

CST Level 1 Land Surveyor Certification Practice (Sample)

Study Guide



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SAMPLE

Questions

- 1. What does a Zenith Angle measure?**
 - A. An angle measured counterclockwise from North**
 - B. An angle measured clockwise from the vertical line**
 - C. A horizontal angle measurement**
 - D. An angle measured directly above the horizontal plane**
- 2. What essential maintenance should be performed on steel survey chains?**
 - A. Polish with a cloth regularly.**
 - B. Remove rust periodically.**
 - C. Inspect for kinks and replace as needed.**
 - D. All of the above.**
- 3. What is a Point of Intersection (PI) defined as?**
 - A. A point where vertical curves meet**
 - B. The midpoint of a horizontal curve**
 - C. Point of Intersection of incoming and outgoing tangents of a horizontal Curve**
 - D. A point of tangency in circular arcs**
- 4. What is a defining feature of bearing measurements?**
 - A. It measures angles from 0 to 270 degrees**
 - B. It uses the south axis as a reference only**
 - C. It is limited to 0 to 90 degrees and relative to north or south**
 - D. It can measure angles in 3D space**
- 5. What type of survey is concerned with the layout of lots and streets?**
 - A. Mine surveying**
 - B. City surveying**
 - C. Hydrographic surveying**
 - D. Industrial surveying**

- 6. Which type of map divides a large parcel into five or more parcels?**
- A. Parcel Map**
 - B. Subdivision Map**
 - C. Base Plan**
 - D. Legal Description**
- 7. What is the function of a level rod during surveying?**
- A. To determine elevation**
 - B. To measure distances**
 - C. To record data**
 - D. To calculate angles**
- 8. What is described as an existing conditions plan created from the initial full topographic survey of a property?**
- A. Profile View Drawing**
 - B. Base Plan**
 - C. Parcel Map**
 - D. Subdivision Map**
- 9. Which of the following would be considered a source of instrumental error?**
- A. Temperature changes**
 - B. Reading errors**
 - C. Kinks in equipment**
 - D. Magnetic variation**
- 10. What is the equivalent length of one rod, perch or pole in feet?**
- A. 10 feet**
 - B. 12.5 feet**
 - C. 16.5 feet**
 - D. 20 feet**

Answers

SAMPLE

- 1. B**
- 2. D**
- 3. C**
- 4. C**
- 5. B**
- 6. B**
- 7. A**
- 8. B**
- 9. C**
- 10. C**

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Explanations

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1. What does a Zenith Angle measure?

- A. An angle measured counterclockwise from North
- B. An angle measured clockwise from the vertical line**
- C. A horizontal angle measurement
- D. An angle measured directly above the horizontal plane

A zenith angle is defined as the angle measured from the vertical line directed straight up toward the zenith (the point in the sky directly above an observer) to the line of sight to an object. This angle effectively provides a measure of how far an object is away from the vertical line, which is why it is specifically characterized as being measured clockwise from that vertical line. Understanding this context helps clarify the nature of a zenith angle. When you visualize the concept, consider that if you are looking straight up (which is the zenith), any angle to a point below the zenith would represent a deviation from this vertical line down toward the horizontal plane. Thus, the measurement originates from the vertical and goes downward rather than across the horizontal plane, ruling out other options based on how angles are typically defined. The other choices describe different types of angular measurements that do not relate to the zenith angle. For instance, an angle measured counterclockwise from North typically refers to azimuth angles, which impact navigation and direction rather than vertical measurements. Horizontal angles, on the other hand, pertain to angles measured parallel to the ground, further distinguishing them from the concept of zenith angles, which operate in a three-dimensional space above and below the horizontal

2. What essential maintenance should be performed on steel survey chains?

- A. Polish with a cloth regularly.
- B. Remove rust periodically.
- C. Inspect for kinks and replace as needed.
- D. All of the above.**

Maintaining steel survey chains is crucial for ensuring accuracy and prolonging their lifespan. Each aspect of maintenance outlined in the choices plays a significant role. Polishing the chain with a cloth regularly helps to keep the surface of the chain clean and free of debris that could interfere with measurements. This simple act prevents corrosion and ensures that the chain operates smoothly during use. Removing rust periodically is essential because rust can weaken the chain and lead to inaccuracies in measurements. Rust not only affects the appearance of the chain but also its functionality. Regular removal of rust, using appropriate methods and materials, helps preserve the integrity of the steel. Inspecting the chain for kinks and replacing sections as needed is vital for maintaining the accuracy of measurements. Kinks can impede the proper alignment and functionality of the chain, which can lead to errors when the chain is used for surveying. Therefore, the correct answer encompasses all these essential maintenance practices, highlighting the comprehensive approach required to care for steel survey chains effectively. Regular attention to these maintenance tasks ensures optimal performance and extends the lifespan of the tools.

3. What is a Point of Intersection (PI) defined as?

- A. A point where vertical curves meet
- B. The midpoint of a horizontal curve
- C. Point of Intersection of incoming and outgoing tangents of a horizontal Curve**
- D. A point of tangency in circular arcs

A Point of Intersection (PI) is defined as a critical geometric feature in horizontal curve design. Specifically, it is the location where the incoming tangent line intersects the outgoing tangent line of a horizontal curve. This point is essential in the design of roadways and railways as it signifies the transition where the curvature begins and ends. Understanding this concept is crucial for land surveyors as it informs the construction and alignment of courses. The other options describe related but distinct concepts within the domain of curve geometry. For instance, the meeting of vertical curves refers to where changes in grade occur but does not pertain to horizontal curvature specifically. The midpoint of a horizontal curve and a point of tangency in circular arcs refer to different aspects of curve design that do not define a PI. Therefore, recognizing the PI's definition as the intersection of tangents helps clarify its integral role in surveying and roadway design.

4. What is a defining feature of bearing measurements?

- A. It measures angles from 0 to 270 degrees
- B. It uses the south axis as a reference only
- C. It is limited to 0 to 90 degrees and relative to north or south**
- D. It can measure angles in 3D space

Bearing measurements are a method of indicating direction with a reference to the cardinal directions. The defining feature of bearing measurements is that they are limited to angles between 0 and 90 degrees and always expressed in relation to either the north or south direction. This means that a bearing measurement constitutes an angle formed from one of the cardinal points—north or south—to the line of interest, while the angle can extend east or west from that point. For example, a bearing of N30°E indicates 30 degrees east of north, and a bearing of S45°W indicates 45 degrees west of south. By restricting measurements to this quadrant system, bearers create a consistent framework for describing directions, making communication about navigational and surveying tasks more efficient and standardized. This system is helpful in practical applications, such as land surveying, where precision in defining the orientation of property lines, construction sites, and geographical features is crucial. The use of angles greater than 90 degrees would not adhere to the conventional bearing system, which is why the option mentioning that bearing measures angles solely within this limit is the most accurate description.

5. What type of survey is concerned with the layout of lots and streets?

A. Mine surveying

B. City surveying

C. Hydrographic surveying

D. Industrial surveying

The focus of the correct answer revolves around the critical responsibilities of city surveying, which encompasses the planning and design of urban spaces. City surveying involves preparing layouts for streets, lots, and public spaces, ensuring that all elements align with zoning regulations and the overall urban plan. This type of survey ensures that infrastructure is strategically positioned to accommodate future development while considering accessibility and efficiency for the community. In urban environments, effective city surveying is essential for balancing land use, transportation, and public services. It provides a framework for constructing roads, residential areas, commercial zones, and parks, which contributes to the organization and functionality of a city. Other types of surveying like mine surveying, hydrographic surveying, and industrial surveying serve specific purposes that do not directly relate to the layout of urban lots and streets. Mine surveying focuses on mineral extraction sites, hydrographic surveying deals with bodies of water and navigational purposes, and industrial surveying pertains to industrial sites and their operations. Each of these fields has its specialized techniques and objectives that are distinct from the concerns of city surveying.

6. Which type of map divides a large parcel into five or more parcels?

A. Parcel Map

B. Subdivision Map

C. Base Plan

D. Legal Description

The type of map that divides a large parcel into five or more parcels is known as a subdivision map. This term specifically refers to the legal process of dividing land into smaller lots, which typically involves adherence to local zoning laws and regulations. Subdivision maps serve as the crucial documents that reflect the new boundaries and layout after a parcel has been subdivided, often aiming for the development of residential communities, commercial properties, or mixed-use spaces. In contrast, a parcel map usually pertains to smaller subdivisions, generally involving four or fewer parcels, and is less comprehensive than a subdivision map. A base plan refers to the foundational layout of a property or project but does not pertain specifically to the legal division of property. Legal descriptions provide a formal, legally recognized method for describing a parcel of land but are not maps themselves; they detail the geographical boundaries of a land area rather than showing the layout of subdivisions. Thus, the subdivision map is the appropriate choice as it directly relates to the division of a larger parcel into five or more smaller parcels.

7. What is the function of a level rod during surveying?

A. To determine elevation

B. To measure distances

C. To record data

D. To calculate angles

The function of a level rod during surveying is primarily to determine elevation. A level rod, also known as a leveling staff or surveying rod, is used in conjunction with a leveling instrument to establish a benchmark or reference point for height above a datum, such as mean sea level. When a surveyor uses a leveling instrument, they can create a horizontal line of sight and then use the level rod to measure the height at various points of interest. The reading taken from the level rod at the point where the instrument is set allows the surveyor to calculate the difference in elevation between the rod and the reference point. This is crucial for tasks such as establishing the grade of a road or determining the height of a building foundation. The accuracy in reading the rod contributes significantly to ensuring the vertical data is reliable, which is essential in construction, land development, and other engineering applications. In this context, while measuring distances, recording data, and calculating angles are important survey-related activities, they do not pertain specifically to the function of a level rod, which is primarily centered around measuring vertical distances or differences in elevation.

8. What is described as an existing conditions plan created from the initial full topographic survey of a property?

A. Profile View Drawing

B. Base Plan

C. Parcel Map

D. Subdivision Map

The term commonly used to describe an existing conditions plan created from the initial full topographic survey of a property is "Base Plan." A Base Plan serves as a foundational representation of the site's current state, incorporating features such as buildings, trees, contours, roads, and other relevant topographic elements. This plan is essential for subsequent design work, as it provides a clear and accurate overview of the landscape and existing structures. In contrast, a Profile View Drawing typically shows a side view of a particular section of land, focusing on grades and elevations rather than the entire site layout. A Parcel Map outlines the division of land into parcels and often includes essential property lines but does not usually detail existing conditions in the same way as a Base Plan. A Subdivision Map illustrates the proposed division of a larger tract of land into smaller lots for development, serving different purposes related to land planning and zoning rather than simply depicting existing conditions.

9. Which of the following would be considered a source of instrumental error?

- A. Temperature changes**
- B. Reading errors**
- C. Kinks in equipment**
- D. Magnetic variation**

Instrumental errors are inaccuracies that arise from the tools and equipment used in surveying rather than from external conditions or human mistakes. Kinks in equipment directly affect the performance and accuracy of measuring devices. For example, if a tape measure or a total station has a physical deformation, such as a kink, it can lead to incorrect readings due to distortion in the measuring apparatus. Temperature changes, reading errors, and magnetic variation are generally categorized differently.

Temperature changes can affect the calibration of instruments but are often considered environmental or operational instead of instrumental. Reading errors specifically relate to human interpretation of measurements, and magnetic variation is related to the Earth's magnetic field affecting compass readings rather than any defect in the instrument itself. Therefore, kinks in equipment are a clear example of an instrumental error because they directly compromise the integrity of the measurements taken.

10. What is the equivalent length of one rod, perch or pole in feet?

- A. 10 feet**
- B. 12.5 feet**
- C. 16.5 feet**
- D. 20 feet**

A rod, perch, or pole is defined as being equal to 16.5 feet. This unit of measurement is historically significant in land surveying and agriculture, as it has been used for various applications, including measuring distances for plots of land. Understanding this unit is essential for land surveyors since it frequently appears in older surveys and legal documents related to property boundaries. The choice of 16.5 feet is based on the conversion that one rod equals 5.5 yards, and since one yard equals 3 feet, this calculation results in $5.5 \text{ yards} \times 3 \text{ feet/yard} = 16.5 \text{ feet}$. This knowledge is vital for surveyors to accurately interpret measurements and effectively determine areas, especially when converting between different systems of measurement.