Concrete Field Technician NCDOT Study Guide

1) While performing the Volumetric Method air test, two pints of alcohol were used to dispel the foam. Which of the following statements is true?
    a) An alcohol correction factor is added to the final meter reading.
    b) No correction is required
    c) An alcohol correction factor is added to the initial meter reading.
    d) An alcohol correction factor is subtracted from the initial meter reading.

2) When pouring Drill Pier Concrete, what is the minimum sampling frequency for test specimens?
    a) One set per 100 yd3
    b) One set per day's operation
    c) Each load
    d) Each 3rd load

3) When used to determine unit weight, the concrete in the mold must be struck off with a
    a) Strike off bar
    b) Strike off plate
    c) Tamping rod
    d) Any of the above

4) The reading on the gage of a pressure meter is 6.2%. The aggregate used has a correction factor of 0.3%. The final air reported is:
    a) 6.5%
    b) 5.9%
    c) 6.2%
    d) 0.3%

5) Which percent range most nearly represents the amount of paste volume in a concrete mix?
    a) 20-40%
    b) 45-75%
    c) 60-80%
    d) 75-90%

6) The air content for incidental and structural concrete ranges from ___ to ___ percent
    a) 3.5, 605
    b) 4.5, 7.5
    c) 5.5, 8.5
    d) 6.5, 9.5

7) Components of concrete that are heated due to cold conditions are heated to a maximum temperature of _____ degrees Fahrenheit by NCDOT specifications.
    a) 85
    b) 95
    c) 150
    d) 210

8) When water is added to concrete in the mixer at the job site, the minimum number of revolutions placed on the mixer is:
    a) 15
    b) 20
    c) 25
    d) 30

9) After consolidation of the unit weight sample, a small amount of concrete can be added to correct for any deficiencies.
    a) True
    b) False

10) Calculate the air content using the following weights: Theoretical Unit Weight 150.05 pcf Actual Unit Weight 140.75 pcf
    a) 6.2%
    b) 5.8%
    c) 4.3%
    d) 6.75%

11) The minimum size sample for one set of concrete test specimens is:
    a) 0.1 cubic foot
    b) 0.5 cubic foot
    c) 1.0 cubic foot
    d) 2.0 cubic foot

12) The minimum set(s) of cylinders to be made on an NCDOT project for class AA concrete on an 87 yd3 pour is:
    a) 1 set
    b) 2 set
    c) 3 set
    d) 4 set

13) By NCDOT specifications, fly ash may be substituted for Portland Cement up to _____ percent by weight of the required cement.
    a) 15
    b) 20
    c) 25
    d) 30

14) The slump test has to be completed within _____ minutes from the time concrete is introduced into the cone.
    a) 2.0
    b) 2.5
    c) 3.0
    d) 5.0

15) _____ is used to dissolve the entrained air bubbles when performing the Chace Air Indicator test.
    a) Water
    b) Distilled Water
    c) 70% isopropyl alcohol
    d) 100% isopropyl alcohol

16) A curing day is defined as any consecutive _____ period, during which the air temperature adjacent to the mass does not fall below _____ degrees Fahrenheit.
    a) 2 day, 40
    b) 12 hour, 40
    c) 24 hour, 35
    d) 24 hour, 40

17) The purpose of air entrainment is to retard the concrete, thereby increasing allowable placement time.
    a) True
    b) False

18) The allowable pH requirements for mixing water used to batch concrete in NCDOT projects ranges from _____ to _____.
    a) 4.5-7.5
    b) 3.0-8.0
    c) 4.5-8.5
    d) 4.0-8.5

19) The chemical reaction between water and cement is _____
    a) Coarse aggregate
    b) Admixture
    c) Hydration
    d) Fine aggregate

20) The type of cement which has the highest fineness and the highest amount of tricalcium silicate, both factors contributing to accelerated strength gain is:
    a) Type I
    b) Type II
    c) Type III
    d) Type IV

21) One gallon of water weighs:
    a) 6.5 pounds
    b) 62.4 pounds
    c) 1 pound
    d) 8.33 pounds

22) Time, temperature and moisture are three factors that affect the _____ of the concrete mix.
    a) Porosity
    b) Reactivity
    c) Curing
    d) Humidity

23) The bonding agent used in a concrete mix is:
    a) Cement
    b) Ait entraining agent
    c) Retarder
    d) Water

24) The number one reason for using air in NCDOT concrete is:
    a) Workability
    b) Strength
    c) Durability
    d) Control of bleed water

25) Admixtures must be dispersed into the mixture with
    a) Cement
    b) Water
    c) Fine aggregate
    d) Coarse aggregate

26) Any opportunity, service, accommodation, use of facility, or other benefit made available for less than the fair market or normal value given in exchange for being influence in the discharge of one's duties or responsibilities defines _____
    a) Conflict of interest
    b) Gift
    c) Favor
    d) Luck

27) An approved set retarding admixture is required when placing concrete on the superstructure of a bridge
    a) True
    b) False

28) Only a few power plants produce an ideal fly ash that has a combination of high fineness and low carbon content
    a) True
    b) False

29) Increasing the amount of cement in a concrete mix while maintaining the same amount of water will most likely result in____
    a) Slow set
    b) Ease of placement
    c) High early strength
    d) Lower strength

30) If a slump exceeds the maximum specified limit, a separate sample is immediately obtained from the same truck load and an additional test is performed.
    a) True
    b) False

31) If the average of two slump test results exceed the specified maximum slump, the load of concrete is ____.
    a) Mixed with a good load
    b) Accepted as reasonably close
    c) Rejected
    d) Placed in the structure

32) When placement of concrete is by pumping, take the concrete acceptance sample from the discharge end of the pump
    a) True
    b) False

33) After placing the concrete, cure it for a period of ___ full curing days
    a) 3
    b) 5
    c) 7
    d) 9

34) Apply moisture from a nozzle under pressure directly upon the concrete when using the water curing method.
    a) True
    b) false

35) The 2012 NCDOT Standard Specifications require a minimum of 3,000 pounds per square inch compressive strength in 7 days for latex concrete.
    a) True
    b) False

36) Do not load trucks used to agitate concrete with more than ____ % of the gross volume of the drum.
    a) 20
    b) 63
    c) 50
    d) 80

37) For central mixers, where mixer performance tests are made, the minimum mixing time shall not be less than _____ seconds.
    a) 50
    b) 63
    c) 120
    d) 90

38) According to the 2012 Standard Specifications, the minimum amount of concrete which can be mixed or agitated in a transit mixer is
    a) 20%
    b) 63%
    c) 50%
    d) 80%

39) The component most easiest and practical to cool is _____.
    a) Aggregate
    b) Water
    c) Cement
    d) Fly ash

40) Mix designs for structural concrete shall be submitted to the Engineer_____ days before proposed use.
    a) 5
    b) 15
    c) 25
    d) 35

41) When using central dispatching, each plant location must have a _____ indirect control of the batching operation.
    a) Certified Batcher
    b) Certified Field Technician
    c) Computer
    d) Truck driver

42) Any person who knowingly falsifies an inspection report or test report required by the Department of Transportation in connection with the construction of highways shall be guilty of a Class H Felony.
    a) True
    b) False

43) Transport compressive strength specimens to the laboratory within _____ after they are made.
    a) 72 hours
    b) 48 hours
    c) 7 days
    d) 28 days

44) The _____ provides information about the moisture calculations made by the batcher on the mix design during batching and is sent out with the first and the last load.
    a) M&T Mix Design Form 312 U
    b) M&T Batch Ticket Form 903
    c) M&T Form 250
    d) Project Diary

45) A mixture of cement paste and fine aggregate is called:
    a) Concrete
    b) Mortar
    c) Paste
    d) Coarse aggregate

46) Alkali Silica Reactivity is
    a) A chemical reaction that deteriorates hardened concrete
    b) A chemical reaction that increases the porosity of the concrete
    c) A chemical reaction that decreases the reactivity of the water and cement mix
    d) A chemical reaction that creates materials

47) All members are to ensure that an atmosphere of ethical behavior is promoted and maintained at all times.
    a) True
    b) False

48) For the slump test, the cones should be filled in ___ layer (s)
    a) 3
    b) 2
    c) 4
    d) 1

49) Should the air under the insulation fall below _____ degrees Fahrenheit during the protection period, immediately cover the concrete with canvas and framework and apply heat uniformly at a rate such that the air surrounding the concrete is less than 50 degrees Fahrenheit for the remainder of the protection period.
    a) 30
    b) 40
    c) 50
    d) 60

50) Acceptance of a concrete mix design for use on a NCDOT project is a _____ process
    a) Threefold
    b) Onefold
    c) Twofold
    d) Fourfold

Answer Key

1. B) No correction is required
2. C) Each load
3. B) Strike off plate
4. B) 5.9%
5. A) 20-40%
6. B) 4.5. 7.5
7. C) 150
8. C) 25
9. A) True
10. A) 6.2%
11. C) 1.0 cubic foot
12. A) 1 set
13. B) 20
14. B) 2.5
15. C) 70% isopropyl alcohol
16. D) 24 hour, 40
17. B) False
18. C) 4.5-8.5
19. C) Hydration
20. C) Type III
21. D) 8.33 pounds
22. C) Curing
23. A) Cement
24. C) Durability
25. B) Water
26. C) Favor
27. A) True
28. A) True
29. C) High early strength
30. A) True
31. C) Rejected
32. A) True
33. C) 7
34. B) False
35. A) True
36. D) 80
37. A) 50
38. A) 20%
39. B) Water
40. D) 35
41. A)) Certified Batcher
42. A) True

43. A) 72 hours
44. C) M&T Form 250
45. B) Mortar
46. A) A chemical reaction that deteriorates hardened concrete
47. A) True
48. A) 3
49. C) 50
50. C) Twofold