

Final Exam
Continuing Education Course #095
Fundamentals of Concrete

1. Concrete is naturally found in nature.

- ☐ a. True
- ☐ b. False

NOTE: The following question was revised on 16 August 2018

2. A common error often heard in public is calling a concrete sidewalk a cement sidewalk.

- ☐ a. True
- ☐ b. False

3. Aggregates are necessary for the chemical process to take place in the curing of concrete.

- ☐ a. True
- ☐ b. False

4. The primary ingredient of Portland cement is:

- ☐ a. Aggregate
- ☐ b. Silica
- ☐ c. Limestone
- ☐ d. Crushed sand

5. A sack of cement:

- ☐ a. Weighs 94 pounds
- ☐ b. Equals one cubic foot
- ☐ c. A sack can also be referred to as a bag of cement
- ☐ d. All of the above

6. A contractor orders 5 cyd of 6 bag concrete. How many pounds of cement will be in the batch?

- ☐ a. 135 pounds
- ☐ b. 564 pounds
- ☐ c. 1,410 pounds
- ☐ d. 2,820 pounds

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7. Using damp sand to make a batch of concrete requires a reduction in the amount of water added to the mix.

- ☐ a. True
- ☐ b. False

8. About how much does a cubic yard of concrete weigh? ($1 \text{ yd}^3 = 27 \text{ ft}^3$)

- ☐ a. 150 pounds
- ☐ b. 2,538 pounds
- ☐ c. 4,050 pounds
- ☐ d. 3 tons

9. Hydration begins when

- ☐ a. Cement is added to aggregate
- ☐ b. Aggregate is added to water
- ☐ c. Concrete is placed in a form
- ☐ d. Water is added to cement

10. Which is **NOT** a correct answer? Admixtures can be added to a batch of concrete to:

- ☐ a. Increase the curing time of the concrete
- ☐ b. Increase the strength of the concrete
- ☐ c. Increase the strength of the aggregate
- ☐ d. Increase the concrete's resistance to oils

11. A slump test can be used to determine the workability of concrete.

- ☐ a. True
- ☐ b. False

12. The principal factor in determining the ultimate strength of concrete is:

- ☐ a. The amount of water used in the mix
- ☐ b. The temperature of the water used in the mix
- ☐ c. The water/cement ratio
- ☐ d. The amount of cement used in the mix

13. Concrete made with Class I cement will reach nearly full strength at around:

- ☐ a. 3 days
- ☐ b. 7 days
- ☐ c. 28 days
- ☐ d. 2 months

14. What is the approximate ultimate strength of the footing concrete which was placed 28 days ago if a 6"Ø test cylinder failed at 70,000 pounds today?

- ☐ a. 619 psi
- ☐ b. 2,477 psi
- ☐ c. 3,850 psi
- ☐ d. 11,666 psi

15. Allowing water to evaporate from a newly placed concrete slab will have adverse effects on the curing of the slab.

- ☐ a. True
- ☐ b. False

16. Placing concrete in a form underwater does not allow the concrete to cure properly.

- ☐ a. True
- ☐ b. False

17. Reinforcing steel used in normal reinforced concrete can have allowable working stresses of:

- ☐ a. 10,000 to 20,000 psi
- ☐ b. 12,000 to 42,000 psi

- ☐ c. 20,000 to 33,000 psi
- ☐ d. 28,000 to 35,000 psi

18. 6 x 6 x 10/10 WWF has:

- ☐ a. 10 inches square grid
- ☐ b. No. 6 wire in the longitudinal direction
- ☐ c. 6 inches square grid
- ☐ d. No 6 wire in the transverse direction

19. How many No. 8 bars (area = 0.79 in^2) of 24,000 psi reinforcing steel would you use to resist a tensile force of 90,000 pounds?

- ☐ a. 3.75
- ☐ b. 4
- ☐ c. 4.75
- ☐ d. 5

20. The center of the span of a pre-stressed beam can lift off the bottom of the form when the pre-stressing cables are cut loose.

- ☐ a. True
- ☐ b. False

21. A post-tensioned beam can be a two span continuous beam.

- ☐ a. True
- ☐ b. False

22. When placing concrete into a wall or column form, the rate at which the concrete fills the form is an important factor.

- ☐ a. True
- ☐ b. False

23. Under certain conditions, when placing concrete in a vertical form, the maximum lateral pressure on that form is given by the following formula:

$$P_{\max} = 150 + 9000 R/T$$

If the temperature of the concrete is 80°F and the concrete is placed in the form at the rate of 3 feet per hour, what is the maximum pressure at the bottom of the form?

- ☐ a. 187.5
- ☐ b. 262.5
- ☐ c. 420
- ☐ d. 487.5