognizing and identifying problems
 - d) **all of the answers listed**
- 614 Which of the following is a risk(s) in having an aquaculture business?
- a) financial
 - b) market
 - c) production
 - d) **all of the answers listed**
- 617 Which of the following is a suggestion(s) for better recordkeeping in an aquaculture business?
- a) Run everything through a checking account
 - b) Always record the gross or total amount
 - c) Always go through all the steps for each transaction
 - d) **all of the answers listed**
- 623 _____ agencies or services under the USDA are involved some way in aquaculture.
- a) 4
 - b) **14**
 - c) 24
 - d) 34
- 625 The regulatory responsibility to the Food Industry of this agency includes control and enforcement of food processes resulting in pollution of waters, land, or air; control of pesticide application; and control of water supplies.
- a) Department of Agriculture (USDA)
 - b) **Environmental Protection Agency (EPA)**
 - c) Department of Commerce (National Marine Fisheries Service)
 - d) Department of Health and Human Services (USPHS)
- 626 The regulatory responsibility to the Food Industry of this agency includes regulation of catch, imports, and processing of fish products.
- a) Department of Agriculture (USDA)
 - b) **Department of Commerce (National Marine Fisheries Service)**
 - c) Environmental Protection Agency (EPA)
 - d) Department of Health and Human Services (USPHS)

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627 The regulatory responsibility to the Food Industry of this agency includes the regulatory powers of international food trade.

- a) Department of Commerce (National Marine Fisheries Service)
- b) Department of Agriculture (USDA)
- c) **Department of Commerce AND Department of Agriculture**
- d) Department of Health and Human Services (USPHS)

628 The regulatory responsibility to the Food Industry of this agency includes enforcement of food legislation regarding food wholesomeness and aspects concerning human health and food process sanitation; food served by transportation companies; and advisory capacity in milk, food, and shellfish sanitation.

- a) **Department of Health and Human Services (USPHS and FDA)**
- b) Department of Agriculture (USDA)
- c) Environmental Protection Agency (EPA)
- d) Department of Commerce (National Marine Fisheries Service)

629 The regulatory responsibility to the Food Industry of this agency includes enforcement of all food legislation related to packaging, labeling, and advertising of food products.

- a) Environmental Protection Agency (EPA)
- b) Department of Agriculture (USDA)
- c) **Federal Trade Commission (FTC)**
- d) Department of Health and Human Services (USPHS)

634 This agency collects a large amount of information on the availability and quality of ground water and surface water supplies.

- a) Food and Drug Administration (FDA)
- b) U.S. Fish and Wildlife Service (FWS)
- c) Department of Energy
- d) **U.S. Geological Survey (USGS)**

635 Congress established five regional aquaculture centers in Title XIV of the Agriculture and Food Act of 1890. Offices of the centers are located in _____.

- a) California, Massachusetts, Michigan, Mississippi and Washington
- b) **Hawaii, Massachusetts, Michigan, Mississippi and Washington**
- c) Hawaii, Massachusetts, Missouri, Mississippi and Washington
- d) Hawaii, Massachusetts, Michigan, Mississippi and Oregon

636 In 1966, the Food and Agriculture Organization of the United Nations (FAO) organized the first world conference on _____.

- a) food
- b) agriculture
- c) **aquaculture**
- d) wildlife

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637 _____ skills in aquaculture are necessary to keep up with new information and review directions for feeding or treating fish.

- a) Writing
- b) **Reading**
- c) Arithmetic
- d) Speaking

638 In aquaculture _____ skills are necessary for such tasks as keeping pond or raceway records, describing disease conditions, or requesting a test.

- a) Reading
- b) Arithmetic
- c) **Writing**
- d) Listening

639 Anyone not convinced of the value of _____ skills to aquaculture should consider the skills required to figure pond volumes, treatment dosages, feed conversion ratios, and fish growth rates.

- a) reading
- b) writing
- c) speaking
- d) **mathematics**

643 Specific jobs or employment opportunities in aquaculture can be grouped into general categories, one/some of which are _____.

- a) employment
- b) supplies and services
- c) training production
- d) **all of the answers listed**

648 Occupations on an aquaculture facility that vary from unskilled, highly skilled and educated individuals include _____.

- a) truck driver
- b) fishery technician
- c) water technician
- d) **all of the answers listed**

672 One species of fish that is often undesirable in lakes and ponds is _____.

- a) bass
- b) **carp**
- c) trout
- d) sunfish

673 An aquaculturist must understand how aquatic organisms _____.

- a) live

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- b) eat
 - c) reproduce
 - d) **all of the listed answers**
- 674 The yearly catch of fish from natural waters is _____.
- a) mostly catfish
 - b) increasing
 - c) **holding constant or decreasing**
 - d) difficult to determine
- 676 The accumulation of salts in water occurs most often when _____.
- a) **water runs across agricultural land**
 - b) water is lost through evaporation
 - c) water settles in a pond
 - d) water collects in a drainage ditch
- 678 Water quality is least affected by which of the following factors?
- a) chemical runoff
 - b) fish density
 - c) fish species
 - d) **weather**
- 679 A fish death can occur when a pond "rolls over"
- a) because the fish turn upside down
 - b) because of the temperature shock
 - c) because the cages sink to the bottom
 - d) **because of low levels of dissolved oxygen**
- 682 The _____ of a fish absorb oxygen from the water.
- a) gonads
 - b) nostril
 - c) **gills**
 - d) dorsal fin
- 683 Trout need a _____ dissolved oxygen concentration than clams to grow and mature.
- a) **higher**
 - b) lower
 - c) about the same
 - d) none of the answers listed
- 684 Crawfish must _____, or break out of their exoskeletons to grow.
- a) **molt**
 - b) buffer
 - c) slough

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- d) exuviate
- 685 Salmon must return to _____ water to spawn and complete their life cycles.
- a) rivers
 - b) salt water
 - c) ocean water
 - d) **fresh water**
- 686 Pond culture relies mostly on _____ recycling of fish waste products.
- a) common
 - b) artificial
 - c) **natural**
 - d) ordinary
- 687 The recirculating production systems must treat the fish wastes with _____ filters.
- a) pollution
 - b) coffee
 - c) **biological**
 - d) none of the answers listed
- 699 The characteristic that determines whether a water supply is classified as freshwater is the _____.
- a) temperature
 - b) mineral content
 - c) oxygen content
 - d) **salt content**