True / False questions are 0.15 point each.

T / F Rhizosphere oxygenation is a consequence of the C_4 photosynthetic pathway.
T / F A created wetlands can be established by increasing the elevation of an area’s hydrologic outlet.
T / F Section 404 of the Clean Water Act has been widely applied to wetlands protection.
T / F Cattails are a UPL category species in Region 1 (the northeast US).
T / F A plant classified as FACW is a wetlands indicator.
T / F Almost all palustrine wetlands are the result of ecological succession from lakes.
T / F Harvest of peat and cranberries from a wetlands is a use value.
T / F Aerenchyma may be formed by cell wall destruction (lysis), or routinely as the plant grows.
T / F Rice survives in saturated soil because its mitochondria are resistant to anoxia.
T / F C_4 plants are at an advantage when they can grow as the understory of a wooded wetland.
T / F A hydrologist would say that a wetlands exists where it does because inflow of water exceeded outflow for some period of time.
T / F Extreme reducing environments may cause methanogenesis.
T / F Denitrification is the conversion of N_2 gas to NO_3-.
T / F The seed bank that exists in wetlands soils provides resilience and stability to the wetland system.
T / F The hydrologic renewal rate (turnover rate) is defined mainly by the amount of rain falling on a wetland.
T / F Histosols are defined primarily by their water status.
T / F If 100% of a study area is covered in cattails it is automatically delineated as a wetlands.
T / F Construction of the barrier protecting Yanty Marsh was justified because it protects endangered species habitat.
T / F Land improvement and land reclamation were terms used to describe wetlands loss in the 19th century.
T / F Delineation and determination do not mean the same thing with respect to wetlands.
T / F From 1988-1996 more than 30% of applications for 404 (dredge and fill) permits were rejected in NYS.
T / F Wetlands regulation is considered by many to be a violation of the Fifth Amendment.
T / F Much of the legislation that is currently being used to regulate, manage, and protect wetlands was originally intended for other purposes.
T / F In the context of the Section 404 permitting program, NWP 26 is considered an individual permit.

Multiple choice questions are 0.3 point each.

The size of a stormwater constructed wetland to treat runoff from a residential development depends on:

(a) the lot size in the development
(b) the number of people per household
(c) the size of the development
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Why is the ability of a plant to use water efficiently often an advantage in a wetlands environment?

(a) The less water used, the less exposure to toxins formed under anaerobic conditions
(b) less energy is required to move the smaller amount of water
(c) most wetlands have limited sunlight
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Identification of a soil as hydric is indicated by:

(a) The listing of the series name on the Hydric Soils List
(b) The presence of a dark-colored horizon in the upper 12”
(c) blue/yellow mottling
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above
For a routine wetlands delineation:
(a) Corps of Engineers personnel visit the study site
(b) only the plants are examined
(c) the owner of the lands gets to determine the wetland status
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

The Cowardin system is:
(a) a classification system for aquatic environments
(b) a method to restore damaged wetlands
(c) a way to calculate the replacement value of a wetlands
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Plants classified as OBL on the National List:
(a) have morphological, physiological, or reproductive adaptations for living in wetlands
(b) can live in many environments, but prefer wetlands
(c) are enough for a wetlands determination
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Ammonification
(a) is the conversion of ammonium ions to nitrogen gas
(b) leads to loss of usable soil nitrogen
(c) requires organic matter
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Subsidence
(a) is required for a wetlands system to be sustainable
(b) can be caused by changes in the level of the hydrologic outlet of a wetlands
(c) exceeds deposition of organic matter in the Everglades Agricultural Area
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Residence time in a constructed wetland
(a) can be changed by adjusting the level of the wetland outlet
(b) affects the treatment efficiency of a constructed wetlands
(c) equals volume divided by flow rate
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above
A saturated, anoxic soil develops a low redox potential. This can lead to:
(a) nitrate \((\text{NO}_3^-)\) being forced to be an electron acceptor and subsequently being converted to ammonia
(b) decomposition reactions becoming less efficient and biological activity slowing
(c) presence of toxic reduced forms of copper and lead
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Plant structures that enable transport of oxygen to plant roots are
(a) Cypress knees
(b) aerenchyma
(c) C₄ pathways
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Ways in which organic soils are lost when converted to agriculture are:
(a) aerobic decomposition
(b) accumulation
(c) wind erosion
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Preferential pathways for water through a wetland can lead to:
(a) reduced residence time of water through the wetlands
(b) incomplete mixing within the wetland system
(c) poor treatment effectiveness for a constructed wetland
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

A hydroperiod diagram includes
(a) a time axis
(b) an indication of water depth or storage with respect to time
(c) rainfall amounts
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Useful reproductive strategies for wetlands plants include:
(a) cell lysis
(b) vegetative propagation
(c) aerenchyma
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above
A stormwater management constructed wetland:
(a) should have a dry weather source of water
(b) usually doesn’t have much plant and animal life
(c) is often used in residential developments
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Which of the following are well adapted to flooded/anaerobic conditions:
(a) pumpkin plants
(b) rice plants
(c) neither of the above

The micropool of a shallow marsh system stormwater constructed wetland should:
(a) support a good stand of cattails
(b) be at least 0.10 acres in size
(c) hold less than 30% of the total storage volume of the wetland
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Replacement value analysis:
(a) is a method used to place a dollar value on the aesthetics of a wetland
(b) was used to justify the breakwall constructed near Yanty Marsh
(c) is more likely to be applied to created wetlands than to constructed wetlands
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

An Extended Detention stormwater constructed wetland should:
(a) increase significantly in surface area during a storm event
(b) have a surface area less than 0.01 times the watershed area
(c) have a runoff coefficient of at least 0.25
(d) a and b
(e) a and c
(f) b and c
(g) all of the above
(h) none of the above

Values of the following questions are in parentheses.
(2.5) Distinguish between social value, use value, and replacement value. Give specific examples.
(1) Rank the following wetlands according to the area of land required to construct them (label the largest #1, the smallest #3)
   (a) A shallow marsh system treating runoff from a 25 acre housing development
   (b) A pond/wetland system treating runoff from a 35 acre nature area
   (c) An extended detention wetland treating runoff from a 15 acre nature area

(4) Fred owns a 6 acre property which contains a 2 acre wetland. He would like to develop the property. What is the right way to go about this and what is the wrong way? What might be some consequences of doing it the wrong way?

(3.5) Consider a wetland that is both fed and drained by a small stream. The flow rate of the stream entering the wetland is 10 liters per second (l/sec). The concentration of N in the inflow water is 25 milligrams per liter (mg/l). The flow rate of the stream leaving the wetland is 8 l/sec. The concentration of N in the outflow is 6 mg/l.
   (a) What is the change in storage of water in the wetland each second?
   (b) Sketch the hydroperiod for this wetland, assuming conditions don’t change and all other hydrologic factors are in balance.
   (c) How much N enters the wetland each second?
   (d) How much N leaves the wetland each second?
   (e) Is the wetland a source or sink for N?
   (f) The total volume of water in the wetland is 5,000,000 liters, what is the residence time of water in the wetlands?
   (g) What is the renewal rate?
Discuss criteria for success of created wetlands and constructed wetlands. Be specific about what is to be measured, possible results and their meaning.