

## 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