Multiple Choice: Circle the letter representing the best answer to the following questions.

1. At what latitude was Duluth during the late Ordovician?
   a. 0°
   b. 30° S
   c. 30° N
   d. 80° N

2. The explosive radiation of species in the Ordovician Period saw an increase in the number of animal families relative to the Cambrian period of:
   a. 25 to 250
   b. 120 to 400
   c. 500 to 1000
   d. 70 to 130

3. What types of changes in the character and types of Ordovian fauna accompanied that radiation (circle all that apply): (2 pts)
   a. the development of a more complex food chain
   b. bottom anchored organisms reached higher above the sea floor
   c. many species began to live on land
   d. brachiopods shells changed from phosphatic to carbonate
   e. the first appearance of coral reefs
   f. the first appearance of vertebrates with skeletons of cartilage
   g. the first appearance of herminians

4. Which of the following was not a major predator in the Ordovician Period:
   a. starfish
   b. gastropods
   c. bryozoans
   d. nautiloids

5. What is one factor NOT thought to have caused the explosive radiation in the late Ordovician:
   a. warming of global ocean temperatures
   b. regression of oceans to continental margins followed by historically high sea levels
   c. increase in atmospheric oxygen to modern-day levels
   d. increased appearance of predators
6. What most likely caused the mass extinction at the end of the Ordovician Period?
   a. extensive glaciation of Gondwanaland
   b. high levels of volcanic activity
   c. hermanian interruption
   d. excessive warming of the oceans

7. What is the name of the sedimentary sequence created by the late Ordovician transgression?
   ______________________________________

8. Which of the following upward progressions of sedimentary units was deposited over the North American craton during the mid-Ordovician transgression?
   a. quartz sandstone → shale → limestone
   b. graptolitic shale/greywacke/volcanic ash → coarsening upward red bed sediments
   c. limestone → dolostone → limestone
   d. conglomerate → shale → sandstone → limestone

9. What is the name of formation that marks the base of this transgressive sequence?
   ______________________________________

10. Which of the following upward progressions of sedimentary units was deposited along the eastern margin of North America in the late Ordovician?
    a. quartz sandstone → shale → limestone
    b. graptolitic shale/greywacke/volcanic ash → coarsening upward red bed sediments
    c. limestone → dolostone → limestone
    d. conglomerate → shale → sandstone → limestone

11. What is the occurrence of volcanic ash layers NOT useful for?
    a. indicators of global temperatures
    b. time markers that can be radiometrically dated
    c. indicators of paleowind directions and thus continental orientation
    d. regional correlation of sedimentary units

12. The development of a clastic wedge of sediments in an orogenic belt is due mainly to:
    a. transgression and regression cycles of ocean levels
    b. sedimentation by deep-sea currents
    c. sediments blown off the low-lying craton
    d. progradation of sediments eroded from a mountainous highland

13. The Taconian Orogeny was caused by:
    a. the rifting of Baltica from Laurentia
    b. the collision of Amazonia with Laurentia
    c. the accretion of a volcanic island arc with the margin of Laurentia
    d. the assembly of Rodinia
14. What is a good modern day analogue to the tectonic setting of Taconic orogen?

_____________________________________________

15. Describe the type of sediments that make up a flysch sedimentary sequence and the type of depositional environment this represents. (2 pts)

Sediments:  _____________________________________________________

Depositional Env.: ___________________________________________________________________

16. The suture zone formed by the orogenic collision of two terranes is commonly marked by:
   a. an aulocogen
   b. a narrow zone of ultramafic rocks
   c. a broad zone of granite batholiths
   d. a change from flysch- to molasse-type sediments

17. What event resulted in the accumulation of molasse sediments?
   a. continental sediments accumulating on a passive margin
   b. submarine turbidity currents
   c. thrust loading of an accreting terrane creating a foreland basin
   d. development of rift grabens

18. What is the name of the ocean that separated North America/Laurentia from Africa and Europe during the Ordovician?
   a. Tethys
   b. Proto-Pacific
   c. Herman
   d. Iapetus