CST Level 1 Land Surveyor Certification Practice (Sample)

Study Guide

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Questions

1. What method is used in stadia surveys?

A. Modified trigonometric leveling

B. GPS positioning

C. Drone surveying

D. GPS triangulation

2. Which specific type of horizontal alignment is critical for roadway design?

A. Intersection

B. Superelevation

C. Vertical Curve

D. Horizontal Curve

3. What characterizes a large scale map?

A. Shows a detailed view of a small area

B. Has a representative fraction of 1:2,000,000 or more

C. Is used principally for global mapping

D. Represents an abstract area with no specific details

4. How many chains are there in one mile?

A. 60 chains

B. 72 chains

C. 80 chains

D. 100 chains

5. What is one characteristic of a reverse curve?

A. Consists of two simple arcs with different radius

B. Features a straight line segment between two curves

C. Is used predominantly in urban areas

D. Only used on steep hills

6. Which surveying type focuses on the relief and features of the earth's surface?

A. Hydrographic surveying

B. Route surveying

C. Topographic surveying

D. Geological surveying

7. When comparing two maps with different scales, what can be stated regarding an engineering map at 1 in = 100 ft and a land subdivision map at 1 in = 1 mile?

A. Both maps have a large scale.

B. The engineering map has the larger scale of the two.

C. Both maps have a small scale.

D. The land subdivision map has the larger scale of the two.

8. In land surveying, what does the needle of the surveyor's compass typically point towards?

A. True North

B. Geographic North

C. Magnetic North

D. Grid North

9. A 100 foot cloth or fiber tape is most likely used for measuring which of the following?

A. Property corners

B. Traverse measurements

C. Slope stake locations

D. Centerline

10. Which unit of area is approximately 2.471 acres?

A. Hectare

B. Labor

C. Morgen

D. Rood

Answers

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

Explanations

1. What method is used in stadia surveys?

A. Modified trigonometric leveling

B. GPS positioning

C. Drone surveying

D. GPS triangulation

In stadia surveys, the modified trigonometric leveling method is employed to determine distances based on the angular measurement of a target and the height difference between the instrument and the target. This technique utilizes a survey instrument with stadia hairs, which are crosshairs that help in measuring the distance to a point by interpreting the readings taken from the staff placed at that location. Stadia surveys are particularly effective for quick distance measurements over varying terrain, as they allow surveyors to obtain data without the need for direct distance measurement equipment. The principle relies on mathematical relationships involving angles and horizontal distance, which is adjusted for the height of the instrument using the stadia readings. Through this method, surveyors can efficiently gather data over a wide area, making it beneficial for construction projects and land assessments. The other methods listed, while useful in their own contexts, do not specifically apply to stadia surveys: GPS positioning, drone surveying, and GPS triangulation are modern technologies that serve different purposes in surveying and mapping but do not incorporate the stadia principle.

2. Which specific type of horizontal alignment is critical for roadway design?

A. Intersection

B. Superelevation

C. Vertical Curve

D. Horizontal Curve

In roadway design, horizontal curves play a critical role in defining the path that vehicles will take when navigating through changes in direction. These curves are essential for ensuring smooth transitions in roadway alignment, which influence the overall safety and operational efficiency of a road. Properly designed horizontal curves help maintain comfortable and predictable vehicle speeds, reduce the risk of skid and rollover accidents, and improve sight distance for drivers. When considering the characteristics of horizontal curves, several factors must be taken into account, including the radius of the curve, the allowable side friction, and superelevation, which is the banking of the road surface to counteract the lateral forces on vehicles. The design must also consider factors like the design vehicle's dimensions, speed, and the expected traffic volume to ensure that the curve can accommodate all types of vehicles safely. While other elements such as intersections, superelevation, and vertical curves are significant in roadway design, they serve different purposes. Intersections focus on points where roads meet and require different design considerations for traffic flow and control. Superelevation is specifically about the banking of curves to assist in vehicle maneuverability at speed, but it is dependent on the curvature itself. Vertical curves are concerned with changes in elevation rather than direction. Thus, the horizontal curve

3. What characterizes a large scale map?

A. Shows a detailed view of a small area

B. Has a representative fraction of 1:2,000,000 or more

C. Is used principally for global mapping

D. Represents an abstract area with no specific details

A large scale map is defined by its ability to show a detailed view of a small area. This means that the features presented on the map are represented with a high level of detail, allowing for precise location and characteristics of the land, structures, and other geographic elements to be discerned easily. In large scale maps, the scale ratio is smaller (e.g., 1:10,000), which indicates that one unit of measurement on the map corresponds to a relatively smaller number of the same units in real life, thereby magnifying the area depicted. The other choices describe characteristics that are associated with small scale maps. For example, a representative fraction of 1:2,000,000 or more suggests a smaller scale map, which covers larger areas with less detail. Similarly, maps used principally for global mapping and those representing abstract areas without specific details also pertain to small scale representations, focusing on broader regions with generalized features rather than specifics. Thus, the correct identification of a large scale map primarily correlates with its detailed depiction of a smaller area.

4. How many chains are there in one mile?

A. 60 chains

B. 72 chains

C. 80 chains

D. 100 chains

One mile is equivalent to 80 chains. This measurement is rooted in the historical use of chains as a unit of length, particularly in land surveying. A chain, typically defined as 66 feet, has been a standard measure since its conception by Edmund Gunter in the 17th century. By using this definition, we can convert miles into chains by recognizing that there are 5,280 feet in a mile. To find the number of chains in a mile, the calculation would be as follows: 5,280 feet per mile divided by 66 feet per chain equals 80 chains. This historical context and calculation affirm the accuracy of the statement that one mile consists of 80 chains, making it a useful reference for surveyors who utilize these units in their work.

5. What is one characteristic of a reverse curve?

A. Consists of two simple arcs with different radius

B. Features a straight line segment between two curves

C. Is used predominantly in urban areas

D. Only used on steep hills

A reverse curve is defined as a type of horizontal curve that consists of two arcs that curve in opposite directions. This characteristic is fundamental to the design of roadways and railways, where such curves can be employed to align with the natural topography or to enhance the aesthetics of the route. The two arcs typically feature different radii, allowing for a smooth transition from one direction to another. This design can improve vehicle flow and reduce the sharpness of turns, contributing to safer navigation for traffic. The other choices do not accurately describe a reverse curve. While straight line segments between two curves are related to compound curves rather than reverse curves, the suggestion of predominant use in urban areas is too broad since reverse curves can also be utilized in rural contexts. Additionally, the assertion that reverse curves are only suitable for steep hills does not hold, as they can be effectively implemented on flatter terrain as well. Understanding the defining attributes of reverse curves will aid in recognizing their applications in land surveying and civil engineering design.

6. Which surveying type focuses on the relief and features of the earth's surface?

A. Hydrographic surveying

B. Route surveying

C. Topographic surveying

D. Geological surveying

Topographic surveying is specifically designed to capture the various relief and features of the earth's surface, such as elevation changes, landforms, vegetation, and man-made structures. This type of surveying creates detailed maps that illustrate the terrain's contour and shape, allowing for a clear representation of the physical characteristics of an area. Topographic surveys are critical in various applications, such as land development, construction planning, and environmental management, as they provide essential information about how the land can be used and what natural features need consideration. The detailed contour lines and features depicted in these surveys help professionals understand how drainage patterns work and how different elevations may impact construction and land use. In contrast, hydrographic surveying focuses specifically on bodies of water, assessing depths and features under the water's surface, while geological surveying is concerned with the underlying geological formations and their properties. Route surveying is primarily about the alignment and grading required for roads, pipelines, or railroads, rather than the general relief of the earth's surface. Thus, topographic surveying is distinctly centered on mapping the earth's surface features and their elevations, making it the correct choice for this question.

7. When comparing two maps with different scales, what can be stated regarding an engineering map at 1 in = 100 ft and a land subdivision map at 1 in = 1 mile?

A. Both maps have a large scale.

B. The engineering map has the larger scale of the two.

C. Both maps have a small scale.

D. The land subdivision map has the larger scale of the two.

The engineering map at a scale of 1 inch equals 100 feet is designed to represent a smaller area in greater detail, which is characteristic of a larger scale map. A larger scale means that the features on the map are represented more closely to their actual size. In this case, 1 inch on the engineering map corresponds to a relatively smaller distance in real life, allowing for more detailed work, often necessary for engineering purposes. On the other hand, the land subdivision map at a scale of 1 inch equals 1 mile covers a much broader area, which reduces the level of detail visible on that map. This scale implies that 1 inch represents a significant distance in reality, classifying it as a smaller scale map compared to the engineering map. In summary, the engineering map offers a larger scale due to its ability to show more detail within a smaller geographic area, making it more precise for engineering applications, whereas the land subdivision map is broader and less detailed.

8. In land surveying, what does the needle of the surveyor's compass typically point towards?

A. True North

B. Geographic North

C. Magnetic North

D. Grid North

In land surveying, the needle of the surveyor's compass typically points towards Magnetic North. This is a fundamental aspect of navigation and surveying, as Magnetic North is the direction that a compass needle aligns itself with due to the Earth's magnetic field. Understanding this concept is crucial because Magnetic North is different from True North (the direction along the Earth's surface towards the North Pole) and can vary significantly depending on your geographical location and local magnetic anomalies. This deviation from True North is called magnetic declination, which must be taken into account for precise surveying work. In practical surveying applications, measurements taken with a compass need to be adjusted for this magnetic declination if the final results are to be aligned with True North or another reference framework, such as Grid North, which is based on a flat map projection system. Thus, the correct understanding of the compass function is essential for achieving accurate orientation and measurements in land surveying tasks.

9. A 100 foot cloth or fiber tape is most likely used for measuring which of the following?

A. Property corners

B. Traverse measurements

C. Slope stake locations

D. Centerline

When considering the primary uses of a 100-foot cloth or fiber tape, it's essential to recognize the characteristics and advantages that make it suitable for specific surveying tasks. A cloth or fiber tape is flexible, lightweight, and typically more manageable than metal tapes, especially over long distances. This makes it particularly advantageous for measuring slope stake locations. Slope stake locations often require a high degree of flexibility in measurement, as you may need to navigate uneven terrain, slopes, or areas where traditional measuring tools might be cumbersome. The ability to easily handle and manipulate a cloth tape makes it ideal for placing stakes in relation to elevations or slopes, which may not require the rigid precision of metal tapes. In contrast, property corners, traverse measurements, and centerline tasks usually require more precision and stability, often necessitating the use of more rigid measuring tools that can withstand pulling tension and provide more accurate readings over longer distances. This is why a cloth or fiber tape is not typically the best choice for those applications.

10. Which unit of area is approximately 2.471 acres?

A. Hectare

B. Labor

C. Morgen

D. Rood

The correct answer is the hectare, as one hectare is defined as 10,000 square meters, which is equivalent to approximately 2.471 acres. This relationship makes hectares a commonly used unit of measure in agriculture and land management, especially in regions that utilize the metric system. Understanding this conversion is essential for land surveyors, as they often deal with large plots of land and need to accurately interpret area in terms that are familiar to stakeholders, including farmers, developers, and landowners. On the other hand, the other units may have relevance in specific contexts, but they do not directly convert to 2.471 acres. A labor typically refers to a specific unit used in some agricultural contexts, a morgen varies in size based on regional definitions and is commonly used in South Africa and parts of Western Europe, while a rood is historically related to the acre but represents a smaller area, equivalent to one-quarter of an acre. Therefore, while those options exist, they do not fit the specific area measurement of approximately 2.471 acres as accurately as the hectare does.