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Final Exam

Continuing Education Course #416 Concrete Slabs-on-Grade
Warehouses III – High Performance Slabs

1. Choose the best answer: Type K, M, or S cements in shrinkage compensating concrete promote the ¬¬¬_____of concrete.
- ○ a. shrinkage
- ○ b. ductility
- ○ c. expansion

2. Choose the best answer: Sulfates in the cement are required in carefully calibrated amounts to allow for the formation of_____, which is a mineral produced to cause expansion.
- ○ a. aluminum zirconium tetrahydrochlorex gly
- ○ b. ettringite
- ○ c. ammonium laureth sulfate

3. When the amount of expansion equals or exceeds the amount of drying shrinkage, this is known as _____ shrinkage compensation.
- ○ a. insufficient
- ○ b. partial
- ○ c. full

4. The use of shrink comp concrete in slabs means that the normal use of _____ to introduce controlled straightline cracks to relieve tension is no longer necessary.
- ○ a. control joints
- ○ b. random cracks
- ○ c. forklift traffic

5. In general, is extremely important to _____ while curing shrink comp slabs.
- ○ a. restrain the slab from moving using obstructions
- ○ b. allow the slab to move
- ○ c. force the slab to dry out quickly

6. The construction of shrinkage compensating concrete slabs is generally performed by _____ contractors.
- ○ a. undiscerning
- ○ b. inexperienced
- ○ c. specialty

7. Choose the best answer: Fibers allow for enhanced _____ of a concrete slab.
- ○ a. expansion
- ○ b. post-crack residual strength
- ○ c. workability

8. Typical synthetic fiber dosages are as follows for the crack control of concrete.

○ a. 0.5 to 1.0 lbs / cu. yd.
○ b. 3.0 to 7.5 lbs / cu. yd.
○ c. 15.0 to 25.0 lbs / cu. yd.

9. If ductility is sufficient, _____ theory (and related equations) would be an advantage in strength checks.
○ a. superstring
○ b. yield line
○ c. relativistic

10. Macrofibers appear to induce _____ that are spread out over the area of slab, relieving stresses more often, and reducing the chances of random cracking (Choose the best answer):
○ a. wide cracks
○ b. highly visible cracks
○ c. microcracks

11. Reinforcing in a concrete slab is recommended if _____:
○ a. joint spacing is wider than ACI 360 recommendations
○ b. shrinkage is 0.02% or less
○ c. joint spacing is less than 12 feet on center in each direction

12. When a slab has 0.5% or greater steel reinforcing by area, this is known as _____reinforcing.
○ a. intermittent
○ b. fiber
○ c. continuous

13. The crack sizes to expect for pours with 0.6% continuous reinforcing is in the range of ___, or the thickness of a credit card.
○ a. 0.03"
○ b. 0.25"
○ c. 1.0"

14. Slabs containing steel tendons or cables that are pulled with jacks after the slabs-on-grade are poured are called _____slabs-on-grade.
○ a. unreinforced
○ b. post-tensioned
○ c. high shrinkage

15. The practical limit for the size of single poured area with post-tensioning is about ____ feet in each direction.
○ a. 25
○ b. 50
○ c. 200

16. _____tendons are housed in plastic sleeves with grease reducing the friction between the sleeve and tendon
○ a. Unbonded
○ b. Bonded

17. Tendon pulling in post-tensioned slabs should occur as ____ as possible to keep the slab from cracking during the drying shrinkage stage.
○ a. late
○ b. early

18. Creep, drying shrinkage, relaxation of the PT tendons, and elastic shortening of the concrete under stress are all examples of _____ losses.

- a. long term
- b. short term

19. Choose the best answer: Warehouses with temperatures in the-15F to 0F range need to be reviewed for potential _____lenses that can penetrate into the soil matrix:

- a. frost
- b. shrinkage
- c. reinforcing

20. The use of _____ in flexible tubing to prevent a frozen soil matrix is fairly common.

- a. cool compressed air
- b. warm glycol fluid
- c. 14 degree F ethyl alcohol

21. The draw down temperature sequence for a freezer slab with a final operating temperature of -15F begins with dropping the temperature to ____ on the initial draw down.

- a. +35F
- b. -15F

22. Automated Storage & Retreival System racking (ASRS) systems, use _____ to move products to and from the racking.

- a. manual methods by hand
- b. crane-type lifts
- c. conventional worker-driven forklifts

23. Installation of the automated equipment in ASRS racking systems may require that FEM Specifications _____ needed to be met.

- a. 360
- b. 9.831 and 9.832
- c. 318-14

24. One rack system requiring a superflat floor is _____ racking

- a. short wide-aisle
- b. Very narrow aisle (VNA)

25. For a VNA system, the lifts need to travel in superflat aisles on what is known as "_____-traffic floors."

- a. defined
- b. undefined
- c. random