

CIM ASTM Level 1 Certification Practice Test (Sample)

Study Guide



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SAMPLE

Questions

- 1. How many portions are required when sampling concrete from a revolving truck mixer?**
 - A. One or more**
 - B. Two or more**
 - C. Four or more**
 - D. Five or more**
- 2. What should be done to the measure after rodding each layer before adding another layer of concrete?**
 - A. Leave it as is**
 - B. Tap the sides smartly 10-15 times with the mallet**
 - C. Fill it with water**
 - D. Cover it tightly**
- 3. How should specimens be prepared if they are not to be standard cured within 48 hours?**
 - A. Kept in a freezer**
 - B. Cured in water**
 - C. Stored in a humid environment**
 - D. Discarded immediately**
- 4. How soon should tests for slump, temperature, and air content begin after obtaining the final portion of the composite sample?**
 - A. 1 minute**
 - B. 3 minutes**
 - C. 5 minutes**
 - D. 7 minutes**
- 5. Which tool may be used to strike off the top surface of concrete after consolidation?**
 - A. A rubber mallet**
 - B. A strike-off bar**
 - C. A trowel**
 - D. A measuring cup**

- 6. What method of consolidation should be used when the slump is greater than 3 inches?**
- A. Vibration**
 - B. Rodding**
 - C. Stamping**
 - D. Tamping**
- 7. Is a composite sample of concrete necessary for temperature determination?**
- A. Yes, always**
 - B. No, if only temperature is being measured**
 - C. Only for testing purposes**
 - D. Only if multiple samples are being taken**
- 8. How should the tamping rod be used to achieve uniformity across the layers?**
- A. Use random movements**
 - B. Keep the rod vertical**
 - C. Rod evenly across the cross section**
 - D. Use minimal pressure**
- 9. What must be done if the concrete contains aggregate larger than permitted for a particular test method?**
- A. Ignore the large aggregates**
 - B. Wet-sieve the sample before testing**
 - C. Use smaller aggregates directly**
 - D. Change the test method**
- 10. How much total time is allowed to conduct the slump test from beginning to completion?**
- A. 1 minute**
 - B. 2 minutes**
 - C. 2 ½ minutes**
 - D. 3 minutes**

Answers

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1. B
2. B
3. C
4. C
5. B
6. B
7. B
8. C
9. B
10. C

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Explanations

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1. How many portions are required when sampling concrete from a revolving truck mixer?

- A. One or more**
- B. Two or more**
- C. Four or more**
- D. Five or more**

When sampling concrete from a revolving truck mixer, the requirement is to take two or more portions. This is necessary to ensure that the sample accurately represents the entire batch of concrete in the mixer. By taking multiple portions, the variance within the concrete mix can be accounted for, which helps in achieving a more reliable and homogeneous sample for testing. Sampling from just one portion would not provide a valid representation of the entire load, as the components of the mix may not be uniformly distributed due to the mixing process or due to segregation that may have occurred during transport. By collecting at least two portions, one can effectively reduce the potential for errors and inconsistencies during testing, leading to more reliable results when determining the properties of the concrete. In regard to higher numbers such as four or five portions, while taking more portions can offer even finer granularity and potentially improve the representativeness of the sample, the minimum standard is set at two to achieve the balance between practicality and reliability in typical sampling conditions.

2. What should be done to the measure after rodding each layer before adding another layer of concrete?

- A. Leave it as is**
- B. Tap the sides smartly 10-15 times with the mallet**
- C. Fill it with water**
- D. Cover it tightly**

After rodding each layer of concrete, tapping the sides smartly with a mallet is essential to ensure proper compaction. This action helps to eliminate air pockets and allows the concrete to settle uniformly, which leads to a denser and more robust final product. If air bubbles are trapped within the mixture, they can create weak spots, leading to issues with strength and durability once the concrete sets. This tapping process allows the concrete to flow better and fill in any voids around the aggregate particles. It also aids in achieving the desired consistency and workability of the concrete before adding subsequent layers. Ensuring that each layer is well-compacted is vital for the structural integrity of the concrete in the end, making this step critical in the concrete pouring process. The other options do not contribute positively to the quality of the concrete placement. Simply leaving it as is could result in uneven settling. Filling it with water would not only be counterproductive but could also negatively affect the concrete's properties. Covering it tightly does not address compaction and may lead to issues like trapping moisture or creating an uneven surface.

3. How should specimens be prepared if they are not to be standard cured within 48 hours?

- A. Kept in a freezer**
- B. Cured in water**
- C. Stored in a humid environment**
- D. Discarded immediately**

Specimens that are not to be standard cured within 48 hours should be stored in a humid environment to prevent them from drying out. This practice is vital because keeping the specimens moist ensures that the hydration process continues as intended, which is crucial for achieving accurate and reliable test results. Proper moisture retention allows the material's properties to develop appropriately, maintaining consistency with standard curing conditions. Storing specimens in a humid environment results in minimal disruption or change to the specimens' intended hydration state, providing a better approximation to standard curing conditions, which typically involve a controlled environment that maintains moisture and prevents drying. This is particularly important for materials like concrete or cement-based specimens, where moisture is key to the curing process and the final properties of the material. Other options such as freezing or discarding the specimens would halt any curing process and compromise the integrity of the material's properties, while curing in water, although somewhat beneficial, does not replicate the standard curing conditions adequately and may lead to issues if not monitored properly. Thus, creating a humid environment is the best practice when standard curing cannot occur within the optimal time frame.

4. How soon should tests for slump, temperature, and air content begin after obtaining the final portion of the composite sample?

- A. 1 minute**
- B. 3 minutes**
- C. 5 minutes**
- D. 7 minutes**

The correct timeframe for beginning tests for slump, temperature, and air content after obtaining the final portion of the composite sample is 5 minutes. This duration is critical because it ensures the properties of the concrete are evaluated while the material remains consistent with its freshly mixed state. Conducting these tests promptly helps to achieve accurate representations of the concrete's workability, temperature, and air content, which are vital for quality control in construction. If tests are conducted too soon, the concrete may not have settled or reached a stable state, leading to unreliable results. Conversely, waiting too long can result in changes to the concrete due to initial setting or environmental factors, ultimately affecting the test outcomes. Thus, adhering to the 5-minute guideline allows for a balance between timing and the integrity of the measurements.

5. Which tool may be used to strike off the top surface of concrete after consolidation?

- A. A rubber mallet**
- B. A strike-off bar**
- C. A trowel**
- D. A measuring cup**

The strike-off bar is specifically designed for leveling and finishing the surface of freshly placed concrete after it has been properly consolidated. This tool allows the user to effectively remove excess concrete and create a flat, even surface, which is essential for achieving the desired finish and thickness of the concrete slab. The straight edge of the strike-off bar ensures consistency in elevation across the surface, making it crucial for ensuring that the concrete meets the required specifications. While a rubber mallet, trowel, and measuring cup are useful tools in concrete work, they serve different purposes. A rubber mallet is typically used to help settle forms or to tap on sides to release air bubbles rather than to strike off the surface. A trowel is primarily utilized for smoothing and finishing the surface but is not the main tool for achieving the strike-off process after consolidation. A measuring cup's role is unrelated to finishing concrete surfaces; rather, it's used for measuring smaller quantities of materials. In summary, the strike-off bar is the most appropriate tool for striking off the top surface of concrete, making it the best answer for this question.

6. What method of consolidation should be used when the slump is greater than 3 inches?

- A. Vibration**
- B. Rodding**
- C. Stamping**
- D. Tamping**

When the slump of concrete exceeds 3 inches, rodding is the recommended method of consolidation. This is because a higher slump indicates that the concrete is relatively fluid and workable, making it easier to consolidate without the risks of segregation that can occur with more aggressive methods. Rodding involves inserting a rod into the concrete mix and gently stirring it to eliminate air bubbles and ensure that the mix is evenly distributed. In situations where the slump is high, rodding provides the necessary consolidation while maintaining the integrity of the mix. This method allows for sufficient compaction while preventing excessive movement that could lead to the separation of coarse and fine aggregates. Other methods like vibration might introduce too much energy into the mix, which could cause segregation of the materials. Stamping and tamping, while effective for certain applications, are generally better suited for lower slump concrete, where more effort is needed to achieve adequate consolidation.

7. Is a composite sample of concrete necessary for temperature determination?

A. Yes, always

B. No, if only temperature is being measured

C. Only for testing purposes

D. Only if multiple samples are being taken

The correct answer indicates that a composite sample of concrete is not necessary if only temperature is the aspect being measured. This is because temperature is a uniform property throughout a batch of concrete, particularly when dealing with freshly mixed concrete. As such, taking a single temperature measurement at a representative location is generally sufficient to reflect the overall temperature of the concrete mix. When measuring temperature, it is typically done at a specific point in time and place, and it does not require the homogeneity that composite sampling would provide, which is more critical for assessments of properties like strength or composition that require homogenization of the materials. Therefore, for the straightforward purpose of determining temperature, any representative location can yield an accurate measurement, making the composite sample unnecessary in this context. The other options imply situations where a composite sample might be required for reasons that do not pertain specifically to temperature measurement alone, which emphasizes that temperature does not necessitate the complexity of composite sampling.

8. How should the tamping rod be used to achieve uniformity across the layers?

A. Use random movements

B. Keep the rod vertical

C. Rod evenly across the cross section

D. Use minimal pressure

Using the tamping rod evenly across the cross section is essential for achieving uniformity when compacting concrete in a test specimen. This technique helps to ensure that each layer of the concrete is consolidated properly, eliminating any pockets of air or inconsistencies within the mix. By moving the rod consistently across the entire surface area, the operator can guarantee that the density and stability of the concrete are uniform throughout all layers. This uniform compaction is crucial for accurate testing results, as variations in density can affect the performance characteristics of the concrete. In contrast, employing random movements can lead to uneven compaction, resulting in a specimen that does not accurately reflect the properties of the concrete mix. Keeping the rod vertical is important to maintain the integrity of the tamping process, but it alone does not ensure uniformity unless accompanied by a consistent sweeping motion across the surface. Using minimal pressure may not provide sufficient force to effectively consolidate the concrete, potentially leaving air voids and leading to disparities in layer density. Thus, achieving even coverage with the tamping rod is key to the reliability of the testing outcomes.

9. What must be done if the concrete contains aggregate larger than permitted for a particular test method?

- A. Ignore the large aggregates**
- B. Wet-sieve the sample before testing**
- C. Use smaller aggregates directly**
- D. Change the test method**

The appropriate action when dealing with concrete that contains aggregate larger than what is permitted for a specific test method is to wet-sieve the sample before testing. This process involves passing the concrete sample through a sieve while it is wet, allowing the larger aggregates to be separated from the smaller particles. Wet-sieving is crucial because many test methods have strict size requirements for aggregates to ensure accurate results. By removing the excess large aggregates, you maintain the integrity of the test and ensure that the sample used is representative of what the test method is designed to evaluate. It preserves the reliability of measurement by adhering to the standardized conditions specified for the testing procedure. Choosing to ignore the large aggregates compromises the test's accuracy and would likely yield invalid results. Simply using smaller aggregates directly would not reflect the original composition of the concrete mix and could lead to incorrect conclusions about its properties. Altering the test method is not recommended unless it is validated for the specific characteristics of the concrete sample in question. Thus, wet-sieving is the most appropriate and accepted practice in this scenario.

10. How much total time is allowed to conduct the slump test from beginning to completion?

- A. 1 minute**
- B. 2 minutes**
- C. 2 ½ minutes**
- D. 3 minutes**

The slump test is a common method used to measure the workability or consistency of concrete. The total time allowed to complete the slump test is 2 ½ minutes from the moment the concrete is placed in the cone until the slump reading is taken. This time frame ensures that the test results accurately reflect the properties of the concrete before it begins to set or change due to environmental effects. The need to complete the test promptly is related to the fresh state properties of concrete. As time progresses, the concrete may start to lose its workability due to hydration processes beginning or environmental factors, which can lead to inconsistencies in the test results. Therefore, adhering to the 2 ½ minute time limit is crucial for obtaining valid and reliable measurements of the concrete's slump, making it an essential aspect of the testing procedure.