

CT Envirothon Aquatics Exam 2011

Print the name of your Team/School on the line in the upper right hand corner of this page and **EACH** additional page. For each of the questions in this exam you will either circle the correct answer or fill in the blank space(s) provided. All specimen identifications are included in the first third of the exam and you are allowed to use the provided keys to ID each organism. Each question from #1-#33 is worth 3 points, question #34 is worth 1 point. Questions #35- #39 are focused on the current topic and worth 2 points each. **GOOD LUCK!!!**

Please utilize the *Key to Saltwater Invertebrates* to identify the following organisms:

1) What is the species in container #1?

a) *Limulus polyphemus*

b) *Mya arenaria*

c) *Cancer irroratus*

d) *Carcinus maenas*

2) What is the species in container #2?

a) *Busycotypus canaliculatus*

b) *Mercenaria mercenaria*

c) *Urosalpinx cinerea*

d) *Nucella lapillus*

3) What is the species in container #3?

a) *Busycon carica*

b) *Crepidula fornicata*

c) *Argopecten irradians*

d) *Callinectes sapidus*

Use *The Amphibians of Connecticut* to identify the following organisms:

4) What is the species in container #4?

a) *Plethodon cinereus*

b) *Plethodon glutinosus*

c) *Notophthalmus viridescens*

d) *Hemidactylium scutatum*

5) What is the species in container #5?

a) *Rana sylvatica*

b) *Rana clamitans*

b) *Pseudacris crucifer*

d) *Bufo americanus*

Use the *Connecticut Fish Key* to identify the following organisms:

- 6) What is the species in container #6?
- | | |
|-------------------------------|-------------------------------|
| a) <i>Apeltes quadracus</i> | b) <i>Pungitius pungitius</i> |
| c) <i>Trinectes maculatus</i> | d) <i>Perca flavescens</i> |
- 7) What species is in container #7?
- | | |
|---------------------------------|-----------------------------|
| a) <i>Micropterus salmoides</i> | b) Cottidae |
| c) <i>Esox americanus</i> | d) <i>Anguilla rostrata</i> |
- 8) What is the species in container #8?
- | | |
|-----------------------------------|-------------------------------|
| a) <i>Apeltes quadracus</i> | b) <i>Fundulus majalis</i> |
| c) <i>Notemigonus crysoleucus</i> | d) <i>Lepomis macrochirus</i> |

Use the *Freshwater Mussels of CT Guide* for the following shell:

- 9) What species is the shell #9?
- | | |
|------------------------------|--------------------------------|
| a) <i>Anodonta implicata</i> | b) <i>Dreissena polymorpha</i> |
| c) <i>Ligumia nasuta</i> | d) <i>Alasmidonta undulata</i> |

Use the *Guide to Riffle Dwelling Macroinvertebrates* for the following organisms:

- 10) What is the family in vial # 10?
- | | |
|----------------|--------------------|
| a) Psephenidae | b) Isthionthetidae |
| c) Perlidae | d) Pyralidae |
- 11) What is the family in vial #11?
- | | |
|---------------------|--------------|
| a) Taeniopterygidae | b) Gomphidae |
| c) Tipulidae | d) Decapoda |

Use the *Invasive Aquatic Plants in CT Guide* for the following plant:

12) What is the plant in container #12?

- a) *Egeria densa*
- b) *Trapa natans*
- c) *Najas minor*
- d) *Ulva lactuca*

For the remaining questions on the exam, no ID guides or other reference materials may be used, unless indicated. All questions come directly from the materials posted on the CT Envirothon website and are referenced for your future learning. Please ask station leaders if you have any specific questions as you work through the exam.

13) As your high school community service project, you and your classmates have decided to perform a fish habitat improvement project in a stream in your town. The stream is classified as a trout maintenance area, so all of you decide creating or enhancing trout spawning beds will be the focus. Trout require the following habitat to spawn (*Extension Notes: Improving Fish Habitat pg 2*):

- a) Seasonally flooded marshes and wetlands near grassy hummocks
- b) Cobble-rubble in fast-flowing streams or wind-exposed shoals of lakes
- c) Stream channels or riffle areas with clean gravel-cobble substrate
- d) Pea gravel in shallow littoral areas

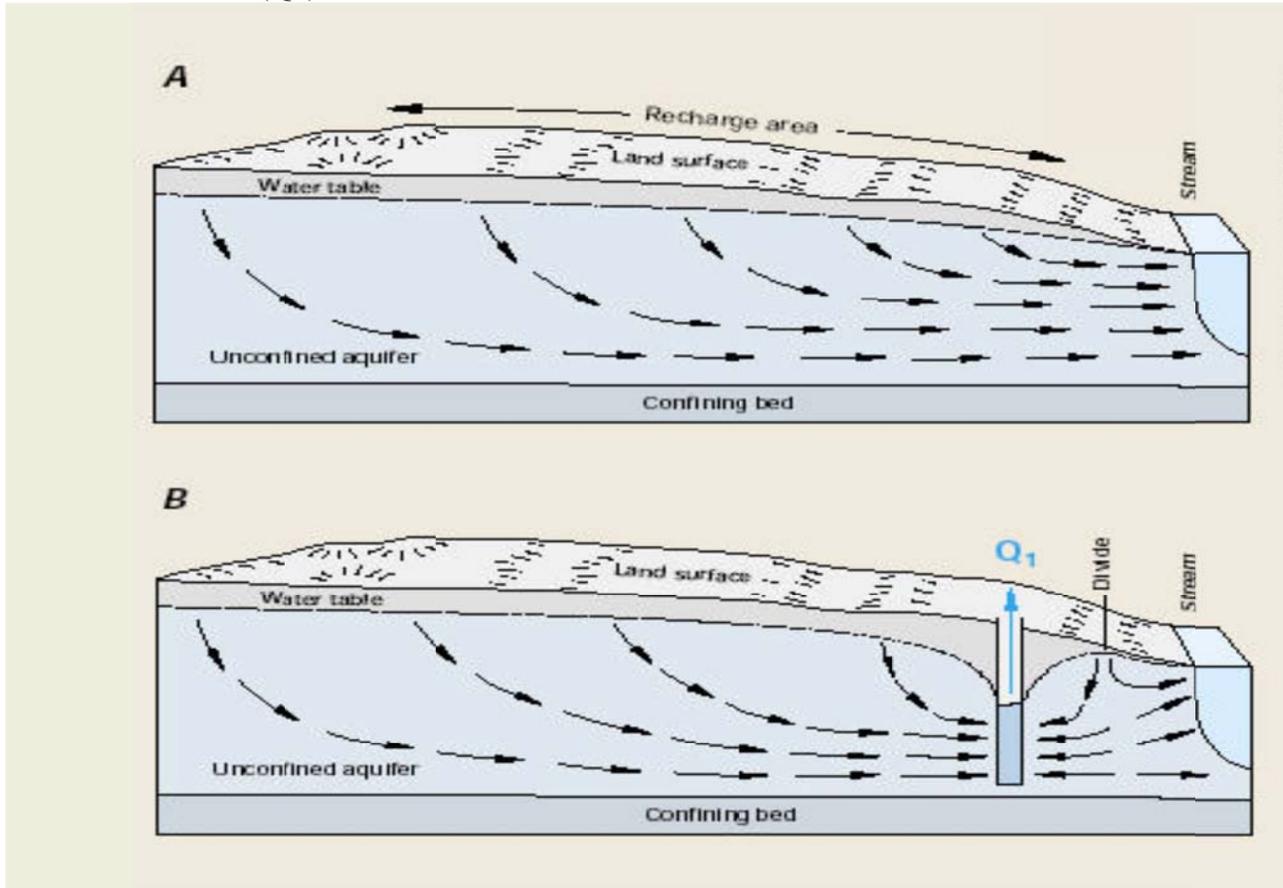
14) _____ reduces or essentially eliminates the effectiveness of a vegetated buffer for storm water management. (*Vegetated Buffer Fact Sheet pg 2*)

- a) Non-point source flow
- b) Concentrated flow
- c) Sheet flow
- d) Low flow

15) Households served by septic systems should have them professionally inspected and pumped every _____. (*USEPA Protecting Water Quality from Urban Runoff pg. 2*)

- a) 1 - 2 months
- b) 6 - 12 months
- c) 3 - 5 years
- d) 10 - 15 years

Use the following Figure to complete the next two questions, A pre-development groundwater system is within a state of dynamic equilibrium (Figure A). A well is installed (Figure B) pumping at a continuous rate (Q_1).



16) What is the resulting effect of the well installation on the groundwater system? (*USGS Circular 1139 pg. 15*)

- A new state of dynamic equilibrium will be achieved, inflow to the groundwater system from recharge will equal outflow to the stream plus the withdrawal from the well.
- Inflow to the groundwater system from recharge will exceed outflow to the stream plus the withdrawal from the well.
- Outflow to the stream plus the withdrawal from the well will exceed the inflow from the groundwater system from recharge.
- The well will withdraw all water from the groundwater system.

17) What level of effect will surface water quality have on the quality of groundwater withdrawn from the well in the system depicted in Figure B? (*USGS Circular 1139 pg. 14*)

- Groundwater quality is always affected by surface water quality of adjacent streams.
- The groundwater divide identified in the Figure indicates that surface water quality will have minimal effect on groundwater quality in this system.
- Surface water quality never impacts groundwater quality in any groundwater system.
- The groundwater quality will directly reflect surface water quality.

18) Which of the following is an example of a **Chemical** control method that can provide effective means of controlling invasive aquatic plants? (*Invasive Aquatic Plants pg 3*)

- a) Use *Galerucella* leaf-feeding beetles to control purple loosestrife
- b) Dewater a small pond over the winter to freeze, dry, and burn invasive plants
- c) Use a harvester to remove plants from the water and cut up vegetation
- d) Spot application of 2,4-D, an herbicide, on patches of invasive milfoil

19) What behavioral adaptation of benthic macroinvertebrates would you **NOT** expect to observe in a riffle habitat? (*River Watch Macro Guide pg 8*)

- a) skaters
- b) clingers
- c) swimmers
- d) sprawlers

20) You collect a benthic invertebrate sample, and find your sample contains 35% worms, 35% midges, and 30% caddisflies (primarily Hydropsychidae). What would you predict the local stream quality to be based on the benthic invertebrate community composition? (*River Watch Macro Guide pg 12*)

- a) Pristine and healthy
- b) Moderately degraded, most likely from organic material
- c) Moderately degraded by a range of pollutants
- d) Seriously degraded

21) In March 2011, CTDEP announced that *Didymo* was identified in the Farmington River. Which of the following is NOT one of the suggested methods individuals recreating in the waterway can use to avoid spreading the highly invasive algae? (*Didymo Sheet guide pg 1*)

- a) Check for clumps of algae and sediment, remove them and leave them at the site.
- b) Leave items until dry to the touch; continue to dry for at least an additional 48 hours.
- c) Pick up all algae visible and transport it home for disposal
- d) Soak all gear for at least one minute in 2% bleach solution or 5% solution of detergent or salt.

Please choose the correct term directly from the options listed in the adjacent text box. Not all choices will be used. (*What Happens to Water pg. 6-7*)

The water budget identifies that water entering a watershed through precipitation equals the amount of water leaving the system through:

Precipitation =

22) Surface ___ runoff ___

23) Groundwater ___ recharge ___

24) ___ evapotranspiration ___

-runoff	-erosion
-consumption	-discharge
-evapotranspiration	
-recharge	-infiltration
-storage	-precipitation

25) What local environmental conditions in Long Island Sound are moving to optimal growing conditions for the invasive algae *Grateloupia turuturu*? (*Red Algae Invasion pg 1*)

- a) Increase in dissolved oxygen
- b) Decrease in nutrient level
- c) Increase in turbidity
- d) Increase in average water temperature

Use the Seafood Watch Handout provided for you to complete the following three questions.
(*Monterey Bay Aquarium Seafood Watch*)

You and your team finish a successful day at Envirothon! Since you are on the coast, you have decided to stop for some seafood on your way home. There is a swordfish special available, and it just so happens everyone in your group loves swordfish!

26) Before you order, your Seafood Watch pocket guide reminds you, you should:

- a) Order a soda.
- b) Ask where your seafood comes from, and whether it is farmed or wild-caught.
- c) Go catch the fish yourself.
- d) Not order seafood.

27) According to the Seafood Watch guide, which of the following is the best choice for the origin of your swordfish?

- a) Canada and US harpoon and hand line.
- b) US
- c) Imported
- d) Farmed

28) You happen to notice an asterisk next to swordfish on the Seafood Watch guide, what does this indicate?

- a) Swordfish is especially tasty.
- b) Swordfish should only be available specific times of the year.
- c) Avoid these items at all cost.
- d) Limit consumption due to concerns about mercury or other contaminants.

29) Which of the following organisms must is considered an obligate vernal pool species? (pg 4
Wicked Big Puddles excerpt)

- a) fairy shrimp
- b) American toads
- c) spring peepers
- d) red spotted newts

30) Under the Long Island Sound Area Contingency Plan, the _____ is the “Federal On Scene Coordinator” in the event of a major oils spill, over 10,000 gallons in the State of Connecticut. (*Sound UPDATE Summer 2010 pg.3*)

- a) Local Fire Department
- b) US Coast Guard
- c) US Environmental Protection Agency
- d) CT Department of Environmental Protection

31) Which of the following organisms in NOT an amphibian? (*Long Island Sound Study pg.9*)

- a) marbled salamander
- b) eastern spadefoot toad
- c) northern water snake
- d) mudpuppy

32) Which of the following is NOT a confirmed impact of suspended sediment on aquatic environments?(*Article 14 Stormwater Center Articles pg 1*)

- a) Loss of sensitive or threatened species when turbidity exceeds 25 NTU
- b) Abrades and damages fish gills increasing risk of infection and disease
- c) Suspended sediments are only a minor carrier of nutrients and metals
- d) Reduces filtering efficiency of zooplankton in lakes and estuaries

33) The _____ snowmelt stage produces the highest contaminant total load and most extreme volume of runoff (*Article 3 Stormwater Center Articles pg 17*)

- a) Roadside Melt
- b) Rain-on-snow Melt
- c) Pavement Melt
- d) Pervious Area Melt

34) **Finish the following statement:**

I am an estuary

I provide _____

(ANY answer receives 1 point)

The following questions on the exam are directly focused on the Current Topic for 2011 “Estuaries.” The materials posted on the CT Envirothon website are referenced for your future learning. These questions are worth 2 points each. Please ask station leaders if you have any specific questions.

Complete the following three pathways for invasive species in Long Island Sound (ie species, vector, potential overall impact) using only words in the text box, for example: Asian rockweed, ballast water, high potential. (pg 13-15 Long Island Sound Interstate Aquatic Invasive Species Management Plan)

- | |
|-------------------|
| - wind/currents |
| -hull fouling |
| -ballast water |
| -Asian sea squirt |
| -Man O’War |
| -Mute swan |
| -Medium |
| -Low |
| -High |

35) Lionfish, **wind/currents**, Medium

36) **Asian sea squirt**, hull fouling, High

37) Chinese mitten crab, seafood industry, **High**

38) The striped bass (*Morone saxatilis*) spend most of their lives in the sea or brackish water, returning to freshwater to reproduce. What is the term for this type of migration? (*Materials for Estuaries – Cannon Envirothon pg. 15*)

- a) Catadromous
- b) Anadromous**
- c) Amphidromous
- d) Potamodromous

39) Which of the following is NOT a tactic that can reduce the high level of petroleum-based fuels and lubricants spilled into Long Island Sound each year? (*Environmentally Responsible Boating pg. 2*)

- a) Spray any spill with a hose into the nearest storm drain**
- b) Avoid overfilling fuel tanks
- c) Choose the least toxic products available
- d) Recycle used antifreeze, oil and batteries