

Professional Foresters Registration Examination

October 12, 2007

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

Applicant #: _____

Question # I

You MUST answer this Question to pass the examination.

Answer on these pages, tear from the booklet and submit with the answer packet

QUESTION I - SHORT ANSWER

- 3% 1. Explain how stream "ordering", such as the Strahler System, works in a large watershed (it is a system that compares streams within and among watersheds)

- 3% 2. For cable logging, define the term "tight-lining".

- 3% 3. List three (3) genera in the family *Fagaceae* found in North America.

- 2% 4. A plant that is more or less restricted to moist sites, but NOT considered an aquatic plant is ecologically termed a _____.

- 3% 5. What makes an orthophotograph different from other aerial photographs?

- 2% 6. Wood fiber is made up of four organic substances. Name two (2).

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2% 7. On tanoak (*Lithocarpus densiflora*), some oak species (*Quercus* spp.) and multiple other species (such as rhododendron), the organism *Phytophthora ramorum* is responsible for a stem and leaf wilting disease known as _____.

2% 8. Increases in stream discharge following various forest management practices have been demonstrated in many parts of the country. Water yield increases as a result of decreased _____ and _____.

4% 9. List any four of the seven characteristics used to determine erosion hazard ratings under the Calif. Forest Practice Rules.

4% 10. List two (2) types of fixed costs and two (2) types of variable costs generally incurred by Licensed Timber Operators in harvesting operations.

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- 4% 11. The Forest Practice Act is intended to regulate timberlands to achieve what two basic goals?

- 3% 12. As per 14 CCR 895, what is the stream condition where the stage of discharge fills the entire channel cross section without significant inundation of the adjacent floodplain, and has a recurrence interval of 1.5 to 2.0 years. _____.

- 3% 13. List three (3) PHYSICAL elements to consider when deciding whether to tractor log or cable log a timber sale?

- 2% 14. 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 is termed a _____.

- 4% 15. List four purposes a Timber Harvest Plan document serves during its life:

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- 4% 16. List 2 situations which may occur during field variable plot cruising, when is it important to know the plot radius factor.

- 2% 17. When the original cost of a natural resource, such as timber, is written off the books as the resources are used, the accounting procedure is called

- 4% 18. Water bodies that are listed as impaired under Sec. 303(d) of the Federal Clean Water Act, must have a plan called a _____ developed for each pollutant which is a calculation of the maximum amount of a pollutant that a water-body can receive and still meet water quality standards.

- 3% 19. List three (3) alternate ways to estimate site quality other than using site index height. and species tables.

- 4% 20. Describe the character of a fully regulated forest based on area regulation.

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- 3% 21. Under what conditions must an on-the-ground meeting, before the commencement of timber operations, between a Timber Harvest Plan's responsible Registered Professional Forester and the Timber Harvest Plan's designated Licensed Timber Operator (or supervised designee) occur?

- 3% 22. What is the difference between a stand's arithmetic mean diameter and its quadratic mean diameter?

- 3% 23. How many acres are in a standard sub-section designated as W1/2 of the SE1/4 of the NE1/4, Section 23, T23N R10E, MDB&M?

- 3% 24. Under the Endangered Species Act (Federal), what is an "Evolutionary Significant Unit" (ESU)?

- 3% 25. What are the three traditional approaches to timberland valuation.

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- 2% 26. Which of the following tree species are susceptible to white pine blister rust: Pinus monticola, Pinus lambertiana, Pinus ponderosae, Pinus sabiniana, Pinus attenuata, Pinus contorta?

- 4% 27. What general criteria are used to distinguish an uneven-aged from an even-aged forest stand?

- 2% 28. How does dwarf mistletoe spread other than by carrying of seed by birds or other animal life?

- 3% 29. You wish to thin a stand of trees to an average 35 ft x 35 ft square spacing. How many trees per acre would your thinned stand have remaining on the average acre?

- 4% 30. Define the term “hydrologic unit code” (HUC) and its purpose or use.

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3% 31. At what point in development of a forest stand is annual nutrient uptake roughly equivalent to return of nutrients through litter fall?

4% 32. For Yield Tax purposes who is considered a timber owner?

3% 33. Name the three types of road surface shape used to facilitate drainage.

END OF QUESTION

QUESTION II- FOREST MENSURATION

OBJECTIVE

To determine your knowledge of several variable plot or fixed plot cruise characteristics, tree taper, and diagram rules.

YOU MUST ANSWER THE QUESTIONS IN PART 1 OR PART 2 . YOU MUST ALSO ANSWER QUESTIONS 3, 4, 5 & 6. 

QUESTION

PART 1. VARIABLE RADIUS PLOT CRUISING

You are to conduct a prism cruise using a 40 sq.ft/acre basal area factor (BAF) for a small parcel of land that you are considering for acquisition. The following data were obtained from three randomly located horizontal sample prism points in this parcel. Basal area and volume were recorded for tallied trees.

Point No.	"In" Tree Number	Tree Basal Area (sq. ft)	Volume (cu. ft)
1	1	3.40	203.0
	2	2.18	130.0
	3	1.23	60.0
2	1	0.55	21.8
	2	4.91	225.0
3	1	0.35	10.5
	2	2.64	175.0
	3	4.27	225.0
	4	5.94	250.0

(Reminder: Tree Factor = BAF / BA of "in" tree)

(Show your formulae and calculations - you may receive partial credit even if the answer is not absolutely correct.)

15% a. Calculate the best estimate of average basal area (sq.ft./acre) for this parcel.

30% b. What is the best estimate of average volume per acre in the stand?

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OR

PART 2. FIXED RADIUS PLOT CRUISING

20% a. Discuss in detail the concept of standard deviation and coefficient of variation as they relate to fixed radius plot cruising. Illustrate with examples.

25% b. Discuss in detail the concepts of sampling error and probability as they relate to fixed radius plot cruising. Illustrate with examples.

APPLICANTS- REGARDLESS OF WHETHER YOU ANSWERED PART I OR PART II, YOU MUST ANSWER THE REMAINING QUESTIONS

15% 3. a. Briefly explain why, in addition to the use of volume tables in an inventory, a forester may need tree taper information.

5% b. Additionally, describe two ways of obtaining tree taper.

4. The Scribner Decimal-C log rule is a diagram rule.

10% a. Explain the term diagram rule.

10% b. When scaling small logs (12" DIB), is there commonly overrun or underrun when using the Scribner Decimal-C log rule. Why?

15% 5. You are considering acquisition of a small parcel of timbered property. Explain how a local mill overrun or underrun would affect the selling value of stumpage from your acquisition.

END OF QUESTION

QUESTION III-FOREST ECOLOGY

OBJECTIVE

To determine your knowledge of the correlation between forest-types in California and environmental conditions as well as other basic ecological concepts.

QUESTION

15% 1. Describe the food web (chain) in a forest ecosystem, and why knowledge of the food web (chain) is of significance in forest management?

15% 2. Define mycorrhiza and discuss their function and significance relating to forest trees and artificially grown nursery stock. Be specific

10% 3. Discuss damping-off and what role it plays in forest regeneration. Include in your discussion forest and nursery environments as they relate to damping-off.

4. Choose **ONE** (1) of the following transects:

A) Fresno due east to the crest of the Sierra Nevada.

B) Red Bluff due west to the Pacific Ocean.

C) East along the San Bernardino BM from the coastal plain to the Colorado River.

30% a. For the transect you chose, list four (4) major conifer forest types and two (2) major hardwood types (tree dominated habitats) that would be encountered along that transect:

30% b. For each of the types you listed above, identify two (2) of the most common tree species and two (2) commonly associated understory plants. Briefly explain how the distribution of these types and species correlate with environmental site factors or physical setting along the transect. Scientific or common names are acceptable.

END OF QUESTION

QUESTION IV- FOREST ECONOMICS

OBJECTIVE

To determine your knowledge of the concept of financial maturity as it pertains to harvesting of even-aged timber stands and selection harvesting.

QUESTION

40% 1a. Explain how financial maturity works when making decisions on the harvesting of EVEN-AGED timber stands.

20% 1b. Be explicit about the biological and economic information needed for determining financial maturity. List 5 valid information needs. (4 points each for any five of the 7 needs given below)

20% 2. Explain which factors, other than financial maturity, would be important in the "real world" situation of a timberland owner deriving income by selling stumpage from a 10,000 acre tract. (Do not consider the case of an owner who processes his own timber.)

20% 3. Explain how the concept of financial maturity, as discussed above, might be adapted to determine optimal lengths of cutting cycles and the levels of residual growing stock when timber stands are being harvested by a selection method. .

END OF QUESTION

QUESTION V- FOREST PROTECTION

OBJECTIVE

To determine your knowledge of forest root diseases and their management in western forest types.

QUESTIONS

- 15% 1. Root diseases can be caused by both biotic and abiotic factors. They are often thought of as detrimental features in the management of forest stands. However that assumption may not be always correct. Discuss three possibly **beneficial** aspects root diseases may have in the ecology of a forest.
- 15% 2. You can identify fungal-caused root diseases by observing the infected tree's symptoms and signs.
A. Give the common or scientific names of 3 fungal root diseases found in western US conifers.
B. What are the differences between symptoms and signs of root disease?
- 30% 3. For the 3 diseases you listed in question 2, **select 2** and briefly discuss the following:
A, What specie(s) of trees are commonly attacked by the disease?
B. Give two examples of symptoms **and** two examples of signs of any common root disease found on western conifer species.
C. What is the best indicator(s) of the presence of each disease?
- 40% 4. Discuss **four silvicultural methods or techniques** that have been used to control or manage root disease spread in western forests. Note that you are discussing methods for any of the root diseases caused by fungi or abiotic factors, not just one disease. A more complete answer will indicate what root disease you think is best managed by the method you are discussing and how the silvicultural method will help lessen or combat root disease.

END OF QUESTION

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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 determine your **analytical and planning** ability relating to road management and legacy logging road location in watercourse and lake protection zones.

SITUATION

You are faced with the alternative of whether to reconstruct a one-half mile segment of an existing road or to construct a new road upslope outside of the watercourse protection zone. This road will provide access for a logging operation in the near future and also provide access for continued, future timber operations.

The climate is temperate and can have storms that exceed 4 inches of precipitation within a 24-hour period in a 5-year return period.

The existing road was built in 1981 as a single lane spur with a nearly constant grade of 3% with insloped drainage using an inside ditch and culverts for cross-drains. It was built just outside the boundary of the watercourse protection zone prescribed at the time of construction.

This road has been blocked for the last 15 years by three sediment plugged cross-drains and resulting washouts. There is an additional washout where a tributary Class II stream crosses the one-half mile segment. (A new road would also, obviously, cross the tributary Class II stream upslope.) The road surface has become vegetated with native grass, forbs, and brush and is in a generally stable condition.

Slopes adjacent to the existing road range from 20 to 35 percent and increase to 40 percent or more within 100 feet upslope from the existing road surface. Soils in the area are 30 to 50 inch deep unconsolidated, coarse, non-cohesive soils developed from weathered granitic parent material.

QUESTIONS

- 30% 1. Discuss both the beneficial and detrimental aspects of each road alternative. Give at least 3 factors to be considered under both the good and the bad. Feel free to discuss additional aspects and solutions that you may need to consider in reaching a decision.
- 15% 2. Describe any site condition(s) requiring special care in design or mitigation.
- 25% 3. List and briefly describe five (5) measures that you would include in your plans to mitigate potential environmental problems. Indicate whether the mitigation applies to the new road, the use of the old road, or both.
- 30% 4. Identify and justify the road option you would select. State the assumptions that lead to a logical and defensible selection. (Economic justification alone is not adequate.)

END OF QUESTION

QUESTION VII-SILVICULTURE

OBJECTIVE:

To determine your knowledge of the silvicultural characteristics of young growth and old growth stands and their relationship to wildlife habitat.

SITUATION:

Consider two adjacent stands. Each covers several hundred acres over similar topography, aspect, and soils. You may **ASSUME** each stand is high timber growing site in **EITHER** coastal redwood, California northwest Douglas-fir, **OR** Sierra Nevada mixed-conifer vegetation types. Both stands border a class I watercourse.

Stand "A" is old-growth and has never been entered for harvesting or stand treatment. Stand "B" was indistinguishable from stand "A" until clearcut in 1920. Following harvesting, stand "B" was burned and rapidly regenerated by natural processes. Your predecessor has aggressively managed stand "B" as the company's "show-piece" example of even-aged, young growth sawtimber management. The history of this stand includes a sanitation salvage cut 30 years ago, a commercial thinning 20 years ago, and a combined biomass and commercial thinning 10 years ago. It is currently stocked at 80% of the normal yield table level, based on basal area, for its age.

- 50% 1. Briefly compare and contrast (one or two sentences only) the following current characteristics of old growth (OG) and young growth (YG) stands:
- A. Vegetation composition (in general terms, it is not necessary to use specific species names)
 - B. Stand age structure and diameter distribution
 - C. Stand structure
 - D. Net primary biomass productivity
 - E. Biomass distribution, on site, by canopy level
 - F. Forest floor composition
 - G. Macro pools and cycling for the following minerals: N, P, K, C
 - H. Current wood production
 - I. Future wood production
 - J. Standing wood volume and value

CONTINUED ON NEXT PAGE

2. You have been directed to prepare a THP for the OG stand. The company desires to recover as much timber value as possible. They have also agreed with CA Dept. of Fish and Game to maintain “suitable habitat” (per WHR analysis criteria) for all vertebrate species now existing in the OG stand. Before beginning to answer the following questions, clearly state the vegetation type, given in the introduction to this question, you are using here.
- 6% A. List 2 mammal, 2 amphibian, and 2 avian species (common names will suffice) most likely to inhabit the OG stand whose habitat may be at risk following a regeneration harvest (structural dependency is not implied).
- 10% B. List five special characteristics of OG stand structures that you may wish to maintain in order to retain habitat for wildlife species commonly associated with OG stands.
- 14% C. What silvicultural method would you recommend to meet the requirements given above? Explain and justify your choice.
- 20% 3. When it’s time to regenerate the YG stand, list and briefly discuss 10 measures might you take to allow the next rotation’s stand to supply some of the habitat needs of species commonly found in the OG stand?

END OF QUESTION

QUESTION VIII- FOREST ADMINISTRATION

OBJECTIVE

To determine your understanding of the application of watershed management principles and their application to forest management under the California Forest Practices Act.

QUESTION

- 30% 1. Placing Watercourse And Lake Protection Zones along watercourses, avoiding soil compaction and disturbance, and control of runoff are three key activities that are designed to protect beneficial uses of water. Explain how each activity is important for protecting the beneficial uses of water.
2. An increase in water temperature is one of the five cumulative **watershed effects** listed in the Forest Practice Rules as potentially resulting from timber harvesting and other activities.
- 12% a. List the other four cumulative watershed effects listed in the Forest Practice Rules.
- 40% b. For each watershed effect you listed, in Part 2a, discuss what types of pre-existing conditions that can exist that make the area particularly sensitive to timber harvesting. What control practices should the Registered Professional Forester consider to avoid or mitigate significant impacts?
- 18% 3. A downstream landowner is concerned that the timber harvest planned upslope will cause a decrease in summer low flows for his grazing pasture. You intend to prepare an informal letter of response. In outline form identify and briefly discuss the elements you would include in the letter which describe watershed processes relative to his site and respond to his concerns. You can assume a location with which you are familiar.

END OF QUESTION

QUESTION IX- FOREST POLICY

OBJECTIVE

To demonstrate your awareness of issues which can influence the balance of growth and harvest in sustained yield management decision-making situations.

SITUATION

As California RPFs, you are required to manage yours or a client's forestland by 14 CCR 913.11, 933.11 or 953.11 which states, "The goal of this section is to achieve Maximum Sustained Production of High Quality Timber Products (MSP)." For this question, assume that sustained yield is synonymous with sustained production and has a basic definition of "growth equals harvest". However, other factors and issues that may be classified as physical/biological and social can influence the actual level of sustained yield. These factors can tip the balance toward either the growth or harvest side of sustained yield with resulting changes in residual inventory. In the policy making process, consideration of these factors can also exert pressures that may tip the balance towards either the growth or harvest side of the sustained yield equation. In terms of sustained yield, you should be aware of the costs and benefits associated with timberland ownership. Regulatory policies may also ultimately affect the balance of growth and harvest.

QUESTION

40% 1. LIST five (5) issues that you believe are physical/biological and five (5) social issues that are pressures that can create an imbalance in the sustained yield equation. Briefly indicate why you consider each issue to be either a physical/biological or social issue.

60% 2. From your list select two social AND two physical/biological issues and discuss in more detail how they create pressure on the sustained yield equation, the costs and benefits (biological, social, financial etc.), and how you might adjust for that pressure over time.

END OF QUESTION

QUESTION X- FOREST MANAGEMENT

OBJECTIVE:

The management of a forest involves the understanding and integration of numerous terms and concepts. This question will evaluate your understanding and relationship of concepts integral to understanding the management of a forest for commercial wood production.

QUESTIONS:

- 25% 1. Define and briefly discuss the term, Forest Regulation, its meaning, application and relevance to today's forest management. (Note: The question refers to the term in regards to producing regular sustained yields of timber, not to rules and regulations such as found in Forest Practice Regulations).
- 25% 2. Define, compare and contrast Area Regulation and Volume Regulation. Also illustrate their operational differences when applied in practice (versus theory) to today's real-life forests.
- 25% 3. Explain the procedure and goals in converting an Unregulated natural or previously unmanaged forest into a Regulated, Normal Forest. Be sure to define terms and concepts used and point out where and why theory may depart from real-life circumstances in today's forest management.
- 25% 4. Define the terms Rotation and Cutting Cycle. Discuss how the definitions may apply to an All-aged forest versus an Even-aged forest.

END OF QUESTION

END OF EXAMINATION