NCDOT – Components of Concrete (Study Questions)

1. A mixture of cement paste and fine aggregate is called:
   A. Concrete
   B. Mortar
   C. Paste
   D. Coarse Aggregate

2. The chemical reaction between water and cement is called:
   A. Hydration
   B. Cement Factor
   C. Natural Cement
   D. Unit weight

3. A pH value of 7.0 indicates:
   A. Neutrality
   B. Alkalinity
   C. Acidity
   D. All of the above

4. The property that reflects the ease or difficulty in placing and finishing freshly mixed concrete, is called:
   A. Workability
   B. Hydration
   C. Durability
   D. Harshness

5. A chemical, such as calcium chloride, used to “speed up” the setting time of concrete is called:
   A. Hydration
   B. False set
   C. Retarder
   D. Accelerator

6. A significant loss of plasticity (without heat generation) shortly after the concrete is mixed is called:
   A. Fineness of cement
   B. Heat of hydration
   C. False set
   D. Batch Operator Error
7. The time it takes a cement paste to have the consistency of a stiff mass is known as:
   A. High early strength
   B. Flash set
   C. Final setting
   D. False set

8. The bonding agent used in a concrete mix is:
   A. Water
   B. Set retarder
   C. Cement
   D. Aggregate

9. A by-product of the combustion of pulverized coal in a Coal-Fired power plant is:
   A. Cement
   B. Carbon
   C. Admixture
   D. Fly Ash

10. A material used for the purpose of delaying the setting time of concrete is:
    A. Retarding admixture
    B. Water reducing agent
    C. Accelerator
    D. Superplasticizer

11. The pH limits of mixing water to be used in NCDOT concrete are:
    A. 1.0 -12.0
    B. 4.5 - 7.0
    C. 4.5 - 7.5
    D. None of the above

12. The weight of one gallon of water is:
    A. 6.65 pounds
    B. 10.25 pounds
    C. 8.33 pounds
    D. 5.00 pounds

13. The ability of hardened concrete to resist the deterioration caused by weathering, chemicals, and abrasions is known as:
    A. Consistency
    B. Durability
    C. Flexibility
    D. Workability
14. The specific gravity of Portland cement is:
   A. 1.00
   B. 2.65
   C. 3.15
   D. 4.50

15. The NCDOT allowable range for air content in incidental and structural concrete is:
   A. 2.0 - 5.5
   B. 3.5 - 7.5
   C. 4.5 - 7.5
   D. 4.5 - 8.5

16. The most important effect of entrained air in concrete is to:
   A. Increase strength
   B. Decrease mixing water
   C. Increase workability
   D. Increase durability

17. Concrete should have the desired slump before beginning any other tests.
   A. True
   B. False

18. Two desirable properties of an aggregate are (one correct answer):
   A. High porosity and inert
   B. Low absorption and abrasive resistance
   C. High porosity and laminated
   D. Laminated and cubical shape

19. In NCDOT mixtures fly ash may be substituted for Portland cement up to ______ by weight of the specified cement:
   A. 10%
   B. 20%
   C. 30%
   D. 40%

20. Which of the following has the greatest effect on the strength, durability, and water tightness of concrete:
   A. Aggregate durability
   B. Color of cement
   C. Cement content
   D. Water-cement ratio