

SECTION B

147 Points of 300 Total Points
Time Allowed to Complete This Section: 4 Hours

Examination Overview

The 1991 California Professional Land Surveyor examination is given in two, 4-hour periods on the same day. Section B is the second section of this two-part examination. Section B consists of the following:

Test Problem No.	Subject Matter	Point Value		
B 1	Legal Description	29	<i>1.55</i> <i>1.63 pts/min.</i>	
B 2	Water Boundary	27		
B 3	Solar	21		
B 4	Boundary	33		
B 5	Construction	27		38
B 6	Survey Law	10		82 55 12

The scope of this exam relates to the principles and practice of land surveying in the various areas of practice. You will be graded on the answers specifically required and in certain cases your method of obtaining these answers as demonstrated in your solution. Therefore, show all your work including all formulae and calculations.

The questions have been designed to realistically reflect the actual conditions and practice of land surveying. The assignment of points to each question is not based on the time required to complete an answer. Instead, points have been assigned on the basis of the relative importance of each question to basic land surveying competence.

Examination Instructions

As you will take this test booklet with you when you complete the examination, do not write your answers in this test booklet. Solution booklets for each test problem have been provided with this test booklet. Present your answers on the sheets provided within each solution booklet. Only work in a solution booklet will be scored. Follow the steps listed below to present your solutions:

- Be sure to use the correct solution booklet for each test problem. The problem number is printed on the cover of each solution booklet.
- Enter the problem number in the space provided on each inside sheet of the solution booklet.
- Enter your identification number on the front cover of each solution booklet and in the upper right-hand corner of each page of the solution booklet in the spaces provided. **Do not write your name on any part of this examination.**
- Additional paper for your solution booklets can be obtained from your proctor. Enter the number of the test problem on every additional sheet you use.
- Number your solution pages 1 of 3, 2 of 3, etc.
- In addition to the answer, show all work pertinent to the problem's solution to demonstrate to the grader the method used.
- Certain problems require a specified number of answers. Where you are required to provide a specific number of answers, you must provide **only** the number of answers required. Any answers provided **beyond** the number required will not be graded.
- Clearly delineate any work that you do not want scored by lining through that part and marking VOID across it.
- When you have completed this portion of the examination, check your work, put your solution booklets in order in the envelope provided, seal your envelope, write your examinee ID number across the seal of the envelope, and give all material to your proctor.

PROBLEM B1
29 Points

PROBLEM STATEMENT

Your client owns a portion of the Southwest 1/4 of Section 5, T7N, R12E, M.D.M, and has provided you with the plat on the facing page. You have been asked to prepare a legal description for a proposed 40.00-foot-wide easement across your client's property.

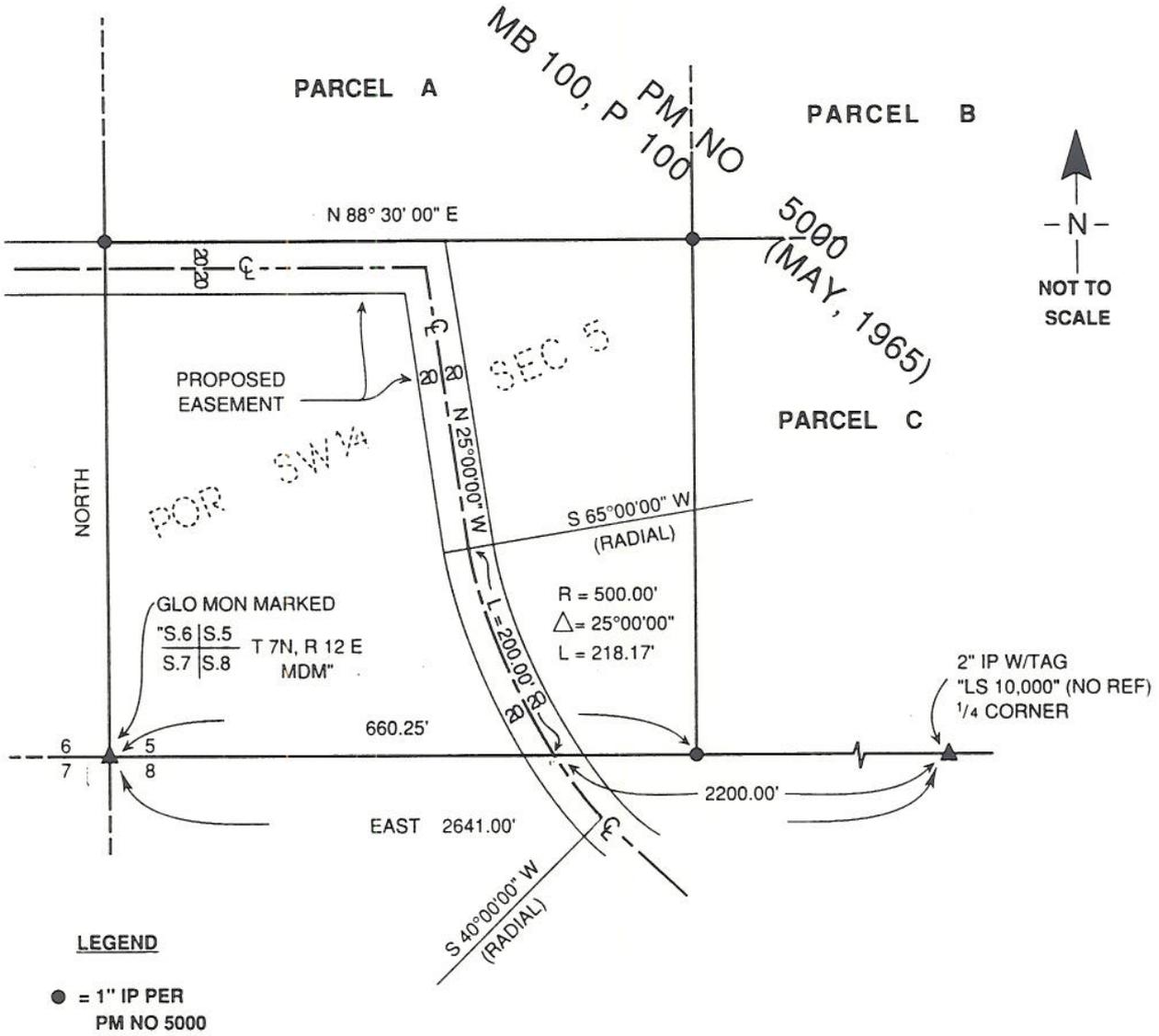
PROBLEM REQUIREMENTS

1. Prepare a strip legal description, including caption (preamble), for the proposed easement.

29 Points

- **Begin your description at the Southwest corner of Section 5.**
- **Use only the information provided on the plat. Do not make assumptions.**

PROBLEM B1



PROBLEM B2

27 Points

PROBLEM STATEMENT

Your client owns Lot 9 of Sandy Beach Tract, a beachfront lot. The front corners have been monumented as shown on the facing page. You have been retained to locate the Westerly property corners. Assume uniform tidal flow and a regular shoreline. Assume a constant grade between Points A and B and Points C and D.

TIDE STATION DATA

	STA CHARLIE (10 MILES NORTH OF LOT 9)		STA TUNA (5 MILES SOUTH OF LOT 9)
MHHW	4.43		4.39
MHW	3.61	3.67	3.52
MTL	2.41		2.58
MSL (NGVD 1929)	1.02		1.02
MLW	0.80		0.78
MLLW	0.00		0.00

NOTE: The values above are local tidal datum at the given station based on MLLW.

PROBLEM REQUIREMENTS

1. Compute the location of your client's Westerly property corners showing dimensions to the found iron pipe monuments and the bearing and distance between the Northwesterly and Southwesterly corners. **Show all work.** **22 Points**
2. What is the purpose of the original government meander line and what is its impact on boundary location? **2 Points**
3. In the event of a boundary conflict with the West line, which state agency would have authority? **1 Point**
4. Which state agency would regulate the development of your client's lot? **1 Point**
5. Of the water lines indicated in the table above, which water line would govern the location of the Westerly line of the property if Sandy Beach Tract were at a natural inland navigable lake? **1 Point**

PROBLEM B3

21 Points

PROBLEM STATEMENT

There are two methods by which azimuth can be determined by observation of the sun. Answer the following questions concerning these methods.

PROBLEM REQUIREMENTS

1. Name the two methods that can be used to determine Azimuth by observations of the sun. 2 Points
2. Which method is more accurate? Explain your answer. 2 Points
3. The following two questions concern the method that uses vertical angle observations:
 - a. How would inconsistencies of the angular (vertical and horizontal) observations be detected? 2 Points
 - b. How would calculations for the effect of the semi-diameter of the sun be eliminated? 2 Points
4. For each method, indicate whether parallax and refraction are taken into account. Explain your answer. 2 Points
5. When using the method that uses only the horizontal angle, what is the single most important area where errors, excluding time and angular measurements, would most likely occur? 1 Point
6. What is an appropriate source for accurate time determination? 1 Point
7. When using the method that uses only the horizontal angle, if observations are made on the trailing limb of the sun, how does that affect your angular calculations? 1 Point
8. For each method, describe how the time of day of your observations affects azimuth determination. 4 Points
9. For each method, describe how averaging your observations for calculation purposes would affect your final azimuth determination. 4 Points

PROBLEM B4

33 Points

PROBLEM STATEMENT

In 1900, the Spanish Rancho was subdivided into lots, one of which is denoted on the facing page as Exhibit "A." In 1940, a portion of this lot was sold using the following description, the preamble for which has been omitted. The 1940 deed was the first conveyance within Lot 70 and has senior rights. There are no occupational issues to be considered.

Beginning at the Northeast corner of said lot marked by stake number S63; thence S 80°00'00" W, along the North line of said lot 800.00 feet; thence S 45°00'00" E, 500.00 feet; thence N 80°00'00" E, 800.00 feet to the Westerly line of Wagon Road; thence N 45°00'00" W, along Wagon Road, 500.00 feet to the point of beginning.

Exhibit "B" is the result of your partial retracement of Lot 70 in the Spanish Rancho.

PROBLEM REQUIREMENTS

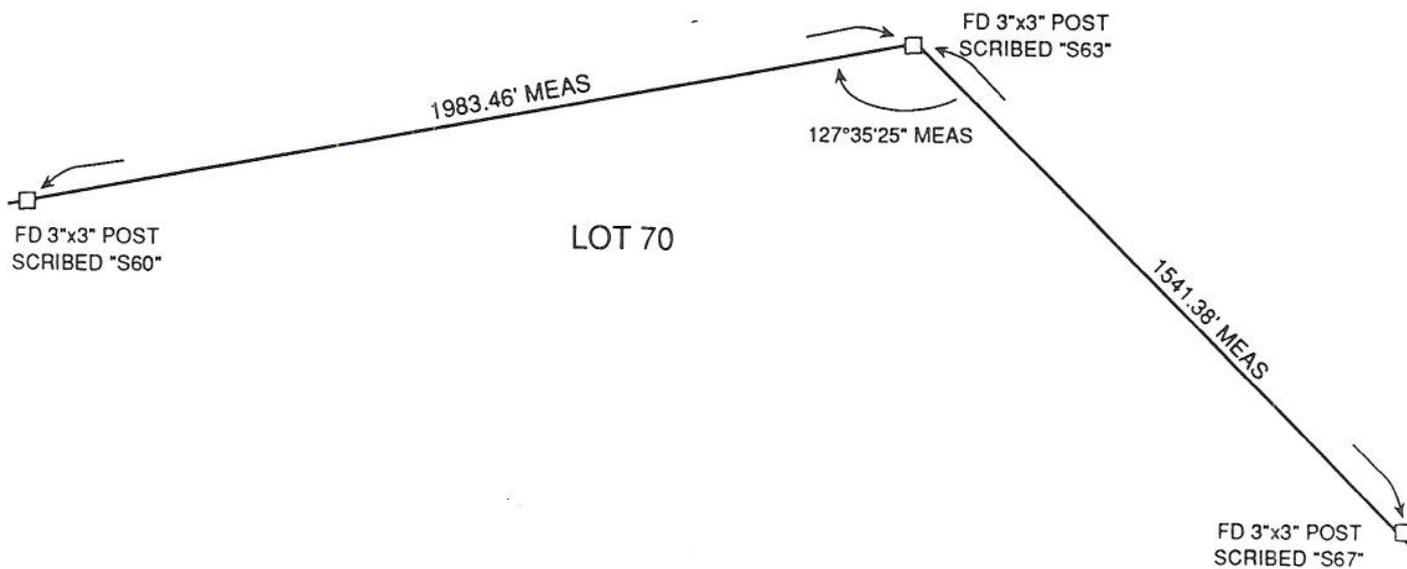
1. Describe two different methods that might be employed to survey the 1940 deed. **12 Points**
2. What would be the major differences between boundaries determined by the two methods? **5 Points**
3. a. Given the differences, describe what issues you would draw your client's attention to if you were asked to survey the boundary of the parcel described in the 1940 deed. **8 Points**
b. What would you suggest to your client to resolve any boundary issue? **8 Points**

PROBLEM B4

EXHIBIT "A"



EXHIBIT "B"



PROBLEM B5

27 Points

PROBLEM STATEMENT

During the rough grading phase of construction, you discovered a 12" water pipe crossing the roadway at Station 18 + 50. The elevation on top of the pipe is 730.92'. You have communicated this information to the project engineer who has asked you to calculate and lay out an equal tangent vertical curve so that the top of pavement passes 36" above the top of the water pipe with the following design elements:

Vertical curve beginning at Station 16 + 50 (Vertical Curve #2)

$G_1 = +8.75\%$

$G_2 = -1.50\%$

A drop inlet needs to be installed at the lowest possible elevation between the beginning and end of horizontal Curve #1 along the flowline.

PROBLEM REQUIREMENTS

Show all work in completing the following requirements.

1. Calculate the following elements of horizontal Curve #1:
 - a. Tangent 1 Point
 - b. Length 1 Point
 - c. EC Station 1 Point

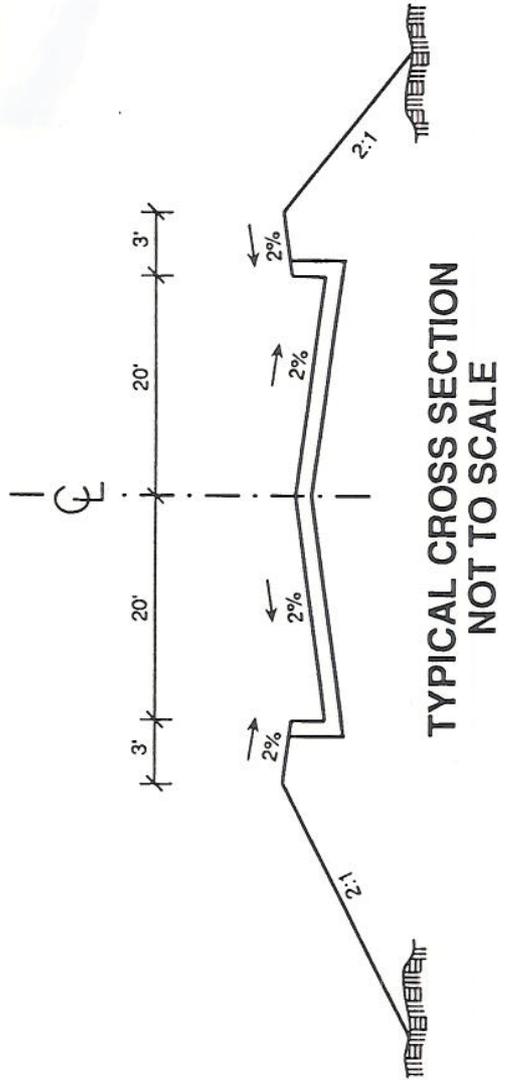
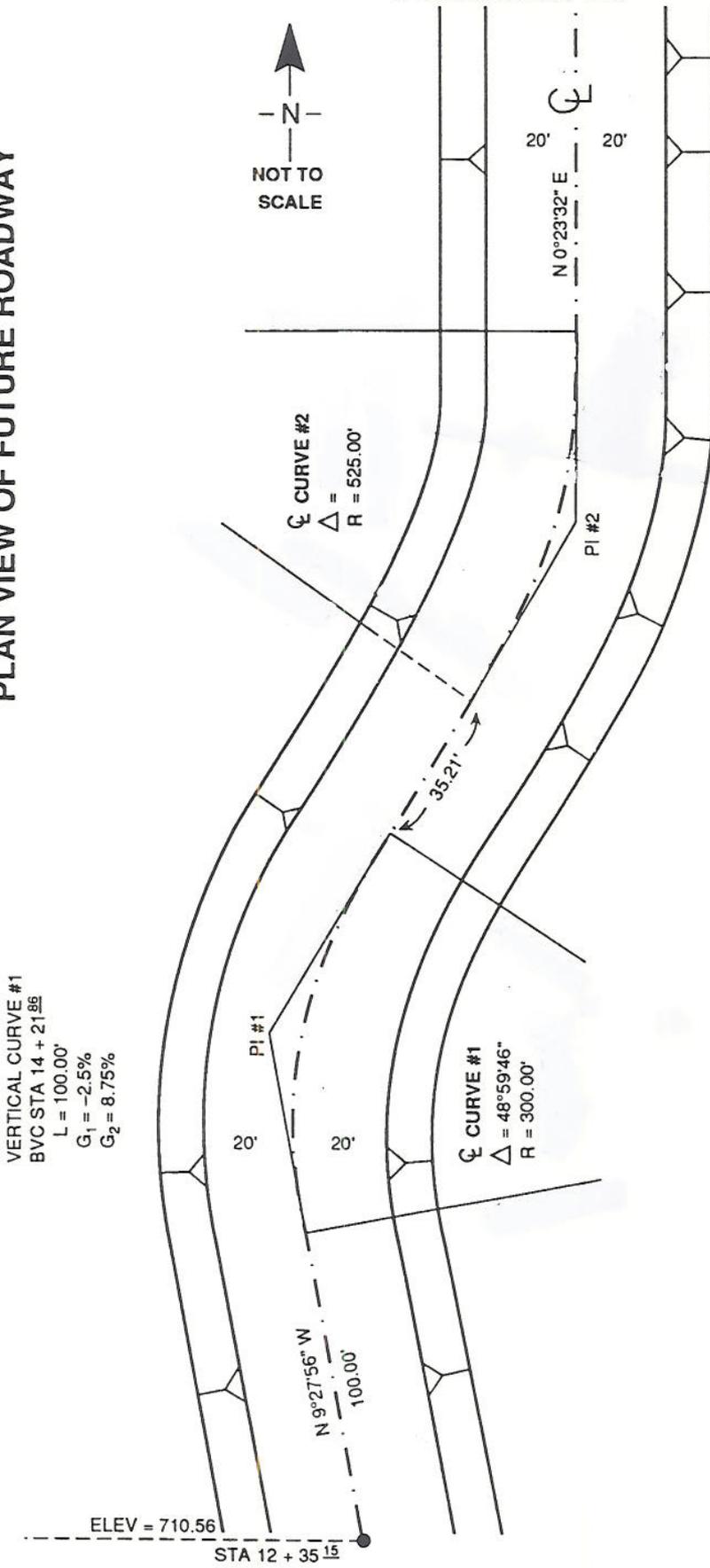
2. Calculate the delta of horizontal Curve #2. 1 Point

3. Calculate
 - a. the station and 6 Points
 - b. the elevation of the top of the drop inlet to be installed between the beginning and end of horizontal Curve #1. 5 Points

4. Calculate the following elements of the equal tangent vertical Curve #2:
 - a. Total length 6 Points
 - b. Point of Vertical Intersection Station 3 Points
 - c. Pavement elevation at the intersection of the centerline and the water pipe. 3 Points

PROBLEM B5

PLAN VIEW OF FUTURE ROADWAY



PROBLEM B6

10 Points

PROBLEM STATEMENT

For each of the following statements, cite the appropriate section number and the applicable government code.

PROBLEM REQUIREMENTS

1. A licensed land surveyor may offer to practice civil engineering incidental to his or her practice provided that the work is performed under the direction of a registered civil engineer. 1 Point
2. A licensed land surveyor may correct certain minor errors denoted on a filed Record of Survey. 1 Point
3. A licensed land surveyor has the right to enter upon private property to investigate and utilize boundary evidence. 1 Point
4. The land surveyor or civil engineer responsible for a road reconstruction project must protect and perpetuate monuments of record. 1 Point
5. All maps, plats, reports, descriptions, or other documents issued by a licensed land surveyor must be signed, sealed, or stamped, and must indicate expiration dates. 1 Point
6. Photogrammetry is within the practice of licensed land surveyors. 1 Point
7. A Record of Survey can be recorded even though the County Surveyor does not agree with its contents. 1 Point
8. When a City Engineer is not authorized to practice surveying, the surveying duties may be assigned to the County Surveyor. 1 Point
9. An adjustment of boundary line(s) between two or more parcels is exempt from the Subdivision Map Act. 1 Point
10. When California coordinates are to be shown on a map, two second order or better monuments must be used to control the coordinate values generated. 1 Point