

# Professional Foresters Registration Examination

October 17, 2008

Part I

**Applicant Must Answer Question I - Short Answer**

Question I - Short Answer

**Applicant Must Also Answer Two of the Remaining Essay Questions in Part I**

Question II - Forest Mensuration

Question III - Forest Ecology

Question IV - Forest Economics

Question V - Forest Protection

Professional Foresters Registration

1416 9th Street, Room 1506-16

Sacramento, CA 9581

**QUESTION I - SHORT ANSWER**

3% 1. According to the California Forest Practice Rules (FPR), how would you define hard frozen conditions when hauling can occur during the winter period?

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3% 2. According to the FPRs, harvests conducted to modify or guide the development of an existing stand of trees, but not to replace or regenerate the stand with a new one are called \_\_\_\_\_ .

4% 3. List two types of variable costs and two types of fixed costs generally associated with harvesting equipment. \_\_\_\_\_

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4% 4. A rectangular piece of land measures 12.3 chains by 42.5 chains. How many acres are in this piece of property (Answer may be rounded to the nearest one decimal place)? \_\_\_\_\_

4% 5. In performing a stocking survey for a plantation area, you lay out a uniform grid as prescribed in the FPRs and sample 80 plots. What would be the minimum number of stock plots needed to conclude the area is stocked, according to the FPRs?

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3% 6. Besides CO<sub>2</sub>, list 3 other **predominantly naturally occurring** greenhouse gases that can be found in earth's atmosphere. \_\_\_\_\_

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3% 7. What California law requires forest practice regulations to address archeological resources? \_\_\_\_\_

4% 8. What is the coefficient of variation used to measure in mensurational sampling?

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4% 9. *Armillaria mellea* (oak root rot) is endemic in California. What are two ways by which you can decrease the prevalence of this problem in a forest setting?

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3% 10. The total assimilation of energy and nutrients by an organism or a plant community per unit of time is called \_\_\_\_\_ production.

3% 11. When an alien or exotic species can establish, grow, reproduce, and maintain itself in an area where it did not originally grow, it is said to be \_\_\_\_\_ .

3% 12. The unconsolidated and more or less chemically weathered mineral or organic material from which soil is developed is called \_\_\_\_\_ .

3% 13. A Representative Fraction (RF) [also known as a Map Scale] of 1:12,000 translates to how many feet on the ground per inch on the map? \_\_\_\_\_

3% 14. The difference between the greater volume actually sawn in a mill over the lesser estimated log scale volume is called \_\_\_\_\_ .

4% 15. List four environmental or topographic settings that are common locations of prehistoric archeological resources found on California timberlands?

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4% 16. How do Forest Practice Rules define “economic feasibility”?

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3% 17. A written analysis of pre-harvest and post-harvest timber stand conditions and a description of the silvicultural practices and systems to be used in lieu of the standard methods in a Timber Harvest Plan (THP) is termed a \_\_\_\_\_

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3% 18. Define the terms DBH, DOB and DIB when measuring trees?

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4% 19. The California Board of Forestry and Fire protection is appointed from three categories of representation. Briefly describe the basis upon which the members of this Board are selected. \_\_\_\_\_

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3% 20. Purposefully leaving a logging road reasonably impassable to standard production four wheel-drive highway vehicles, and leaving a logging road and landings, in a condition that provides for long-term functioning of erosion controls with little or no continuing maintenance is termed \_\_\_\_\_, under the FPRs.

3% 21. List 3 preventive practices to control forest insects, mites and diseases.

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3% 22. Of the following California legislative acts involving forestry, which one came first, in chronological order (date of passage): Z'berg-Nejedly Forest Practice Act, Forest Taxation Reform Act, Registered Professional Foresters Act?

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3% 23. For tax purposes, logging equipment is usually depreciated and roads are amortized. By what taxation process is the cost of timber recovered by the forest enterprise?

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3% 24. The Scribner Dec. C log rule differs from the International ¼" Rule in what basic way? \_\_\_\_\_

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3% 25. A plant specified by law as being undesirable, troublesome and difficult to control is called a \_\_\_\_\_.

4% 26. List four of the *genera Fagaceae* found in North America. \_\_\_\_\_

3% 27. The process by which a landscape is broken into small islands of forest within a mosaic of other forms of land use or ownership is known as \_\_\_\_\_.

4% 28. On a cable logging system, explain the purpose of the haulback line.

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3% 29. An agreement between the U.S. Secretary of the Interior and either a private entity or a State, specifying the conservation measures that will be implemented in exchange for a permit that would allow the taking of a threatened or endangered species is called a \_\_\_\_\_.

3% 30. In a THP or other forest management document, you include a description of an area as a "Class 6, multiple layered trees with size class 5 trees over a distinct layer of class 4 or 3 trees, with a total tree canopy exceeding 60% closure". What type or system of classification system is this description taken from?

\_\_\_\_\_.

**END OF QUESTION**

## QUESTION II- FOREST MENSURATION

### OBJECTIVE

To determine your ability to identify property location and size, develop and implement cruise specifications, and make rudimentary mensurational calculations.

### QUESTION

- 25% 1. Your employer gives you the attached plat for a cruise and asks you to construct a table of the legal description of the tracts shown and to compute the total area in acres. For acreage computation purposes, assume all sections and the township have the normal and standard dimensions of the Public Land Survey. You may assume that the portion of the ownership in the S1/2 SW1/4 of section 15 is 45 acres.
- 10% 2. Assume you are a Registered Professional Forester in California. Your boss tells you there are some problems regarding the correct location of the property lines on the east boundary of Section 15 on the plat shown in Part 1. He asks you to take the necessary action to locate the property line so it can be recorded with the County as a Record of Survey. Without going into detail about actual survey procedure, what would you do to get the job done?
- 15% 3a. Describe "3P sampling".
- 15% b. Imagine a 40-acre tract of timber (100,000 bdf/acre) that is to be sold. Contrast the use of 3P sampling with both a 100% cruise and line-plot sampling to make an estimate of the appraised value of that tract.
4. Your employer asks you to conduct a 20% line plot cruise of all property shown on the plat shown in Part 1, except for the area located in section 15. Assume the area to be cruised is all in timber, except 40 acres in Section 10 and the property located in Section 1, both of which are covered with brush and no trees.
- 5% a. What is the land area to be cruised? How many 1/4 acre plots will you cruise?
- 5% b. All of the areas to be cruised are on moderately steep, north facing ground. In what cardinal direction will your cruise lines run?

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- 5% c. On completion of the cruise, you calculate that the total sample volume is 700 MBF, gross. What is the gross volume on the cruised area?
- 20% d. Your boss wants an estimate of the net volume recoverable when the area is logged. What five (5) factors have you considered while in the field and during office calculations to arrive at your estimate of net volume?

(SEE MAP ON FOLLOWING PAGE THAT COMPLETES THIS QUESTION)

**NOTE - BE CERTAIN TO HAND-IN THE PLAT MAP WITH YOUR ANSWERS AND THE EXAM PACKET**

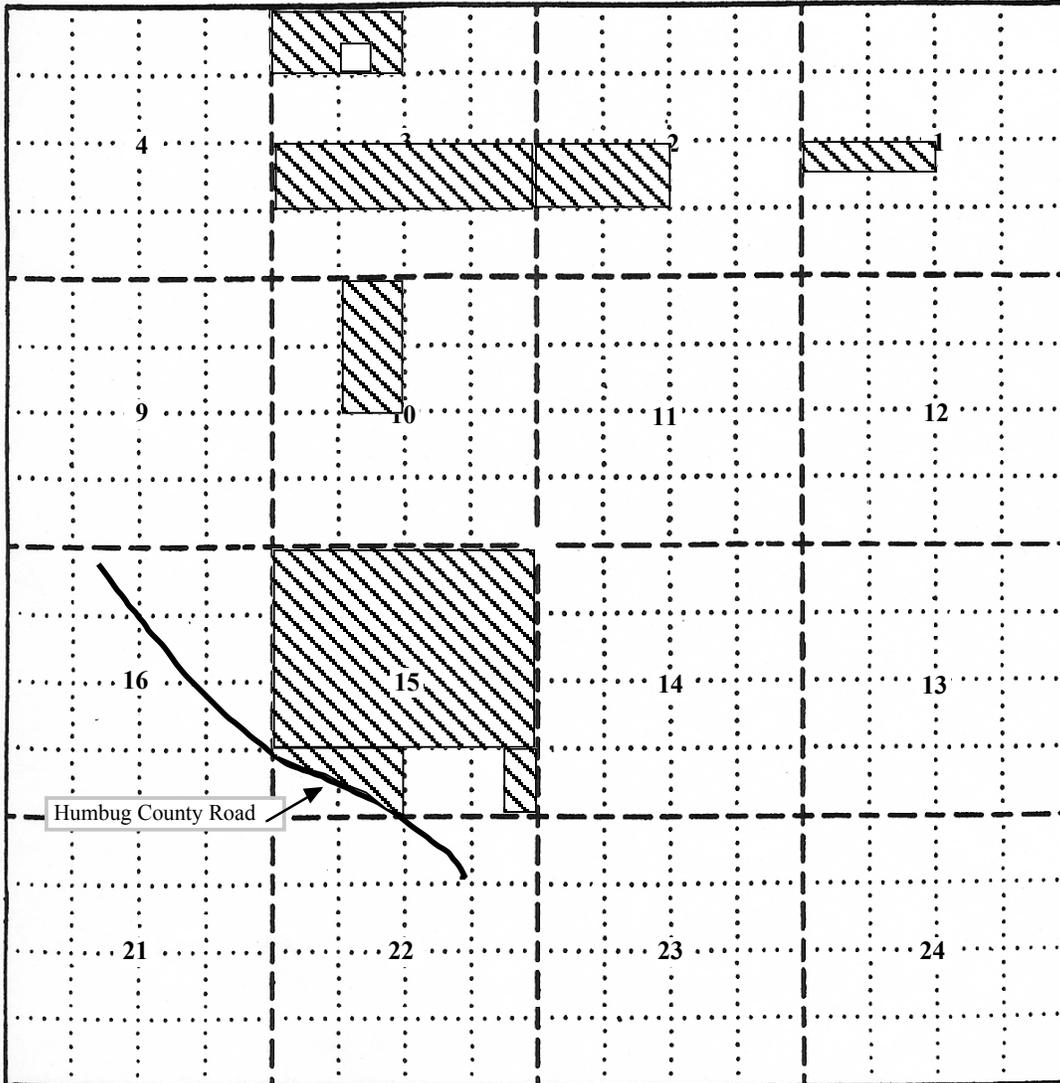
**END OF QUESTION**

# MAP-MENSURATION QUESTION

Map for Mensuration Question : APPLICANT NO.= \_\_\_\_\_

This map is to be used to construct the answer to Question 1 You may compute on this map, but all sections and acreages should be listed in Table form on the answer sheets. Please note that this is a partial township map with the sections numbered in the center. Hand in map with answer sheets.

T 15N, R12E, MDB&M



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### QUESTION III-FOREST ECOLOGY

#### OBJECTIVE

To demonstrate your knowledge of forest ecology by predicting phases of secondary succession after harvesting.

#### SITUATION

Choose **ONE** of the Wildlife Habitat Relationship System vegetation types given below:

Coast Redwood  
Sierra Mixed Conifer  
Red Fir

Consider a small watershed in the forest type you chose from above. A tractor yarding system will be used to clearcut a portion of the area (30 acres in the Redwood, or 20 acres in the Sierra Mixed Conifer, or 10 acres in Red Fir areas). There will be no artificial reforestation practices applied and no forest treatment except site preparation in the form of slash disposal (broadcast burn on Redwood, or tractor pile and burn on Sierra Mixed Conifer and Red Fir). Assume that no stand replacement events occur for the next 100 years. As a knowledgeable forester you should be able to predict the development of secondary succession in the area for the following phases:

- a. 3-5 years after cutting (regeneration phase)
- b. 20-40 years after cutting (stem exclusion phase)
- c. 70-100 years after cutting (gap succession phase)

#### QUESTION

Make whatever logical assumptions are necessary to develop a complete answer, but be sure to state and explain the assumptions at the appropriate places in your answer. Common names are acceptable, but you may give scientific names where you feel clarification is necessary.

For **EACH** of the phases given above (a., b., and c.):

- |     |    |  |
|-----|----|--|
| 15% | 1. | Discuss the structure of vegetation you would expect to be present in each age class.  |
| 15% | 2. | Discuss the composition of vegetation you would expect to be present in each age class.  |
| 40% | 3. | Discuss the five most important factors that affect the development of structure and composition for the specific vegetation type you have selected. |
| 30% | 4. | Discuss possible management problems for each age class presented by the developing stand.   |

**(END OF QUESTION)**

## QUESTION IV- FOREST ECONOMICS

### OBJECTIVE

To determine your ability to use the Present Net Worth (PNW) approach in timberland purchase decisions.

### SITUATION

You are the land procurement forester for Treegrow Timber Company. Mr. Fishcatch, who operates a segment of a nearby stream as a private fishing club, owns several thousand acres of well-forested land surrounding the stream segment to protect water quality and provide a scenic backdrop. Mr. Fishcatch realizes the importance of timber production and, therefore, offers to sell to Treegrow Company a portion of his property if the Company will agree contractually to operate this land under the uneven-aged system.

You are seriously considering Mr. Fishcatch's offer because you have determined, by examining similar lands, that all of the parcels offered by Mr. Fishcatch are suitable for timber production. These parcels look especially attractive since you know that the ideal residual growing stock level for your timberlands is 20,000 b.f./acre, the same as the Fishcatch parcels. You have also previously determined that the addition of only 185 more acres to your existing land base would make it possible to achieve a regulated forest. You have developed a fact sheet (which can be found on the page following this question) that you use to answer the following:

### QUESTION

15% 1a) Using the Present Net Worth (PNW) approach (formula on fact sheet), which hypothetically ideal cutting cycle length (4, 5, or 6 years) will maximize PNW? Show all of your work on the Computational Table provided below:

**(Applicants: Please note that the solution to this question is possible without a scientific calculator. See the tools and aids given on the fact sheets.)**

Cutting Cycle Length, Yrs.	Growth/Cut Volume, MBF	Forecasted Unit Values for Harvested Timber \$/MBF	(a) = Net Revenue, \$/AC	Discounted Net Revenue, \$	Constant, (c/i)	PNW, \$
4	4.8				33.33	
5	6.0				33.33	
6	7.2				33.33	

**CONTINUED NEXT PAGE**

- 15% 1b) Explain what the term Present Net Worth means and why it is a valid approach for determining the solution you derived for 1a, above. .
- 10% 2. Briefly discuss which parcels you can feasibly buy based only on PNW.
- 5% 3. Can you acquire enough acres to economically achieve forest regulation?
- 5% 4. Explain what budget request you should submit for the purchase of the new lands.
- 20% 5. Answer **EITHER** a or b:
- a. Explain to the Treegrow Timber Company owners why you did not subtract the value of the residual growing stock as a cost when calculating the PNW of Mr. Fishcatch's offer.
- b. Mr. Treegrow Sr. does not understand why you used a 6% real interest rate when inflation alone is over 4%. Explain how the effect of inflation is normally handled in PNW calculations.
- 30% 6. When you present your proposal to Mr. Fishcatch, he questions your management plan. In particular, he feels compelled by the Forest Practice Act to achieve the goal of “maximized sustained production of high quality timber products” (Sec. 4513[b], PRC). Discuss **two (2)** possible interpretations of “maximum sustained production of high quality timber products” and how they pertain to the use of a PNW approach.

**END OF QUESTION**

**FACT SHEET ON NEXT 2 PAGES**

**FACT SHEET FOR DETERMINATION OF PNW OF FISHCATCH PARCELS**

Mr. Fishcatch has offered to sell the following parcels to the Treegrow Company at these prices:

Parcel No.	Acres	Current Stocking Level/Acre	Selling Price/Acre Including Value of Current Growing Stock
A	53	20,000 b.f.	\$2,400
B	65	20,000 b.f.	\$2,500
C	71	20,000 b.f.	\$2,600
D	75	20,000 b.f.	\$2,700

Assumptions Regarding Mr. Fishcatch's parcels:

**Annual growth increment** (constant over stocking levels of 20 - 30 mbf; do not compound growth in any computations): 1200 bf/ac/yr

**Administration and other annual cost:** \$ 2.00/ac/yr

**Alternative Rate of Return (REAL interest rate or the rate of return that could be earned on an investment in the financial markets with similar risk):** 6%

**Ideal cutting cycle length:** 4, 5 or 6 years

**Simplified formula for Present Net Worth (PNW):**

PNW = Discounted Net Revenue – Discounted Annual Costs

$$PNW = \left[ \frac{a}{(1+i)^n - 1} \right] - \frac{c}{i}$$

Where: *a* = Net Revenue at end of each cutting cycle

*c* = Annual costs

*i* = Real Interest Rate (Discount Rate)

Denominator value for first term in PNW equation (Discounted Net Revenue).

n	(1+i) <sup>n</sup>
4	1.2625
5	1.3382
6	1.4185

*i* = Discount rate (real interest rate)

*n* = Cutting cycle length

Forecast Unit Values for Harvesting in Varying Volumes/Acre (Assumes same quality/size of trees at all levels)	
Volume Cut (b.f./acre)	Stumpage (\$/mbf)
< 1000	105
1000 - 2000	110
2000 - 3000	120
3000 - 5000	140
> 5000	145

**(END OF FACT SHEETS)**

## **QUESTION V- FOREST PROTECTION**

### **OBJECTIVE**

To determine your knowledge and ability to analyze fire potential and develop methods to reduce wildland fire threats with minimal impact upon the environment.

### **SITUATION**

A developer has retained you to prepare a fuels management plan for a new development comprising 475 homes. The project encompasses 1,650 acres of which 425 acres are to be developed over a period of five years. The remaining lands are to be retained in open space and become the responsibility of the homeowners association. The project lies in an area known to have had severe fire activity in the past. The local fire department has expressed concerns that due to the hilly terrain and fuel loading, good wildfire pre-planning will be needed to protect the new development. It has thus required that a fuels management plan be developed and implemented prior to approval of the project.

### **QUESTIONS**

- 15% 1a) Identify five commonly used methods of managing and modifying fuels. Briefly discuss the methods, limits and advantages, and any precautionary considerations such as risk and liability that you feel should be noted.
- 20% 1b) Briefly discuss a positive and a negative attribute or effect upon the environment for each method. Do not use an answer given in 1a.
- 45% 2. In outline form, describe the steps you would take to develop a fuels management plan that will substantially reduce wildland fire hazards. Include in your plan Public Resource Code requirements for fire clearance.
- 20% 3. Discuss four alternatives for the developer to take when a portion of the project lies within an identified extreme fire hazard severity zone and no environmentally sound or cost effective method of mitigating the fuel hazard is available.

**END OF QUESTION**

**Professional Foresters Registration Examination**

**October 17, 2008**

**Part II**

**Applicant Must Also Answer Three Of The Remaining  
Five Essay Questions In Part II**

Question VI-Forest Engineering  
Question VII-Silviculture  
Question VIII-Forest Administration  
Question IX-Forest Policy  
Question X-Forest Management

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## QUESTION VI - FOREST ENGINEERING

### OBJECTIVE

To demonstrate your ability to design logging road and yarding systems taking into consideration engineering constraints, logging practices, stream and soil protection and silvicultural method.

### SITUATION

You are working under the direction of a California Registered Professional Forester (RPF) for the purpose of formulating a Timber Harvest Plan (THP) covering the area outlined on the attached map (see page following this question for map.) Cable and tractor systems are the only options for the harvest area. After a brief field review, the RPF has concluded that construction of "Road A" will be necessary and construction of "Road B" is a possibility. Ground slopes adjacent to the Class III watercourses are 55% for a distance of 100 feet from the channel. Ground slopes adjacent to the Class II watercourses are 75% for a distance of 100 feet from the channel. All other ground slopes within the proposed harvest area range from 30 - 55%. The Class I stream is a productive fish habitat and is in a Threatened or Impaired (T or I) watershed. The RPF wants you to spend no more than two field days making a preliminary determination on the feasibility of using "Road B" as shown. The stand is well stocked with second-growth conifers. The distribution of timber volume is uniform across the slope except that volumes are heavier on the lower half of the unit.

15% 1a) From an engineering perspective, discuss the field reconnaissance procedure you would undertake to determine if the proposed Road B layout can be reasonably achieved. Include the equipment and samples of the types of calculations you would have to make.

20% b) Discuss the economic and environmental implications of building Road B.

5% c) Consider the area between Road A and the Class II watercourse. Assume cable logging would be used if only Road A was constructed. Briefly discuss how the construction of Road B would influence the choice of yarding method for this area.

20% d) If "ROAD B" is used, discuss specifically what special provisions might be required in the THP. State your assumptions.

15% e) Briefly describe some of the factors you will consider in deciding whether to use temporary or permanent stream crossings.

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10% f) Explain what factors would influence landing locations for Road A and Road B and draw on the attached map the most feasible landing locations along each road.

15% 2. You are evaluating timber types while working on road location and have decided to recommend a commercial thin for the entire THP area. You wish to have a residual stand basal area of 150 square feet. Contrast and compare the elements that you should consider relative to the selection of each yarding system under this intermediate treatment.

**(THE MAP ON THE FOLLOWING PAGE COMPLETES THIS QUESTION. BE CERTAIN TO PLACE YOUR APPLICANT'S NUMBER IN THE SPECIFIED LOCATION, REMOVE IT FOR EASE OF USE DURING THE EXAMINATION AND RETURN WITH YOUR WRITTEN ANSWERS)**

**END OF QUESTION**

**HOLD FOR MAP**

## QUESTION VII-SILVICULTURE

### OBJECTIVE

To determine your ability to integrate a variety of factors when developing a silvicultural prescription for a non-industrial private forestland owner.

### SITUATION

Silvicultural decisions today often must be based on many factors besides the silvic requirements of individual tree species. Nonetheless, foresters are often mandated to maximize productivity -- not only for income to the landowner but to ensure an adequate supply of forest products for future generations.

You have been hired by a landowner to prepare a 160-acre Timber Harvesting Plan to generate enough money to pay for the college expenses of her four children over the next few years. The landowner wants you to harvest and regenerate the stand to best provide a return now, along with retirement income opportunities in the future. Although the landowner has hired you, you also have a mandate to protect public resource values, and must consider possible aesthetic, biological, soil, recreational, and watershed impacts to the surrounding area while you prepare a plan to meet her objectives. The parcel is bordered by a State Park and scenic highway on the south side; industrial timberlands on the west and east; and a subdivision to the north. Having prepared many other timber harvest plans, you also know that paying attention to local political issues helps in securing an approved plan for your landowner.

You may choose **ONE** of the two stands described below to use in answering your question:

#### **Mixed Conifer Stand**

- Overstory Composition:  
50% Ponderosa pine (80 years old)  
40% Douglas-fir (40 years old)  
10% White fir (80 years old-infected with *Arceuthobium sp.*)
- Total basal area: 125 sq.ft./acre
- Understory: Predominantly tanoak shrubs and white fir poles (<100 stems per acre) with decadent manzanita; some Douglas-fir seedlings
- Other: Site Class III; low to moderate erosion hazard. Adjacent timberlands have *Dendroctonus brevicomis* infestation.

**OR**

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## **Redwood Stand**

- Overstory Composition:  
60% redwood (80 years old)  
40% Douglas-fir (80 years old - infected with *Fomes pini*)  
  
Total basal area: 200 sq.ft/acre
- Understory: heavy tanoak
- Other: Site Class III; moderate to extreme erosion hazard. Adjacent industrial timber stands have been clearcut over the past 10 years.

Considering landowner objectives, site and stand description, and political realities, choose and justify a silvicultural prescription for **ONE** of the stands described above. Use the following questions as your guideline.

### **QUESTIONS:**

- 20% 1. What is the silvicultural method you propose to harvest this stand in order to meet landowner and resource objectives? Describe the desired species mix and basal area per acre and/or point count per acre, and whether the stand will be managed even-aged or uneven-aged, and why.
- 20% 2. Describe possible drawbacks and benefits of your choice in terms of future stand development and timing of monetary return, potential species' marketability, maximum productivity, aesthetics, and wildlife diversity.
- 20% 3. Describe and justify a site preparation method, or justify why site preparation is not necessary, and how you propose to protect the soil, water, residual trees and wildlife from potential damage from either the silvicultural or site preparation method you have chosen.
- 20% 4. If artificial regeneration is chosen to stock the area, describe and justify choice of species, seedling stock size, initial planting density, time of planting, and target density of the developing stand in 10 years. Describe when and how you would evaluate the success of the stand's regeneration. Describe your survey method. Include in your discussion California Dept. of Forestry and Fire Protection's (CDFFP'S's) requirements for stocking density, distribution, and timing of achievement of stocking.

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If natural regeneration is chosen, describe and justify the species composition and target density of the developing stand in 10 years. Describe when and how you would evaluate the success of the stand's regeneration to the species you desire to manage. What are some intermediate treatments and their timing that could be used to adjust the developing natural stand to ensure it develops in the manner you have proposed above?

- 20% 5. Explain and justify the timing of the next entry to meet the landowner objectives, maximize productivity, and protection of natural resources.

**END OF QUESTION**

## QUESTION VIII- FOREST ADMINISTRATION

### OBJECTIVE

To determine your knowledge of biological and social elements relating to application of stocking standards in California.

### SITUATION

There has been considerable disagreement among professional foresters over what level of reforestation stocking should be required under the Forest Practice Act. Some foresters believe that the requirement is too high, while others believe that the requirement is only a minimum and should be higher. Each of these perfectly valid points of view appear to stem, in part, from the uncertainties associated with predicting the future.

### QUESTION

Develop a discussion supporting each viewpoint. Be sure to include a thorough discussion of biological and social elements. Include considerations that are pertinent to the issue in terms of:

- 15% A) Economics,
- 15% B) Site Quality,
- 15% C) Growth And Productivity,
- 10% D) Log Quality,
- 15% E) Wildlife Needs
- 15% F) Aesthetics
- 15% G) Pests

**END OF QUESTION**

## QUESTION IX- FOREST POLICY

### OBJECTIVE

To demonstrate your knowledge of the policies, privileges and responsibilities granted under the California Professional Foresters Law, Forest Practice Rules and Forest Practice Act.

### SITUATION

Assume that you are a California Registered Professional Forester (RPF):

### QUESTION

- 6% 1. A. Briefly describe the three qualifications an applicant must meet to qualify for application and licensing as a Registered Professional Forester in California.
- 4% B. Under the Professional Foresters Law, what two actions are declared unlawful for any person who is NOT a RPF?
- 5% C. As a RPF what is your legal responsibility relating to the contents and implementation of a Timber Harvesting Plan written by you?
- 10% 2. A. A Licensed Timber Operator (LTO) logs a 50-acre piece of timberland he owns with a valid Timber Harvest Plan (THP). He completes the work satisfactorily but fails to restock adequately in the prescribed time. Briefly list and explain the corrective steps California Dept. of Forestry and Fire Protection (CDFFP) may take, assuming that the LTO refuses to do any planting?
- 20% B. The same LTO is logging a piece of timberland, under an approved THP, for the DoDah Lumber Co. During an inspection he is found to be skidding across a Class I stream, in several locations, in violation of the THP specifications. Briefly discuss three actions the CDFFP may take, from less serious to most serious, to stop the damage.
- 20% 3. A RPF signs a THP prepared by his apprentice 2005 graduate forester, without the RPF ever visiting the site. The RPF believes the area is not erosion-prone with no class I, II, or IV streams in the THP area and a selection cut is proposed. He believes his apprentice has adequate experience to do the fieldwork and prepare the THP. Discuss the RPF's level of responsibility and whether he has performed an illegal act by signing the plan under the circumstances.

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15% 4. A RPF retains a wildlife biologist's service in preparing a THP, with his client's permission. The RPF pays the biologist for his work. The RPF then adds a 20% charge to the biologist's fee on to his bill for the client. Discuss whether the RPF might be guilty of any violations of the Professional Foresters Law.

20% 5. For this question, assume the RPF is also a Licensed Timber Operator. He buys timber from small non-industrial timberland owners. One of his marketing points in "closing the deals" to buy the timber is that he can do the THP as well as the logging, saving the landowner on the expense of preparing a THP, and hence give them a better price for their timber. In addition he tells the timberland owners that since he will also be the LTO, he will be supervising the logging and that improves quality and compliance with the Forest Practice Act and this arrangement lets him give the timberland owners a better price.

A. Discuss whether this is a criminal act and the validity of this approach as it relates to the best interest of the landowner.

B. Describe the steps that you would take to head-off any potential conflicts of interest or criminal/civil problems if you were faced with a similar situation.

**END OF QUESTION**

## QUESTION X- FOREST MANAGEMENT

### OBJECTIVE:

This question will evaluate your understanding of basic forest management concepts having to do with stand growth.

You must answer these questions with both written explanations and definitions and graphs. **For the graphical illustrations, please draft them on the graph sheets provided for your use.** You may remove them from the examination packet, for ease of use during the examination, but **YOU MUST** hand in the graph sheets with your written answers. Be sure to place your Applicant's Number in the provided space on the graph sheets. Be sure to adequately label graph axes with titles, units, and/or values so as to make your graph understandable and to insure that it truly aids in understanding your written answer.

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### QUESTIONS

1. Assume that you are depicting the following attributes for an even-aged stand of Douglas-fir. Further assume that no intermediate stand manipulations will be done.
  - 10% A. On a single graph, depict what the number of trees per acre per diameter class would look like at 40, 80 and 100 years. Explain what is happening in biological terms. (Note-Graders will be looking for a correct answer that is in the "ball-park" as to numbers of trees being depicted and relative changes in number of trees as the stand ages, not exact numbers.)
  - 5% B. What stand management technique commonly performed attempts to take advantage of the biological behavior you have described in 1A above?

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- 10% C. Depict a graph of total stand growth volume per acre as a function of stand age. Define the term total stand growth and explain why your graph behaves in the way you have drawn it.
- 20% D. On a single graph, depict typical curves for periodic annual growth increment (PAI) per acre and mean annual growth increment (MAI) per acre. Clearly label which curve is PAI and MAI. Define the terms and explain why the curves behave in the way and position you have drawn them.
- 15% E. Explain and define the concept of culmination of mean annual growth increment and the age that it occurs for a stand. Does this concept apply to both even-aged and uneven-aged stands? Explain and justify your answer.
- 20% 2A. Assume that you are interested in expressing the above concepts in relation to useable or net volumes, rather than total volumes. Explain the affect that switching from a total volume basis to a net volume basis would have on the calculation of the age of the culmination of mean annual increment.
- 20 % 2B. Assume that your management plans include a change in volume rule from Scribner Board Feet to Cubic Feet or from a minimum top diameter of 8-inches to a minimum top diameter of 4-inches. Explain the affect that switches in utilization standards such as these would have on the calculation of the age of the culmination of mean annual increment.

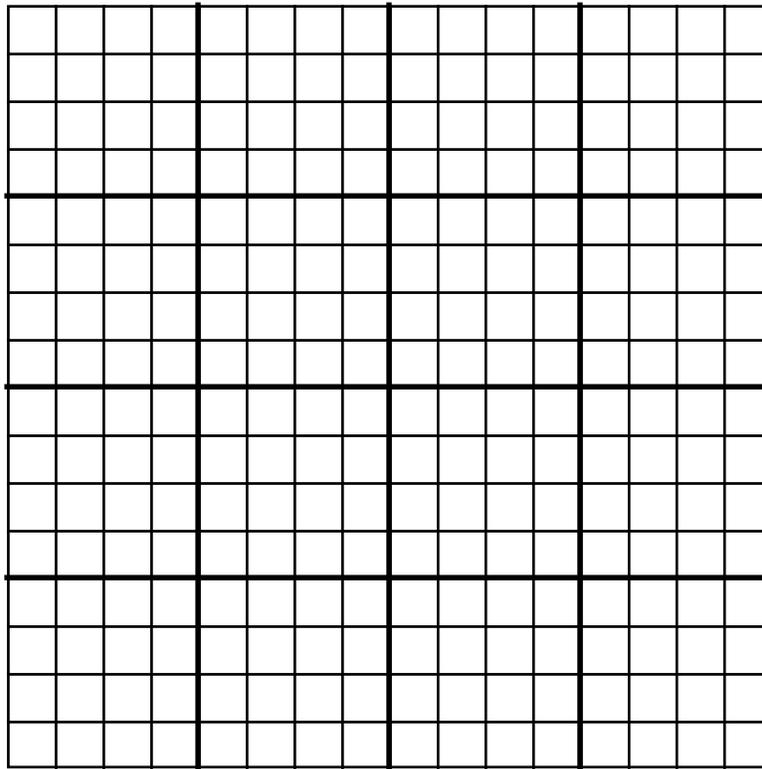
**END OF QUESTION**

**GRAPH FORMS FOLLOW**

**END OF EXAMINATION**

**GRAPH FORMS FOR USE WITH MANAGEMENT QUESTION  
APPLICANT NUMBER \_\_\_\_\_**

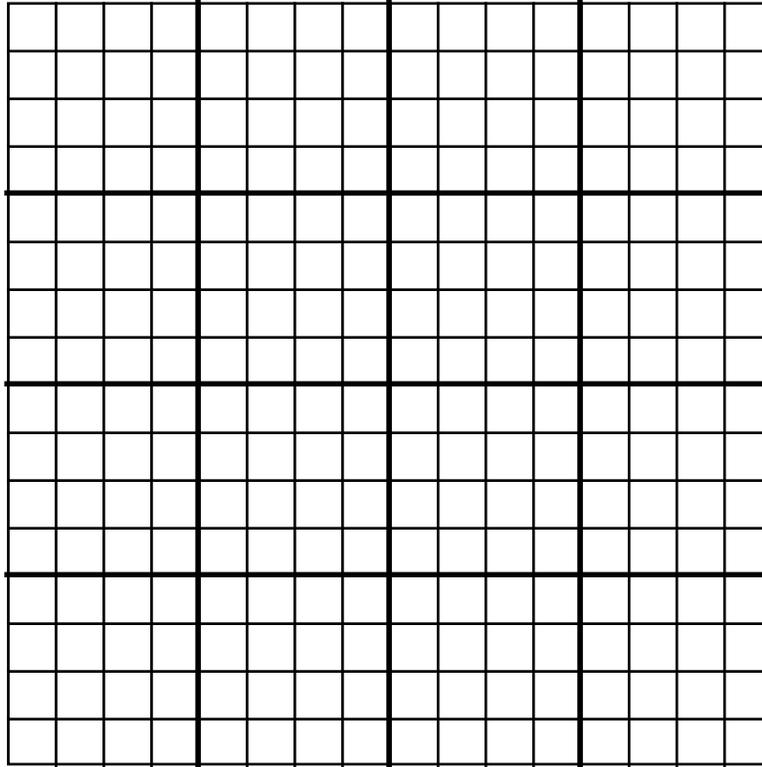
**GRAPH FOR QUESTION 1A & B**



**HAND IN WITH ANSWERS AND EXAM**

**GRAPH FORMS FOR USE WITH MANAGEMENT QUESTION  
APPLICANT NUMBER \_\_\_\_\_**

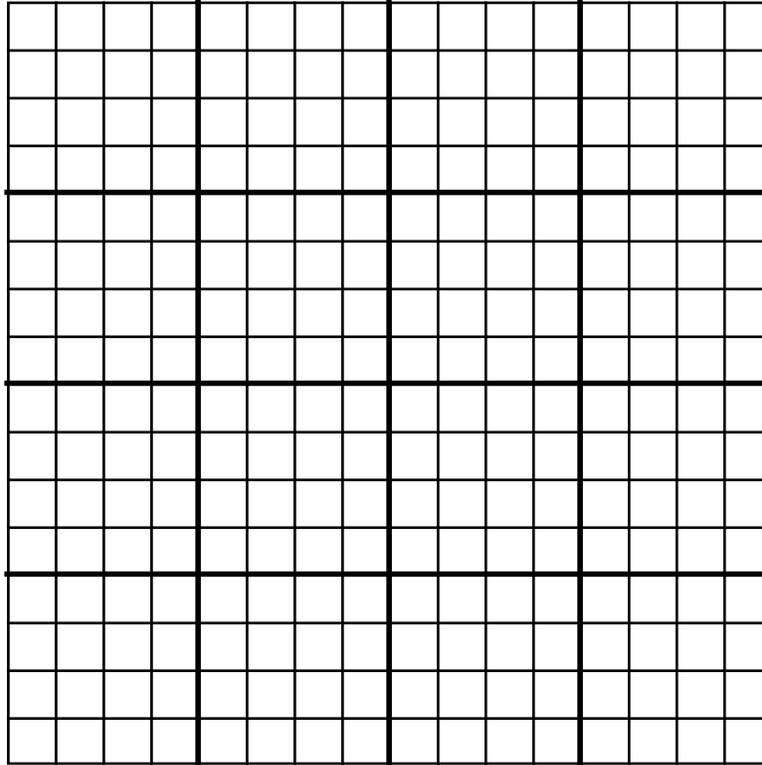
**GRAPH FOR QUESTION 1C**



**HAND IN WITH ANSWERS AND EXAM**

**GRAPH FORMS FOR USE WITH MANAGEMENT QUESTION  
APPLICANT NUMBER \_\_\_\_\_**

**GRAPH FOR QUESTION 1D**



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**END OF EXAMINATION**